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Small Firm Credit Market Discrimination, SBA-Guaranteed Lending, and Local Market Economic Performance

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We empirically test whether SBA-guaranteed lending has a greater impact on economic performance in markets with a high percentage of potential minority small businesses. This hypothesis is predicated on priors related to three overlapping assumptions. These three assumptions are: (1) The classic type of credit rationing developed in the seminal paper by Stiglitz and Weiss (1981) is more likely to occur in markets with a higher per capita percentage of minority small businesses because such markets are more likely to have more severe information asymmetry problems, (2) SBA-guaranteed lending is likely to reduce these credit rationing problems—thus improving the level of development of the local financial market, and (3) increased local financial market development helps to lubricate the wheels of economic performance (Rajan and Zingales, 1998). Using local labor market employment rates as our measure of economic performance, we find evidence consistent with this proposition. In particular, we find a positive and significant impact on the average annual level of employment in a local market of SBA-guaranteed lending in that local market. This impact is 200 percent larger in markets with a high percentage of potential minority small businesses. This result has important implications for public policy in general and SBA-guaranteed lending in particular.

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Small firm credit market discrimination, SBA guaranteed lending, and local market economic performance

1. Introduction

Minority entrepreneurs report that access to adequate capital is a major problem much more often than their majority counterparts. For example, in a recent study, Blanchflower, Levine, and Zimmerman (2003) report that Black small business owners are three times as likely as White small business owners to list access to sufficient capital at reasonable rates as a major problem faced by their firm.

This reported disparity in access to capital between minority and majority small business owners may stem from one or two possible sources [or some combination of these sources]. Either minority small business owners do not offer to capital providers as many positive net present value (NPV) projects, on average, as majority small business owners. Or, minority small business owners are subject to certain constrains on the flow of capital to their operations that majority small business owners do not encounter.

The former is simply a perception of capital access disparities. However, the latter represents real economic effects that serve to distort capital markets and reduces the efficiency of our overall financial system. Most of the extant literature points to this latter description as painting the more accurate picture of the current market conditions faced by minority owners of small firms. For example Cavalluzzo, Cavalluzzo, and Wolken (2002) report that minority-owned small businesses are not significantly less profitable than majority owned small businesses. Thus, the hypothesis that minority small business owners on average have fewer NPV projects is not supported by the data.

What then are the likely sources of capital access constraints on minority small businesses? The extant literature usually points to discrimination as the likely culprit. For example, Blanchflower, Levine, and Zimmerman (2003) conclude that their analysis (which considers a very rich set of explanatory variables) strongly points to severe levels of discrimination in small business credit markets.

There are at least two reasons why discrimination against minority-owned firms might be observed in small business credit markets. The first is simply prejudicial behavior [Becker (1971) type discrimination]. The second is related to differential levels of asymmetric information and credit rationing. If minority-owned firms are more likely to be credit rationed because of relatively larger asymmetric information problems, then it is possible to observe capital allocation outcomes in the small firm credit market that coincide with outcomes based on prejudicial discriminatory behavior. However, if the source of the disparity is credit rationing, then this type of behavior is more accurately described as statistical discrimination and does not carry the nefarious connotations associated with prejudicial discrimination. Nevertheless, it is still discrimination and more importantly, it places a real cost on our economic system.

One method likely to reduce these costs of asymmetric information based discrimination is to reduce the amount of asymmetric information in these credit markets [especially for minority-owned firms]. 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 observed statistical discrimination by fostering a relationship between the minority-owned small business and the lending entity.

One program designed to ameliorate the asymmetric information problem in small business credit markets is the SBA guaranteed lending program. There is some evidence that this program helps to reduce credit rationing problems in small firm credit markets [Craig, Jackson, and Thomson, 2006]. Because the financial contracting problems that lead to credit rationing are basically the same types of problems that lead to statistical discrimination, it is reasonable to investigate whether a government intervention that reduces credit rationing also reduces observed disparate treatment or observed discrimination.

Thus, the primary research question addressed in this paper is: Does SBA guaranteed lending lessen the negative impacts of discrimination on minority entrepreneurs and their communities? The remainder of this paper is organized as follows. In section 2 we provide some background on economic performance and financial market development. In section 3 we present a discussion of public policy and small business credit markets. In section 4 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 5. Section 6 outlines the data, our hypotheses and empirical strategy. The results appear in section 7. Finally, our conclusions and future research questions are outlined in section 8.

2. Background on economic performance and financial market development

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

Three important recent studies provide evidence that relatively higher levels of financial market development do indeed tend to lead to higher levels of one measure of economic performance. That is, 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 performance 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 minority-owned small firms. Specifically, we examine whether a government intervention aimed at increasing small firms' access to bank credit has a relatively greater impact in high-minority areas. We use SBA guaranteed lending as our government invention method. We choose the [minority-owned] 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). This may be especially important in high-minority areas where the per capita number of minority-owned small businesses is likely to be higher.

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 a positive relationship between SBA guaranteed lending and other measures of economic performance existed. Nor did we investigate whether these relationships were different for areas with a relatively high proportion of minorities in the local market. We refer to these markets as high-minority markets. And, we use the level of labor market employment, or the employment rate, as our measure of economic performance. Thus, we test whether SBA guaranteed lending has a differential impact for high-minority markets.

In this paper, our null hypothesis is that SBA guaranteed lending does not impact high-minority markets differently than low minority markets. And, our primary alternative hypothesis is that SBA guaranteed lending has a greater impact on the employment rate in high-minority markets. This alternative hypothesis is predicated on priors related to three assumptions. First, 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. Second, SBA guaranteed lending is

likely to reduce these credit rationing problems. This will improve the level of development of that local financial market. And, third, this increased financial market development will help to lubricate the wheels of economic performance [especially in high-minority markets] and increase the effective level of labor utilization, or the employment rate (Rajan and Zingales, 1998).

Our results suggest that high-minority markets are positively impacted by SBA guaranteed lending. Moreover, the impact for high-minority markets is three times as large as it is for low minority markets. This result has important implications for public policy in general and SBA guaranteed lending in particular.

3. Public policy and small business credit markets

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. This rationale may be even stronger when applied to high-minority markets.

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 business loan portfolio of roughly 240,000 loans was worth about $60 billion in 2004, making it the largest single financial backer of small businesses in the United States. To place this amount in perspective, consider that in June 2004 commercial banks reported a total of about $522 billion dollars of small business loans outstanding (SBA, 2005). Thus, SBA guaranteed loans represented over 10% of total commercial bank small business loans outstanding at that time. And, commercial banks provide the majority of small business credit supplied in the USA.

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 performance. 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 impact on social welfare 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 performance in high-minority communities. Specifically, we test whether SBA guaranteed lending to small firms has a relatively greater impact on the average level of labor employment in high-minority 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 performance in high-minority markets.

4. 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 allocate 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 high-minority communities. Furthermore, because the value of collecting information on borrowers may be less in high-minority markets [because of expectations of less

aggregate per capita lending], the levels of imperfect information may be higher, in equilibrium, in high-minority 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.

5. 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 minority-owned 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.

[†] 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.

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.[‡] The following year, the SBA began making direct loans and guaranteeing bank loans to small businesses. Congress also assigned to the SBA the function of making loans to victims of natural disasters. This was a continuation of one of the functions of the Reconstruction Finance Corporation, an organization dissolved by Congress when it created the SBA. Congress also directed the SBA to continue some of the functions of the dissolved Small Defense Plants Administration. These functions included working to get help small businesses procure government contracts; helping small business owners with managerial and technical assistance; and assisting small businesses develop employee training programs.

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 act that created the SBA is Public Law 163.

the early 1970s. 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 (SBA, 2006).

The 7(a) loan program is the more basic and more significant of these two programs. The name of the program originates from the section of the Small Business Act which authorizes the agency to provide business loans to American small businesses [Section 7(a)].

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. Currently, and the maximum guaranty is $1,500,000 and the maximum loan amount under the 7(a) program is $2,000,000. Thus, the maximum guaranty is 75 percent of the maximum loan amount (SBA, 2006).

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 (SBA, 2006).

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, 2006).

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 (see SBA, 2006 for more on the 504 program).

6. 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 high-minority 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 high-minority area small business and the lending entity.

It also encourages the lender to "learn" more about the high-minority 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 high-minority 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 high-minority area.

Our empirical research focuses on SBA guaranteed lending because this is where the empirical evidence is likely to be strongest concerning the impact of government intervention in small firm credit markets. This conclusion is based on two observations. First, SBA guaranteed lending programs encompass all types of small business lenders, from community banks and thrifts to bigger banks. And, second, 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 the labor employment rate in the local market. [The implicit assumption here is that labor and capital are complements for small firms.] To the extent that SBA guaranteed lending programs mitigate credit market frictions, there should be a positive relationship between SBA guaranteed lending and the level of employment, especially across less developed [e.g., high-minority] financial markets. Therefore, we test for whether SBA loan guarantees lessen credit market frictions by testing whether a measure of the normalized amount of SBA guaranteed lending in a local market is correlated with relatively higher levels of employment in high-minority areas. Our null hypothesis is that there are no discernible

differences in the impact of SBA guaranteed lending on employment rates in high-minority markets relative to higher income markets.

Data

To examine this SBA guaranteed lending and employment rates in high-minority 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 1999. In 2000 the Census Bureau reclassified their racial categories. Because of this change we do not include data after 1999. A breakdown of loan size, total credit and number of loans reveals that we have over 300,000 loans in our sample. The average size of these loans was about $225,000, suggesting that about $68 billion of credit was extended over our sample period.

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. As in studies by Berger and Hannon (1989), Calem and Carlino (1991), Jackson (1992a, 1992b), Shaffer (1994, 2004), and Berger (1995), 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.

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 employment levels over our sample period. Our basic model is:

$$EMPR_i = \alpha_0 + \alpha_1 PICAP_i + \alpha_2 HERF_i + \alpha_3 MSADUM_i + \alpha_4 DEPPOP_i$$

$$+ \alpha_5 SBAPOP_i + \alpha_6 SBADEP_i + \varepsilon_i \qquad (1)$$

Equation (1) uses the average annual employment rate over our sample period (*EMPR*) at the local market level to proxy for economic performance. We are interested in how SBA guaranteed lending affects cross-sectional changes in *EMPR*. The primary variables of interest on the right side of Equation (1) are *DEPPOP* (the inflation-adjusted deposits per capita in a local market), *SBAPOP* (the inflation-adjusted total dollar amount of SBA-guaranteed loans per capita in the local market) 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 *EMPR* of higher (or lower) amounts of SBA guaranteed lending at higher (or lower) levels of inflation-adjusted deposits per capita in a local market [*DEPPOP*]. *SBADEP* is of interest because it provides an indication of whether SBA guaranteed lending has a different impact in less developed local financial markets. For example, 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 impact in more developed local financial markets.

The analysis described above is used to introduce the general relationship between SBA guaranteed lending and local financial market development. Next, we consider the relationship between SBA guaranteed lending and local financial market development in high-minority areas. We use Equation (2) below to conduct this analysis. Equation (2) is designed to specifically test whether SBA guaranteed lending has a differential impact on local market employment rates in high-minority areas. Two interactive variables are included in Equation (2) to accomplish this test. The two variables are *SBAMIN and DEPMIN*. *SBAMIN* is equal to *SBAPOP* times *HIGHM*, and *DEPMIN* is equal *to DEPPOP* times *HIGHM*. And, *HIGHM* is an indicator variable equal to one if the percentage of minority population in the local market is greater than 25.55 percent; *HIGHM* is equal to 0.0 percent otherwise. The value 25.55 percent is equal to the mean [10.50] plus one standard deviation [15.05] from the mean for our sample. Equation (2) is as follows.

$$EMPR_i = \alpha_0 + \alpha_1 PICAP_i + \alpha_2 HERF_i + \alpha_3 MSADUM_i + \alpha_4 DEPPOP_i +$$
$$\alpha_5 SBAPOP_i + \alpha_6 HIGHM_i + \alpha_6 DEPMIN + \alpha_6 SBAMIN + \varepsilon_i \qquad (2)$$

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 of market liquidity and financial development.

The deposit market Herfindahl index (*HERF*) is included in Equations (1) and (2) 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. The definitions of the variables used in the empirical analysis are provided in Exhibit 1.

7. The empirical results

Equations (1) and (2) are 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 $15,562 with a high of $36,772 and a low of $6,637 and a standard deviation of $3,080. Our measure of financial market development, local market deposits per capita (*DEPPOP*), displays a very wide range also. The high for *DEPPOP* is $106,313 deposits per capita, while the low is only $147 worth of deposits per capita, and the mean is $8,314 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 $416.39 per capita to a low of $0.00 per capita, with a mean of $28.33 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 the local market employment rate (*EMPR*) is significantly positively correlated with local market per capital income (*PICAP*), per capita deposits (*DEPPOP*), and SBA guaranteed lending per capita (*SBAPOP*). And, that the correlation coefficients for the first two of these relationships are rather large. Also, notice that *EMPR* is significantly negatively correlated with our high-minority population percentage variable (*HIGHM*) and *HERF*.

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

In table 3 we present the main results for our study. These results are estimated using an OLS fixed effects method. 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 influences on employment levels 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 employment rates.

From table 3, our measure of financial development (*DEPPOP*) has a positive and significant coefficient, suggesting a positive and significant impact on *EMPR*. 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. The issue of endogeneity is a concern for this variable. For it could be argued that higher levels of employment cause higher levels of per capita bank deposits as forcefully as it can be argued that higher levels of per capita bank deposits cause higher levels of employment. However, as mentioned in our introduction, recent studies such as 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 better economic performance. Furthermore, this issue of endogeneity is not central to our analysis, as we are more concerned with the impact of our interaction variable *SBAMIN* on *EMPR* rather than the causal linkages between *EMPR* and *SBAPOP* [or between *EMPR* and *DEPPOP*].

Notice from table 3, that *SBAPOP* also has a positive and significant coefficient, suggesting a positive and significant impact on *EMPR*. 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 the level of employment by 0.8 percentage points. Of course, the outcome of this example would change to about 1.5 percentage points if we use Model 2 in table 3.

The major variable of interest in model 2 of table 3 is *SBADEP*. This is the interactive variable that represents the impact on *EMPR* of increasing *SBAPOP* at higher levels of financial market development (*DEPPOP*).

Notice that *SBADEP* has a negative and significant coefficient associated with it. This suggests that at higher levels of financial market development (*DEPPOP*), per

capita SBA guaranteed lending has a lower impact on *EMPR* than it does at lower levels of financial market development. Given that high-minority areas are likely characterized by relatively lower levels of financial market development, it is possible that SBA guaranteed lending will have more of an impact on local market employment rates in high-minority markets.

This latter proposition is tested directly in Model 3 of table 3. The interaction variable (*SBAMIN*) in Model 3 in table 3 is equal to the dummy variable (*HIGHM*) times local market per capita SBA guaranteed lending (*SBAPOP*). The dummy variable *HIGHM* is equal to one, zero otherwise, if the local market minority population is greater than 25.55 percent. Notice that the coefficient (-0.47) for *HIGHM* in table 3 is negative, large, and statistically significant. This suggests that, other things equal, high-minority local markets experience an employment rate that is on average 0.47 percentage points less than the employment rate for those markets that are not high-minority.

Our main variable of interest in model 3 is *SBAMIN*. Notice that the coefficient [0.012] for *SBAMIN* is positive and statistically significant at the ten percent level. Also notice that for this specification the coefficient [0.006] for *SBAPOP* is only about one-half the size of the coefficient for *SBAMIN*. This suggests that *SBAPOP* has about three times the positive impact in high-minority markets as it does in low minority markets. Recall that the coefficient on *SBAMIN* is the marginal impact of *SBAPOP* in a high-minority market, the total impact is represented by the sum of the coefficients [0.018] for *SBAMIN* and *SBAPOP* in model 3.

Overall, the results from table 3 suggest that per capita SBA guaranteed lending is significantly positively correlated with the local market employment rate. And, the

impact of SBA guaranteed lending on the level of employment is 200 percent greater in high-minority markets relative to low minority markets. These results lead to the rejection of our null hypothesis. Recall that our null hypothesis is that the impact of SBA guaranteed lending on employment rates in high-minority markets is the same as it is in low minority markets.

Our results are also consistent with the notion that less developed financial markets benefit relatively more from governmental interventions in small firm credit markets. This relatively higher benefit is consistent with a credit rationing argument such as Stiglitz and Weiss (1981), where the intervention serves to ameliorate a market failure in the small firm credit market. More specifically, the results also suggest that SBA guaranteed lending will have a larger positive impact on social welfare if it is targeted to certain high-minority areas.

Robustness Checks

Several robustness checks were performed for Equations (1) and (2). In particular, we estimated Equations (1) and (2) separately for MSAs and non-MSA counties, using disaggregated guaranteed lending variables for the 7(a) and 504 lending programs. Additionally, we estimated the equations using a stacked regression (OLS) approach with our panel data.

These robustness checks yield results qualitatively consistent with those reported in table 3. Additionally, because of the potential for multicollinearity in our regressors, 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. We also tested the

standard errors in our regressions for possible heteroskedasticity. This was not a significant problem.

We recognize that there may some endogeneity concerns with certain variables in our models. For example, higher local market employment rate levels may influence local market per capita income as well as vice versa. We addressed this issue in two ways. First, we removed the per capita income variable from our analysis. This did not materially change our results for our SBA guaranteed lending variable. Second, we used per capita income before the beginning of our sample period (e.g., 1990) in the analysis. This latter analysis suggested that local markets with higher per capita income at the beginning of the sample period experienced higher levels of employment over the sample period. This provides "some" evidence that higher per capita income levels may result in higher levels of employment. Next, we use the average SBA lending per capita variable for the 1991-1995 period and the employment levels variable from the 1996-2001 period. All other variables (in model 1 of table 3) were calculated as before. The results from this lagged SBA variable exercise were qualitatively the same as our previous results. We also used a stacked regression analysis and lagged the SBA lending variable by one period (and two periods). The results were again qualitatively the same.

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 high-minority areas. If SBA loan

guarantees indeed reduce credit rationing in high-minority markets for small business loans, then there should be a relationship between measures of SBA guaranteed lending activities and economic performance, and this relationship should be more evident in high-minority markets.

We find evidence consistent with this proposition in this study. In particular, we find a positive and significant impact on the average annual level of employment in a local market as we increase the level of SBA guaranteed lending in that local market. And, the magnitude of this impact is relatively larger in high-minority markets. Indeed, one interpretation of our results is that the impact is three times as large in high-minority markets.

However, all of our results should be interpreted with caution because of at least five issues. First, we are unable to control for small business lending at the local market level and hence, we do not know whether SBA loan guarantees are contributing to economic performance 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.

Third, we do not have direct measures of whether SBA guaranteed lending is really reducing discrimination at the microeconomic level. Fourth, we do not have any measures of the actual demand for credit by potential and existing minority small business owners in the local market. And, fifth, we do not include measures of the costs of SBA guaranteed lending...which would include the performance of granted SBA loans.

All of these issues relate to a larger question. That question is: What is the optimal level of SBA guaranteed lending in U.S. small firm credit markets. Future research will seek to shed additional light on this larger question.

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Exhibit 1: Variable Definitions

Variable	Definition	Source
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	Indicator 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	---
HIGHM	Indicator variable equal to one if the minority population in the local market is greater than 25.55 percent of the total local market population; zero otherwise.	BLS
DEPMIN	Interactive variable equal to HIGHM times DEPPOP	---
SBAMIN	Interactive variable equal to HIGHM times SBAPOP	---

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)	15.562	6.637	36.772	3.080
MSADUM	0.13	0	1.00	0.34
DEPPOP($000)	8.314	0.147	106.313	6.114
SBAPOP($)	28.33	0.00	416.39	29.48
Minority	10.50	0.00	86.79	15.05
HIGHM	0.15	0.00	1.00	0.36

Notes: 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. All dollar amounts are in 1990 dollars. Minority is the percentage of the local market population classified as racial minorities. HIGHM is an indicator variable equal to one if Minority is greater than 25.55; else HIGHM is equal to zero.

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

	EMPR	PICAP	HERF	MSADUM	DEPPOP	SBAPOP	HIGHM
EMPR	---						
PICAP	**0.44 (0.00)**	---					
HERF	**-0.18 (0.00)**	**-0.29 (0.00)**	---				
MSADUM	**0.08 (0.00)**	**0.43 (0.00)**	**-0.31 (0.00)**	---			
DEPPOP	**0.27 (0.00)**	**0.28 (0.00)**	**-0.23 (0.00)**	**0.04 (0.08)**	---		
SBAPOP	**0.18 (0.00)**	**0.20 (0.00)**	**-0.01 (0.67)**	**0.02 (0.42)**	**0.07 (0.00)**	---	
HIGHM	**-0.21 (0.00)**	**-0.09 (0.00)**	**0.06 (0.01)**	**0.14 (0.00)**	**-0.09 (0.00)**	**-0.12 (0.00)**	---

Notes: P-values are in parentheses. 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. HIGHM is an indicator variable equal to one if the minority population in the local market is greater than 25.55 percent of the total local market population; else HIGHM is equal to zero.

Table 3. OLS Fixed Effects Regression Estimation (N=2358)

This table provides parameter estimates for Equation (1): $\boldsymbol{EMPR_i = \alpha_0 + \alpha_1 PICAP_i + \alpha_2 HERF_i + \alpha_3 MSADUM_i + \alpha_4 DEPPOP_i + \alpha_5 SBAPOP_i + \alpha_6 SBADEP_i + \varepsilon_i}$. EMPR is the average annual employment rate in percentage points over the sample period. PICAP is average per capita income in local market *i* over our sample period. HERF is the average Herfindahl ratio, calibrated to be between zero and one, in market *i* over the 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 1), the variable SBADEP is excluded. In the second variation (Model 3), the variables SBAMIN and DEPMIN are substituted for SBADEP. SBAMIN and DEPMIN are equal to SBAPOP and DEPPOP times a dummy variable, respectively. That dummy variable [HIGHM] is equal to one; and zero otherwise, if the percentage of minority population in the local market is greater than 25.55. 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	87.02 (251.23)*	86.82 (243.42)*	87.14 (248.43)*
PICAP	0.41 (19.46)*	0.41 (19.45)*	0.39 (18.56)*
HERF	-0.69 (-3.26)*	-0.67 (-3.15)*	-0.43 (-2.05)**
MSADUM	-1.15 (-6.30)*	-1.14 (-6.29)*	-0.95 (-5.26)*
DEPPOP	0.07 (7.45)*	0.09 (6.83)*	0.10 (9.33)*
SBAPOP	0.008 (4.44)**	0.015 (4.46)*	0.006 (3.36)*
SBADEP		-0.001 (-2.34)**	---
HIGHM			-0.47 (-1.87)***
DEPMIN	----	----	-0.12 (-5.84)*
SBAMIN			0.012 (1.77)***
Adj – R^2	0.236	0.238	0.262
F-statistic	146.94*	123.59*	105.65*