Does SBA guaranteed lending increase economic growth in low-income areas? [*]

William E. Jackson III
Federal Reserve Bank of Atlanta

Ben R. Craig
Federal Reserve Bank of Cleveland

and

James B. Thomsom
Federal Reserve Bank of Cleveland

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[*] Ben Craig and James Thomson are economists in the research department at the Federal Reserve Bank of Cleveland. William E. Jackson III is a financial economist at the Federal Reserve Bank of Atlanta. The views expressed are those of the authors and not those of the Federal Reserve Banks of Atlanta or Cleveland, or the Board of Governors of the Federal Reserve System. We thank the Small Business Administration for providing us with the SBA loan-guarantee data and Pat Higgins for outstanding research support. This research was started while Jackson was an associate professor of finance at UNC-Chapel Hill. Jackson thanks the Ewing M. Kauffman Foundation for providing generous financial support for this study. Questions or comments on this paper should be directed to William E. Jackson III at william.jackson@atl.frb.org.

Abstract

In this paper we empirically test whether SBA guaranteed lending has a greater impact on economic growth in low-income markets. This hypothesis is predicated on priors related to four overlapping assumptions. These four assumptions are: (1) income levels proxy for relative development of the local financial market, (2) less developed financial markets are more likely to have more severe information asymmetry problems, and thus are more likely to be impeded by credit rationing problems (Stiglitz and Weiss, 1981), (3) SBA guaranteed lending is likely to reduce these credit rationing problems -- thus, improving the level of development of that local financial market, and (4) increased financial development helps to lubricate the wheels of economic growth (Rajan and Zingales, 1998).

Our results suggest that the positive impacted on economic growth of SBA guaranteed lending is significantly larger in low-income markets. This result has important implications for public policy in general and SBA guaranteed lending in particular.

The impact of SBA guaranteed lending on economic growth in low-income areas

1. Introduction

It is a well documented finding in the economics literature that economic growth and financial market development are positively correlated. However, whether relatively higher levels of financial development actually cause higher rates of economic growth, or higher rates of economic growth cause higher levels of financial development, is an issue of debate that dates at least to the studies Schumpeter (1911) and Robinson (1952).

Three important recent studies provide evidence that relatively higher levels of financial market development do indeed lead to higher rates of economic growth. Jayaratne and Strahan (1996), Rajan and Zingales (1998), and Guiso, Sapienza, and Zingales (2004), all report significant evidence supporting the proposition that the causal relationship runs from more financial market development to more economic growth. All of these papers are very careful to develop reasonable structural instruments to proxy for the relative amount of local financial market development.

In this paper, we investigate whether local financial market development helps to promote economic growth by focusing on a particular rationale for such a relationship. That rationale is financial market development may increase the amount of external finance available to small firms. Specifically, we examine whether a government intervention aimed at increasing small firms' access to bank credit has a relatively greater impact in low-income areas. We exploit the fact that there is a strong positive correlation between low-income markets and markets with relatively low levels of financial development. And, we use SBA guaranteed lending as our government invention

method. We choose the small firm credit market because of the high degree of information asymmetry that may be associated with it. And, because this information asymmetry may lead to a credit rationing problem as explained in Stiglitz and Weiss (1981).

We choose the SBA guaranteed lending program because our previous research (Craig, Jackson, and Thomson, 2006) suggests that SBA guaranteed lending has a small positive influence on the rate of economic growth in local geographic markets. Our previous research used MSAs and non-MSA counties to represent local geographic financial markets. However, Craig, Jackson, and Thomson (2006) did not investigate whether this positive relationship between SBA guaranteed lending and economic growth was different for low-income markets.

Therefore, in this paper, our null hypothesis is that SBA guaranteed lending does not impact low-income markets differently than other markets. And, our primary alternative hypothesis is that SBA guaranteed lending has a greater impact on economic growth in low-income markets. This alternative hypothesis is predicated on priors related to four overlapping assumptions. These four assumptions are: (1) income levels proxy for relative development of the local financial market, (2) less developed financial markets are more likely to experience severe information asymmetry problems, and as Stiglitz and Weiss (1981) point out, that could lead to credit rationing, (3) SBA guaranteed lending is likely to reduce these credit rationing problems -- thus, improving the level of development of that local financial market, and (4) increased financial development helps to lubricate the wheels of economic growth (Rajan and Zingales, 1998).

Our results suggest that low-income markets are positively impacted by SBA guaranteed lending. Moreover, the impact for low-income markets is significantly larger than other markets. This result has important implications for public policy in general and SBA guaranteed lending in particular.

The remainder of this paper is organized as follows. In section 2 we provide some background on small business credit markets and economic growth. In section 3 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 firm credit market and hence provides a rationale for SBA loan guarantees. An overview of SBA lending programs is presented in section 4. Section 5 outlines the data, our hypotheses and empirical strategy. The results appear in section 6. Finally, our conclusions and future research questions are outlined in section 7.

2. Background on small business credit markets and economic growth

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. 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 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 250,000 loans is worth more than $60 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 informational 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 guaranteed lending activities and economic growth. And, this is what we found in Craig, Jackson, and Thomson (2006). In particular, we found a positive (although small) and significant relationship between the level of SBA lending in a local market and future per capita income growth in that market. Overall, our empirical results were consistent with a positive social welfare impact of SBA guaranteed lending.

In this paper we use a simplified version of the analysis in Craig, Jackson, and Thomson (2006) to evaluate a potential determinant of economic growth in low-income communities. Specifically, we test whether SBA guaranteed lending to small firms has a relatively greater impact on economic growth in low-income local markets. We find that it does.

In the next section, we provide a brief discussion of the economics of small firm credit markets. This discussion focuses on a highly select group of theoretical and empirical articles that help explain the severe credit allocation problems caused by imperfect information in small firm credit markets. These articles also provide insight into the mechanism that allow a government intervention, such as the SBA guaranteed lending program, to result in higher economic growth in low-income markets.

3. The economics of small firm 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 loans. 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 for an additional increase in the interest rate; and, beyond a certain point may actually decrease as the interest rate is increased. 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.

Stiglitz and Weiss (1981) argue that when borrowers are distinguishable, the lender may decide to deny credit to an entire group. This is their classic redlining argument. We expect the likelihood of this type of credit rationing to be higher in low-

income communities. Furthermore, because the value of collecting information on borrowers may be less in low-income markets [because of expectations of less aggregate per capita lending], the levels of imperfect information may be higher, in equilibrium, in low-income markets.

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. In our empirical analysis, we use the notion from Kane and Malkiel (1965) that differences in the relative size of the bank deposit base across markets may provide an indicator of the relative degree of credit rationing in that local market.

Petersen and Rajan (1994) extended the theory 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.

4. 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.[†]

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 guarantees reduce the rate of interest at which banks are willing to lend, external loan guarantees will help mitigate the moral hazard problem. This is 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. Additionally, 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 also help mitigate the adverse selection problem. Thus, in theory, SBA loan guarantees should reduce the probability that a viable small business is credit rationed.

[†] 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.

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 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 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.[‡] 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.

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

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 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).

5. The hypotheses, data, and empirical strategy

One method likely to reduce the costs of asymmetric information based credit rationing is to reduce the amount of asymmetric information in these credit markets [especially for firms in low income areas]. One very practical method for doing this is to encourage lenders to make [profitable] loans that they would not otherwise make. And, in so doing the lender develops a "relationship" with the borrower. This relationship

allows for the collection of borrower-specific information at a relatively low cost through basic monitoring of the loan. This reduces future levels of asymmetric information and reduces credit rationing by fostering a relationship between the low-income area small business and the lending entity.

It also encourages the lender to "learn" more about the low-income area in general and increases the likelihood of the lending bank making additional loans in that area. This is the [positive] information externality effect discussed in Lang and Nakamura (1993). SBA guaranteed lending may increase the level of local bank credit available to small firms in low-income markets by decreasing the amount of firm specific asymmetric information in the local financial market and by increasing the positive information externality associated with learning about the low-income area.

Thus, 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.[§]

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,

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

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 a socially suboptimal credit allocation that negatively impacts economic growth. To the extent that SBA guaranteed lending programs mitigate credit market frictions, there should be a positive relationship between SBA guaranteed lending and economic growth and development, especially in less developed [low-income] financial markets. Therefore, we test for whether SBA loan guarantees lessen credit market frictions by testing for whether measures of SBA guaranteed lending are related to relatively more economic growth in low-income areas. Our null hypothesis is that SBA guaranteed lending has no discernible difference in impact on economic growth in low-income markets relative to non-low-income markets.

Data

To examine this SBA guaranteed lending and economic growth in low income areas 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 individual loan data are aggregated to the local market level. For this study, we also aggregate over time to produce cross-sectional observations for our local markets. 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.

Why We Use MSAs and Non-MSA-Counties to Define our Geographic Markets

To analyze the impact of SBA guaranteed lending on economic growth; we must define the unit of observation for our empirical models. In general, because the relationship we wish to investigate is a market level phenomenon for credit markets, we must consider an appropriate geographic approximation for a credit (or banking) market. We desire a measure that reasonably represents an economic market for our cross-sectional analysis. By its nature, an economic market should include the spatial clusters or geographic areas where the economic agent works, shops, and in general lives. For our research, we consider MSAs and non-MSA counties to be the most appropriate geographic proxy for a banking market. There are at least three reasons that support our use of MSA and non-MSA counties to represent banking markets.

The first reason is the extant literature. For example, studies by Rhoades (1982), Berger and Hannon (1989), Calem and Carlino (1991), Jackson (1992, 1996), Shaffer (1994, 2004), Berger (1995), and Dick (2005), and others use MSAs and/or non-MSA counties as the proxy for geographically distinct banking markets.

The second reason is that banking regulators use it. The Federal Reserve Board and each of the twelve Federal Reserve Banks use geographic proxies for banking markets that are based, to a large degree, on MSAs and non-MSA counties. The Office of the Comptroller of the Currency, the Office of Thrift Supervision, and the Federal Deposit Insurance Corporation do likewise. Thus, reporting requirements for banks are often based on this geographic banking market proxy.

The third reason is that practitioners very often use MSA and non-MSA counties as a measure of the relevant banking market. For example, bankers often compare their performance by their proportion of deposits, relative to competitors, in a certain MSA or county.

We considered census tracts, but determined that they may be too small. This is because it may not be unusual for an economic agent to reside in one census tract, work in another census tract, and shop extensively [if not exclusively] in yet other census tracts. We also considered states, but considered that definition to be too large. Especially in light of the results from Peterson and Rajan (2002), which suggest that most small firms borrow from banks within a few miles of their headquarters.
For these reasons we believe the MSA and non-MSA county are the appropriate definitions to use for a local geographic in this study.

In summary, 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. Our data set consists of over 2300 cross-

sectional local market observations, each representing annual data averaged over 11 years (1991 through 2001).

Empirical Strategy

To test our null hypothesis we simplify the analysis of Craig, Jackson, and Thomson (2006). These authors estimate their models using classic Arellano and Bond panel regression estimation techniques. In this study, we estimate a simple cross-sectional OLS fixed effects regression model that incorporates measures of the income growth over our sample period. Our basic model is:

$$PIGROWTH_i = \alpha_0 + \alpha_1 EMPR_i + \alpha_2 PICAP_i + \alpha_3 HERF_i + \alpha_4 MSADUM_i + \alpha_5 DEPPOP_i + \alpha_6 SBAPOP_i + \alpha_7 SBADEP_i + \varepsilon_i \quad (1)$$

Equation (1) uses average annual growth in [nominal] per capita income over our sample period (*PIGROWTH*) at the local market level to proxy for economic performance. We are interested in how SBA guaranteed lending affects cross-sectional changes in *PIGROWTH*. The primary variables of interest on the right side of Equation (1) are *SBAPOP* (the total dollar amount of SBA-guaranteed loans scaled by population in the local) and *SBADEP*. The variable *SBADEP* is equal to *DEPPOP* times *SBAPOP*. It is a measure of the cross-partial derivative, or interaction term, for the impact on *PIGROWTH* of higher (or lower) amounts of SBA guaranteed lending at higher (or lower) levels of deposits per capita in a local market [*DEPPOP*]. This is our main variable of interest. A negative coefficient on *SBADEP* would imply that the impact of *SBAPOP* is less at higher levels of *DEPPOP*. Or, stated differently, SBA guaranteed lending has less [more] impact in high [low] income local markets.

It is also important to consider the impact of *DEPPOP* on *PIGROWTH*. *DEPPOP* is our measure of financial development, and a proxy for local market income level, as cross-sectional per capita income and per capita deposits are significantly positively correlated. Of course, we also use per capita income as a direct measure of local market income levels. This will be discussed in our results section.

Notice that we use a measure of total deposits [*DEPPOP*] instead of a measure of total credit in the local market. We do this for two reasons. First, 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). Second, King and Levine (1993a) suggest that the local market deposit base is one of several reasonable measures market liquidity and financial development.

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. We also include the employment rate (*EMPR*) for the market to control for local employment conditions. The definitions of the variables used in the empirical analysis are provided in Exhibit 1.

6. The empirical results

Equation (1) is estimated using a simple OLS fixed effects method. Descriptive statistics for the variables used in the regression can be found in table 1, and a correlation coefficients matrix in table 2. Our regression estimation results are presented in table 3. Notice from table 1 that our primary variables of interest display large dispersions. EMPR, our employment rate percentage, ranges from 98.67 percent to a low of 68.06 percent, with a mean of 93.67 percent. Our per capita income variable (PICAP) has a mean of $18,100 with a high of $42,470 and a low of $7,750 and a standard deviation of $3,640. Note that per capita income growth (PIGROWTH) has a positive mean (4.02 percent), and that it ranges from a low of -19.12 percent to a high of 8.89 percent. However, even with this rather huge range the standard deviation for PIGROWTH is a modest 1.20 percent.

Our measure of financial development, local market deposits per capita (DEPPOP), displays a very wide range also. The high for DEPPOP is $124,460 deposits per capita and the low is only $160 worth of deposits per capita. A similar story can be told for our measure of SBA guaranteed lending activity. Per capita SBA guaranteed lending (SBAPOP) ranges from a high of $486.93 per capita to a low of $0.00 per capita, with a mean of $32.87 per capita over our sample period.

In table 2 we present a correlation matrix for our main variables. There are several correlation coefficients in table 2 worth mentioning. For example, notice that local market per capital income growth (PIGROWTH) is significantly positively correlated with the local market employment rate (EMPR), local market per capital income (PICAP), per capita deposits (DEPPOP), and SBA guaranteed lending per capita

(SBAPOP). However, the correlation coefficients for each of these relationships are rather small.

The correlation coefficients for our independent variables suggest that multicollinearity may be a concern for local market per capita income (PICAP) and EMPR and for PICAP and MSADUM. These concerns about multicollinearity are evaluated using a variance-inflation-factor (VIF) method.

In table 3 we present the main results for our study. Table 3 provides in column two (Model 1) the results of an OLS fixed effects estimation of Equation (1). The fixed effects class variable is the state in which the local market is located. Focusing on individual states as our fixed effect allows us to control for variations in state specific factors associated with systematic per income growth of local markets within the same state. Examples of these state specific factors are levels of educational attainment and other human capital measures, technological endowment and advancement, and state level public policies designed to influence economic growth.

The results in table 3 [Model 1] suggest that the local market employment (EMPR) has a positive and significant impact on per capita income growth in that local market (PIGROWTH). Per capita income level also has a positive and significant impact on PIGROWTH. Local market deposit concentration (HERF) has a negative and significant impact on PIGROWTH.

Our measure of financial development (DEPPOP) also has a positive and significant impact on PIGROWTH. Recall that DEPPOP is per capita bank deposits in the local market. To some extent this is a measure of cross-sectional local market liquidity levels. A similar measure of liquidity was used by King and Levine (1993a,

1993b) to proxy for the level of financial development across countries. However, the issue of endogeneity remains a concern for this variable. For it could be argued that higher levels of per capita income growth causes higher levels of per capita bank deposits as forcefully as it can be argued that higher levels of per capita bank deposits causes higher per capita income growth. This issue of endogeneity is not central to our analysis as we are more concerned with the impact of the interaction of SBAPOP and DEPPOP on PIGROWTH rather than the causal linkages between PIGROWTH and DEPPOP or between PIGROWTH and SBAPOP.

Notice that SBAPOP also has a positive and significant impact on per capita income growth. But, the impact appears to be economically small. For example, if you increased per capita SBA guaranteed lending in a local market by three standard deviations (approximately $100) the predicted result is an increase in per capita income growth of 0.4 percentage points. Of course, the outcome of this example would change to about 1.5 percentage points [in low-income markets] if we use Model 3 in table 3, and would be only 0.2 percentage points if we use Model 2.

Our major variables of interest in table 3 are SBADEP, MSASBA, and SBALOW. These are all interactive variables that represent the impact on PIGROWTH of increasing SBAPOP as the level of local market financial development increases.

SBADEP is SBAPOP times DEPPOP. Notice that SBADEP has a negative and significant coefficient associated with it. This suggests that at higher levels of financial development (DEPPOP), per capita SBA guaranteed lending has a lower impact on PIGROWTH than it does at lower levels of financial market development. Given that our measure of financial market development is positively correlated with per capita

income levels, it is likely to be the case that at higher levels of per capita income SBA guaranteed lending will have less of an impact on per capita income growth. Or, stated differently, at lower levels of local market per capita income SBA guaranteed lending will have a larger impact on per capita income growth.

This proposition is tested more directly in Model 3. The interaction variable (SBALOW) in Model 3 in table 3 is equal to a dummy variable times local market per capita SBA guaranteed lending (SBAPOP). The dummy variable is equal to one [zero otherwise] if the local market per capita income level (PICAP) is less than 80 percent of the average PICAP in our sample. Notice that the coefficient for SBALOW is positive and statistically significant. Also notice that for this specification the coefficient for SBAPOP is insignificant. This suggests a large decline in the impact of SBAPOP on PIGROWTH at higher levels of PICAP.

Overall, the results from table 3 suggest that per capita SBA guaranteed lending is significantly positively correlated with local market growth in per capita income. And, the impact of SBA guaranteed lending on per capita income growth is greater in low-income markets relative to non-low-income markets.

Endogeneity and robustness checks

Endogeneity has almost always been a concern in empirical studies where measures of financial development were used to explain economic growth. And, we recognize that concern here. However, over the years our understanding of the connection between economic growth and financial develop has matured. And, as reported by Levine (1997), even most skeptics would recognize that the preponderance of theoretical models and empirical evidence suggests a positive relationship between

financial development and economic growth. Levine (1997) goes further and states that "[t]here is even evidence that the level of financial development is a good predictor of future rates of economic growth, capital accumulation, and technological change. Moreover, cross country, case study, industry- and firm-level analyses document extensive periods when financial development – or the lack thereof – crucially affects the speed and pattern of economic development."

A more recent study, that is close in spirit to our study, by Guiso, Sapienza, and Zingales (2004), reaches a similar conclusion about the direction of causality between economic growth and financial development. Using survey data on household income and wealth in Italy, plus firm specific and province level data, Guiso, Sapienza, and Zingales (2004) study the effects of differences in local market (provinces) financial development within an integrated financial market (Italy). They find that financial development enhances the likelihood that an individual starts his or her own business, increases competition, and encourages economic growth. They also find that these effects are weaker for larger firms. Given that larger firms usually have better access to funds outside the local market, this finding is consistent with intermediation theory and the motivation for our current study. Overall, the findings reported in Guiso, Sapienza, and Zingales (2004), suggest local market financial development is an important contributing factor to local market economic growth even in a well integrated national financial environment.

Support for financial market development *causing* economic growth can also be found in recent studies by Jayaratne and Strahan (1996) and Rajan and Zingales (1998). Jayaratne and Strahan (1996) study the relaxation of bank branching restrictions in the

U.S. over the 1972-1992 time period. They find that the rates of real per capita income growth increase significantly following intrastate bank branching reform. They provide persuasive arguments that these observed increases in income growth rates are caused by changes in the banking system, or more generally, local financial market development.

In Rajan and Zingales (1998), another important paper, they use a novel approach in examining the issue of whether financial development helps to facilitate economic growth. They assume that financial development reduces the costs to firms of externally acquired capital. Then they conjecture that industrial sectors that need relatively more external financial capital will grow more rapidly (and be relatively larger) in countries with more highly developed financial markets. Using a large sample of countries over the 1980s timeframe, they find strong support for their conjecture. And, very importantly, they demonstrate that their results are unlikely to be driven by reverse causality, omitted variables or outliers; common criticisms of empirical results suggesting financial development may have a positive and significant impact on economic growth.

Even with the evidence from the extant literature mentioned above, endogeneity remains a concern for our model. This is because our policy variables are unlikely to be completely exogenous, at least contemporaneously. Our policy variables may be influenced by local characteristics that are also associated with per capita income growth. To address this endogeneity problem, we estimate Equation (1) using our panel data. In this estimation 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 were 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. The results [not reported in this paper] use an instrument set that includes contemporaneous to the right hand side variable 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.

Robustness Checks

Several other robustness checks were performed for Equation (1). In particular, we estimated Equation (1) separately for MSAs and non-MSA counties, using disaggregated guaranteed lending variables for the 7(a) and 504 lending programs, and using variables for the percentage of guaranteed lending going to manufacturers, the proportion of total lending covered by the guarantee, and a dummy variable equal to one if that local market received no SBA guaranteed loans. Additionally, we estimated Equation (1) using a stacked regression (OLS) approach with our panel data.

All of these robustness checks yielded results qualitatively consistent with those reported in table 3. Additionally, because of the potential for multicollinearity in our regressors in Equation (1), we conducted a variance-inflation-factor (VIF) analysis. Our

VIF results suggest that multicollinearity was not a problem for the results reported in table 3. Going forward several other robustness checks will be performed. For example, in the next iteration of this paper we plan to use real instead of nominal dollar amounts in our analyses. We will also correct the standard errors in our regressions for possible heteroskedasticity.

7. Conclusions and extensions to our analysis

SBA guaranteed lending programs are one of many government sponsored market interventions aimed at promoting small business. The rationale for these guarantees is often based on the argument that credit market imperfections can result in small enterprises being credit rationed—particularly those in low-income areas. If SBA loan guarantees indeed reduce credit rationing in low-income markets for small business loans, then there should be a relationship between measures of SBA guaranteed lending activities and economic growth, and this relationship should be more evident in low-income markets.

We find evidence consistent with this proposition in this study. In particular, we find a positive (although small) and significant impact on per capita income growth in a local market related to the level of SBA guaranteed lending in that local market. And, this impact is relatively larger in low-income markets. Indeed, one interpretation of our results is that this impact is positive and significant *only in low-income markets*.

However, all of our results should be interpreted with caution for at least two 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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Exhibit 1: Variable Definitions

Variable	Definition	Source
PIGROWTH	Average annual growth in per capita income in the local market over the sample period	
EMPR	Average employment percentage rate in the local market over the sample period	BLS
SBAPOP	Average per capita amount of new SBA Guaranteed Lending in the local market over the sample period	SBA, BLS
HERF	Average deposit market herfindahl over the sample period	FDIC SUMD
PICAP	Average per capita income in the local market over our sample period	BEA
MSADUM	Dummy variable equal to one if local market is an MSA, zero otherwise	BEA
DEPPOP	Average annual per capita bank deposits in the local market over the sample period	FDIC SUMD
SBADEP	Interactive variable equal to SBAPOP times DEPPOP	

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 1. Descriptive Statistics (N=2358)

Variable	Mean	Min	Max	Std Dev
EMPR	93.67	68.06	98.67	3.00
HERF	0.53	0.03	1.00	0.28
PICAP ($000)	18.10	7.75	42.47	3.64
MSADUM	0.13	0	1.00	0.34
PIGROWTH	4.02	-19.12	8.89	1.20
DEPPOP	9.64	0.16	124.46	7.12
SBAPOP	32.87	0.00	486.93	33.92

Notes: PIGROWTH is the average annual percentage growth in per capita income in market *i* over the sample period [1991-2002]. EMPR is the average annual employment rate in percentage points over the sample period. HERF is the average Herfindahl ratio, calibrated to be between zero and one, in market *i* over the sample period. PICAP is average per capita income in local market *i* over our sample period. MSADUM is an indicator variable equal to one [zero otherwise] if market *i* is a MSA (metropolitan statistical area). DEPPOP is the average annual per capita bank deposits in market *i*. SBAPOP is the average annual amount of (new) SBA guaranteed lending in market *i* over our sample period. SBAPOP is calibrated in dollars in per capita, and DEPPOP is calibrated in thousands of dollars per capita.

Table 2. Pearson Correlation Coefficients Matrix
(N=2358)

	PIGROWTH	EMPR	PICAP	HERF	MSADUM	DEPPOP	SBAPOP
PIGROWTH	---						
EMPR	0.11 (0.00)	---					
PICAP	0.03 (0.09)	0.44 (0.00)	---				
HERF	-0.10 (0.00)	-0.18 (0.00)	-0.31 (0.00)	---			
MSADUM	-0.06 (0.00)	0.08 (0.00)	0.43 (0.00)	-0.31 (0.00)	---		
DEPPOP	0.08 (0.00)	0.27 (0.00)	0.28 (0.00)	-0.23 (0.00)	0.04 (0.07)	---	
SBAPOP	0.05 (0.02)	0.18 (0.00)	0.21 (0.00)	-0.01 (0.67)	0.02 (0.32)	0.08 (0.00)	---

Notes: P-values are in parentheses. PIGROWTH is the average annual percentage growth in per capita income in market *i* over the sample period [1991-2002]. EMPR is the average annual employment rate in percentage points over the sample period. HERF is the average Herfindahl ratio, calibrated to be between zero and one, in market *i* over the sample period. PICAP is average per capita income in local market *i* over our sample period. MSADUM is an indicator variable equal to one [zero otherwise] if market *i* is a MSA (metropolitan statistical area). DEPPOP is the average annual per capita bank deposits in market *i*. SBAPOP is the average annual amount of (new) SBA guaranteed lending in market *i* over our sample period. And, SBADEP is an interaction variable equal to SBAPOP times DEPPOP. SBAPOP is calibrated in dollars in per capita, and DEPPOP is calibrated in thousands of dollars per capita.

Table 3. OLS Fixed Effects Regression Estimation of Equation (1)

This table provides parameter estimates for Equation (1): $PIGROWTH_i = \alpha_0 + \alpha_1 EMPR_i + \alpha_2 PICAP_i + \alpha_3 HERF_i + \alpha_4 MSADUM_i + \alpha_5 DEPPOP_i + \alpha_6 SBAPOP_i + \alpha_7 SBADEP_i + \varepsilon_i$ PIGROWTH is the average annual percentage growth in per capita income in market *i* over the sample period [1991-2002]. EMPR is the average annual employment rate in percentage points over the sample period. HERF is the average Herfindahl ratio, calibrated to be between zero and one, in market *i* over the sample period. PICAP is average per capita income in local market *i* over our sample period. MSADUM is an indicator variable equal to one [zero otherwise] if market *i* is a MSA (metropolitan statistical area). DEPPOP is the average annual per capita bank deposits in market *i*. SBAPOP is the average annual amount of (new) SBA guaranteed lending in market *i* over our sample period. And, SBADEP is an interaction variable equal to SBAPOP times DEPPOP. SBAPOP is calibrated in dollars in per capita, and DEPPOP is calibrated in thousands of dollars per capita. This table also provides three variations of Equation (1). In the first variation (Model 2), the variable MSASBA is substituted for SBADEP. MSASBA is equal to MSADUM times SBAPOP. In the second variation (Model 3), the variable SBALOW is substituted for SBADEP. SBALOW is equal to SBAPOP times a dummy variable. That dummy variable is equal to one [zero otherwise] if the per capita income in the local market is less than 80 percent of the average per capita income across all markets in our sample. T-statistics are in parentheses. "*" indicates significant at the 1% level. "**"indicates significant at the 5% level. "***"indicates significant at the 10% level.

Parameter Estimates and T-statistics			
Variable	**Model 1**	**Model 2**	**Model 3**
Intercept	2.40 (10.86)*	2.34 (10.83)*	2.94 (11.35)
EMPR	0.01 (6.08)*	0.01 (6.15)*	0.02 (6.58)*
PICAP	0.02 (3.55)*	0.02 (3.52)*	0.014 (1.27)
HERF	-0.40 (-5.54)*	-0.39 (-5.41)*	-0.35 (-5.07)*
MSADUM	-0.16 (-3.76)*	-0.38 (-2.21)**	-0.13 (-0.89)
DEPPOP	0.013 (1.98)**	0.003 (1.81)***	0.02 (3.03)*
SBAPOP	0.004 (2.32)**	0.002 (2.13)**	0.003 (1.17)
SBADEP	-0.0003 (-2.49)**	----	----
MSASBA	----	-0.006	----
SBALOW	----	----	0.012 (4.61)*
Adj – R^2	0.108	0.101	0.147
F-statistic	17.01*	16.67*	20.04*

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