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Increasingly, policymakers are looking to the small business sector as a potential engine of economic growth. Policies to promote small businesses include tax relief, direct subsidies, and indirect subsidies through government lending programs. Encouraging lending to small business is the primary policy objective of the Small Business Administration (SBA) loan-guarantee program. Using a panel data set of SBA-guaranteed loans we assess whether SBA-guaranteed lending has an observable impact on local and regional economic performance.

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On SBA-Guaranteed Lending and Economic Growth

The promotion of small businesses is a cornerstone of economic policy for a large number of industrialized countries. Right or wrong, there appears to be a widely held perception that the small business sector is the incubator of growth, the place where innovation takes place and new ideas become economically viable business enterprises. Moreover despite the research findings of Davis et al. (2000) that the small business sector is not a net creator of jobs in the United States, policymakers routinely point to small businesses as important sources of employment growth. Therefore, it is not surprising that there is widespread political support for government interventions aimed at promoting small business in the United States and increasingly around the world.

A widely held view among economists is that while markets are the best way to allocate scarce resources, sometimes government interventions can improve upon market outcomes. Credit market imperfections, particularly in the market for small enterprise credit, are among the usual suspects cited as rationale for government intervention. After all, there is reason to believe that the information-related problems that drive the credit rationing equilibrium of Stiglitz and Weiss (1981) may be particularly severe in the market for small firm finance. To the extent that small firms are credit rationed, government interventions in the form of direct credit or Small Business Administration (SBA) loan guarantees may be justified because of the deadweight losses associated with not funding all the projects in the economy that have positive-net-present-value.

We are interested in the efficacy of SBA guarantees of small enterprise loans. After all, the level of SBA activity in the small business loan market is not trivial. The

SBA's current business loan portfolio of roughly 219 000 loans worth more than $45 billion makes it the largest single financial backer of US businesses in the nation. Over the ten-year period (fiscal year) 1991-2000, the SBA assisted almost 435 000 small businesses in obtaining more than $94.6 billion in loans, more than in the entire history of the agency before 1991 (SBA, 2004). Hence, the redistributive effects of the SBA's loan guarantee programs may be economically important and raise the question as to whether the net benefits of these programs are positive.

To the extent that SBA loan guarantees mitigate credit market frictions these guarantees will result in improved capital allocation in the economy. This in turn should have an impact on economic growth and development. On the other hand, if SBA guarantees do not serve to reduce credit rationing in lending markets we should not observe a significantly positive correlation between the level of SBA guarantees and economic performance. In the latter case, SBA activities might be detrimental to economic growth as they would misallocate credit. To examine this question we construct a data set containing all loans guaranteed by the SBA under its two main lending programs from 1990 through the end of 2000, measures of economic conditions, and market structure variables. Using observations at the local market level we examine whether SBA-guaranteed lending significantly affects economic performance and economic growth—as measured by per capita income and log change in per capita income, respectively. We find evidence consistent with SBA loan guarantees providing a positive impact on future economic growth.

The remainder of the paper is organized as follows. In section 2 we provide a brief history of the SBA and an overview of its major lending programs. Understanding

the role Congress intended this agency to perform is essential in evaluating the social welfare implications of the SBA's activities. The historical record clearly shows that Congress created the SBA to mitigate perceived market imperfections that were reducing credit availability for small businesses. 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 enterprise credit market and hence provides a rationale for SBA loan guarantees. Section 4 outlines the data, our hypotheses and empirical strategy. The results appear in section 5. Overall, our empirical results are consistent with a positive, albeit small, impact of SBA guaranteed lending on personal income growth. Finally, our conclusions and future research questions are outlined in section 6.

2. A brief history of the SBA and its major credit extending programs

The SBA was created on 30 July 1953 by the enactment of Public Law 163. However, the SBA's legislative purpose and mission had begun to take shape years earlier in a number of predecessor agencies. These predecessor agencies included the Smaller War Plants Corporation (SWPC), the Small Defense Plants Administration (SDPA) and the Reconstruction Finance Corporation (RFC). All of these agencies were created mainly as a response to the pressures of the Great Depression or World War II.

The primary predecessor agency of the SBA was the Reconstruction Finance Corporation (RFC). The RFC was created in 1932 during the Hoover Administration. Its mission was to help mitigate the financial crisis of the Great Depression by providing emergency capital to troubled commercial banks (Rhyme, 1988). In 1934, the powers of the RFC were expanded and it became a full-fledged federal lending program for all

firms hurt by the Depression, both large and small businesses and both financial and nonfinancial firms. The extension of RFC authority to business lending is often considered the beginning of the present SBA 7(a) loan guarantee program (Rhyme, 1988). The RFC was also given the authority and responsibility to provide relief loans to individuals and organizations severely affected by natural disasters. When the RFC was closed, the SBA was created to assume both the disaster and general business lending functions of the RFC.[1] However, the SBA's business lending function was directed exclusively toward small business. Some suggest that this limitation was the direct result of the banking industry's successful lobbying to reduce the competition of government-provided business lending programs, especially those that aided large businesses (Rhyme, 1988). The enabling legislation empowers the SBA to make loans to small business concerns either directly or in cooperation with banks or other lending institutions.[2]

It is clear from the legislation that created the SBA that Congress perceived that small businesses face special problems in obtaining financing and that small business is a very important part of the American economy. Congressional intent is stated distinctly in the act.[3]

> The essence of the American economic system of private enterprise is free competition. Only through full and free competition can free markets, free entry into business, and opportunities for the expression and growth of personal initiative and individual judgment be assured. The preservation and expansion of

[1] Public Law 163 abolished the RFC and created the SBA. It also clearly stated the necessity for an agency like the SBA, set forth SBA's mission, and described the powers the SBA would have at its disposal to carry out that mission.
[2] See Public Law 163, Section 207. Section 207 empowers the SBA to assist small businesses in obtaining government contracts and to provide technical and managerial aids to small businesses.
[3] See Public Law 163, Section 202.

such competition is not only to the economic well-being but to the security of this Nation. *Such security and well-being cannot be realized unless the actual and potential capacity of small business is encouraged and developed. It is the declared policy of the Congress that the Government should aid, counsel, assist, and protect insofar as is possible the interests of small-business concerns in order to preserve free competitive enterprise, to insure that a fair proportion of the total purchases and contracts for supplies and services for the Government be placed with small-business enterprises, and to maintain and strengthen the overall economy of the Nation.*[4]

Developments in loan programs

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. Then, in 1958, the Investment Company Act established the Small Business Investment Company (SBIC) Program. This program added directly to the credit granting authority of the SBA. Under the program the SBA licensed, regulated and helped provide funds for privately owned and operated venture capital investment firms. These firms specialized in providing long-term debt and equity investments to high-risk small businesses. Although the program was established as a temporary remedy to a specific problem, the program is still alive and fully operational today (Rhyme, 1988).

[4] Congressional intent is also reflected in Section 204 of Public Law 163 which states, 'In order to carry out the policies of this title there is hereby created an agency under the "Small Business Administration"…'. Thus the primary mission of SBA became to '… *aid, counsel, assist, and protect insofar as is possible the interests of small-business concerns'.*

Over the years, the statutory authority and administrative structure of SBA's business lending programs have been remarkably stable. However, within this legal framework the SBA has made at least one major concession to the fact that private financial institutions are typically better at deciding which small business loans to underwrite than are government agencies. This recognition led the SBA, in the mid-1980s, to move away from making direct loans and toward making relatively more guaranteed (?) loans. Currently, the SBA makes direct loans only under very special circumstances, and guaranteed lending is the main form of SBA lending. The SBA's main business lending programs are the 7(a) guaranteed loan program and the 504 loan program.

The 7(a) guaranteed loan program

The 7(a) loan program is the most basic and most significant among the SBA's business loan 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. Loans from the 7(a) program are only available on a guaranty basis. This means that they are provided by lenders who choose to structure their own loans according to (?) the SBA's requirements and who apply and receive a guaranty from the SBA on a portion of these loan. The SBA does not fully guaranty 7(a) loans. The SBA guaranty is usually in the range of 50 per cent to 85 per cent of the loan amount, and the maximum guaranty is $1 000 000. The guaranty is a guaranty against payment default; the lender and the SBA share the risk that a borrower will not be able to repay the loan in full. The guaranty does not cover imprudent decisions by the lender or misrepresentation by the borrower (SBA, 2004).

Under the guaranty concept, commercial lenders make and administer the loans, and small businesses apply to lenders for their financing. The lender decides whether it will make a loan internally or if the application has some weaknesses which, in the lender's opinion, mean the loan will require an SBA guaranty before it will be underwritten. The guaranty that the SBA provides is available only to the lender. It assures the lender that in the event of a payment default, the government will reimburse the lender for its loss, up to the percentage of SBA's guaranty. Under the 7(a) program, the borrower remains obligated for the full amount due.

The 504 loan program

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 purchasing major fixed assets (such as land or improvements, including new or existing buildings, grading, street improvements, utilities, parking lots, landscaping, the modernization, renovation or conversion of existing facilities, and long-term machinery and equipment). SBA financing is provided through a certified development company (CDC), 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, and each covers a specific geographic area (SBA, 2004).

Typically, a 504 project includes a loan secured by several entities: A senior lien from a private-sector lender covers up to 50 per cent of the project cost. A loan secured with a junior lien from the CDC covers up to 40 per cent of the cost (this loan is backed

by a 100 per cent SBA-guaranteed debenture). A contribution of at least 10 per cent equity from the small business being helped is also required.

The maximum SBA debenture is $1 000 000 per project, where the project is defined in terms of a given set of job creation criteria or a community development goal. Generally, a business must create or retain one job for every $50 000 provided by the SBA. The maximum SBA debenture is $1.3 million for projects that meet specific public policy goals recognized by the SBA.[5]

3. SBA lending and the economics of credit markets

Over the last ten years the SBA has been responsible for well over $100 billion in small business credit extensions, more than any single private lender. Of course, this is what the SBA was created to do. The agency's primary mission as set forth by Congress, after all, is to assist small businesses in their quest for credit on reasonable terms. But is the SBA program well-conceived public policy in the sense that it has been designed to improve the efficiency and equity of lending markets?

The answer to this question would appear to be yes if Congress made at least three assumptions when it created the agency. First, lawmakers had to assume that small business lending differs from large business lending, either in terms of costs or [public] benefits. Second, they had to think that imperfections exist in the [private] small business credit market that prevent the market from delivering the economically efficient amount

[5] Current public policy goals recognized by the SBA are as follows: (1) business district revitalization, (2) expansion of exports, (3) expansion of minority business development, (4) rural development, (5) enhanced economic competition, (6) restructuring because of federally mandated standards or policies, (7) changes necessitated by federal budget cutbacks, (8) expansion of small business concerns owned and controlled by veterans, and (9) expansion of small business concerns owned and controlled by women (SBA, 2004).

of credit to small businesses at market prices. Third, they must have believed that the SBA would have the power and expertise to help ameliorate these market imperfections.

Peterson (1999) suggests that small business lending is indeed different from large business lending on three dimensions. Financing costs are different. Small businesses pay a higher fixed cost per unit of credit than larger businesses. The availability of information is different. Asymmetric information problems associated with small firms are more severe than with larger firms. The importance of relationships with banking institutions is different. Relationships between and banks (typically small ones) and small businesses are much closer than between large companies and banks, and thus are more valuable to both small business and to the banks.. However, these differences alone are not sufficient to justify government intervention in the small business credit market. The economic rationale for market intervention by the SBA must be linked to some form of market failure. Some suggest that market failure may exist in credit markets because these markets tend to be informationally imperfect. Further, the economic literature documents that this market failure may take the form of equilibrium credit rationing.

Market imperfections and credit rationing

The credit rationing literature is one of the more insightful areas in modern economics. Two of the more important papers in this area are Kane and Malkiel (1965) and Stiglitz and Weiss (1981). Stiglitz and Weiss (1981) demonstrate that price alone may not equilibrate demand and supply in credit markets. They also show that the corresponding disequilibrium would unlikely be just a temporary phenomenon.

Importantly, Stiglitz and Weiss (1981) show that in equilibrium a loan market may be characterized by credit rationing. They reason that banks making loans are concerned about the interest rate they receive on the loan and the riskiness of the loan. However, the interest rate may itself affect the riskiness of the pool of bank loans by either sorting potential borrowers (the adverse selection effect) or influencing the actions of borrowers (the moral hazard effect). Both effects derive directly from the imperfect information that is present in loan markets after banks have evaluated loan applications. When the price (interest rate) affects the nature of the transaction, it is unlikely that price will also clear the market.

The adverse selection aspect of interest rates is a consequence of different borrowers having different probabilities of repaying their loan. The expected return to the bank 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 'good 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. As the interest rate rises, the average 'riskiness' of those who borrow increases, and this may actually result in lowering the bank's expected profits.

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 return on projects which succeed. Higher interest rates may thus induce firms to

undertake projects with lower probabilities of success but higher payoffs when successful. This is the moral hazard problem.

For these reasons, the expected return by the bank may increase less rapidly than the interest rate; and, beyond a point, may actually decrease. Clearly, under these conditions, it is conceivable that the demand for credit may exceed the supply of credit in equilibrium. Although traditional analysis would argue that in the presence of an excess demand for credit unsatisfied borrowers would offer to pay a higher interest rate to the bank, bidding up the interest rate until demand equals supply, it does not happen in this case. This is because the bank would not lend to someone who offered to pay the higher interest rate, as such a borrower is likely to be a worse risk than the average current borrower (Stiglitz and Weiss, 1981). The expected return on a loan to this borrower at the higher interest rate is 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.

Of course, the interest rate is not the only term of the contract which is important. Stiglitz and Weiss (1981) report that the amount of credit extended, and the amount of collateral the bank demands of the borrower, will also affect the behavior of borrowers and the distribution of borrowers. And, as with interest rates, increasing the collateral requirements of borrowers may actually decrease the returns to the lender, by either decreasing the average degree of risk aversion of the pool of borrowers or inducing borrowers to undertake riskier projects.

Consequently, it may not be profitable to raise the interest rate or collateral requirements when a bank has an excess demand for credit; instead, banks may deny

loans to borrowers who are observationally indistinguishable from those who receive loans. This is what Stiglitz and Weiss (1981) refer to as credit rationing.

Importance of lending relationships

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

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

Petersen and Rajan (1994) suggest that in addition to interaction over time, relationships can be built through interaction over multiple products. That is, borrowers may obtain more than just loans from a bank. Borrowers may purchase a variety of financial services and also maintain checking and savings accounts with the bank. These

added dimensions of a relationship can affect the firm's borrowing cost in two ways. First they increase the precision of the lender's information about the borrower. For example, the lender can learn about the firm's sales by monitoring the cash flowing through its checking account or by factoring the firm's accounts receivables. Second, the lender can spread any fixed costs of producing information about the firm over multiple products. Petersen and Rajan (1994) report that both effects reduce the lender's costs of providing loans and services, and the former effect increases the availability of funds to the firm.

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

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

Finally, the SBA loan guarantee programs may improve the intermediation process by lowering the risk to the lender of extending longer-term loans, ones that more closely meet the needs of small businesses for capital investment. After all, the problem Congress is said to have worried about, is long-term credit for small businesses.

4. The questions, empirical strategy, and data

Our empirical research focuses on SBA loan guarantees, which are only one of the several ways the government promotes small business lending. Federal Home Loan Banks, for example, are authorized by Congress to accept small enterprise loans as eligible collateral when they extend subsidized advances to banks, which reduces the cost of funding small business loan portfolios.[6] We chose to study the impact of SBA loan guarantees because if government intervention in the small business credit market is effective, the evidence is likely to be strongest in the SBA programs. This is because SBA loan guarantees more completely resolve the agency problems that give rise to credit rationing in these markets than do other approaches, like that of the Federal Home Loan Banks. SBA programs also encompass all types of small business lenders, from community banks and thrifts to bigger banks. Finally, the SBA has operated for a long time—more than a half a century.

We take as our maintained hypothesis that credit market frictions—primarily in the form of costly information and verification of a small firm's projects—can lead to socially suboptimal credit allocation. To the extent that SBA loan guarantee programs mitigate credit market frictions, there should be a relationship between SBA-guaranteed lending and economic growth and development. Therefore, we test for whether SBA loan

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

guarantees lessen credit market frictions by testing for whether measures of SBA lending are related to local economic growth. Thus, our null hypothesis is that SBA lending has no discernible impact on local market economic growth.

To examine this SBA growth hypothesis we utilize data from three sources. The first source is loan-specific data—including borrower and lender information—on all SBA-guaranteed 7(a) and 504 loans from 2 January 1990 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. The second source is data on economics conditions from the National Bureau of Economic Research (NBER), the Bureau of Labor Statistics (BLS) and the Bureau of Economic Analysis (BEA) from 1990 through 2001. The third source is data from the Federal Deposit Insurance Corporation's (FDIC) annual summary of deposit data (SUMD) files. All of our data are aggregated to the local market level. We use Metropolitan Statistical Areas (MSAs) to define the relevant local market for urban areas and non-MSA counties as the local market for rural areas. We focus on local markets because we suspect that it is at this level where the SBA-guaranteed lending should have the greatest impact. Hence, our data set consists of approximately 2200 local market observations per year over 12 years (1990 through 2001).

To test our null hypothesis we construct two sets of regression equations in which measures of local economic conditions are related to proxy variables for SBA lending and the structure of the local financial market. Also included are controls for national economic conditions. A second set of regression equations relate proxies for economic

growth to levels and changes in SBA lending and market structure variables. Our model is:

$$PICAP_t = \alpha_0 + \alpha_1 PCIAP_{t-1} + \alpha_2 SBADEP_{t-1} + \alpha_3 EMPR_t + \alpha_4 NBER_t + \alpha_5 HERF_t + \alpha_6 MSA_t + \alpha_7 SBAG_{t-1} + \alpha_8 SBA7A_{t-1} + \alpha_9 SBAM_{t-1} + \alpha_{10} EMPR_{t-1} + \varepsilon_t \quad (1)$$

Equation (1) uses per capita income (*PICAP*) in the local market level to proxy for economic conditions. The primary variable of interest on the right side of the equation is $SBADEP_{t-1}$ (the total dollar amount of SBA-guaranteed loans scaled by total deposits in the market lagged one year). We scale by total deposits instead of measures of total credit because we cannot construct measures of bank lending at the local market level. Market-level deposit data are available, however, from the SUMD data, and total deposits should be highly correlated with lending. We also include as controls for the impact of SBA lending: the share of SBA loans that are 7(a) loans (*SBA7A*), the share of SBA loans provided to manufacturing concerns (*SBAM*), and the SBA's exposure on the outstanding balances of the SBA-guaranteed loans (*SBAG*).

Two variables are included in equation (1) to control for the structure of the local market. The first variable is the deposit market Herfindahl index (*HERF*), which provides a measure of the relative concentration, and presumably the relative competitiveness, of the local banking markets. The second variable is a dummy variable (*MSA*) that captures whether the market is urban (*MSA* = 1) or rural (*MSA* = 0). Finally, we include the employment rate (*EMPR*) for the market and a dummy variable for NBER recessions (*NBER* = 1 if the national economy is in a recession, 0 otherwise) to control for local and national economic conditions. The definitions of the variables used in the empirical analysis are in table 1.

Finding a positive and significant relationship between the level of per capita income and SBA-guaranteed loans in a local market is inconsistent with the null hypothesis of no connection between these loans and economic conditions. However, we might also observe this positive correlation between economic performance and SBA-guaranteed lending activity if the probability of a lender offering an SBA-guaranteed loan is positively related to local market economic conditions. In other words, the higher *level* of income might cause the lagged SBA-guaranteed lending rather than the other way around, in part because it incorporates past growth rates. Therefore, we investigate whether SBA-guaranteed lending activity is related to local economic growth. To do this we estimate the following regression equation:

$$\begin{aligned}\Delta LNPI_t = {} & \beta_0 + \beta_1 LPI_{t-1} + \beta_2 \Delta LNSBA_t + \beta_3 \Delta LNDEP_t + \beta_4 \Delta LNEMPR_t \\ & + \beta_5 \Delta LNSBA_{t-1} + \beta_6 \Delta LNDEP_{t-1} + \beta_7 NBER_t + \beta_8 MSA_t + \beta_9 HERF_t \\ & + \beta_{10} LNSBA_{t-2} + \beta_{11} LNDEP_{t-2} + \beta_{12} LNEMPR_{t-1} + \beta_{12} LNSBAG_{t-2} \\ & + \beta_{14} LNSBA7A_{t-2} + \beta_{15} LNSBAM_{t-2} + \mu_t\end{aligned} \tag{2}$$

The dependent variable in equation (2) in the log change in personal income from t-1 to t ($\Delta LNPI_t$).[7] The primary regressors of interest are the log change in small business loans ($\Delta LNSBA_t$), the lagged log change in small business loans ($\Delta LNSBA_{t\text{-}1}$) and the log level of small business loans lagged two periods ($LNSBA_{t\text{-}2}$). Under our null hypothesis that SBA loan guarantees have no discernable impact on economic growth, we would expect the coefficients on $LNSBA_{t\text{-}2}$, $\Delta LNSBA_t$ and $\Delta LNSBA_{t\text{-}1}$ to be insignificant. Thus this estimating equation differs from the first in two ways: it shifts the focus from possible past changes of personal income (that contribute to its current level) to a single contemporaneous change, and it also observes more dynamics in the effects of past SBA-

[7] To preserve observations with a value of zero we add one to all observations prior to taking the natural logarithm.

guaranteed activity on that contemporary change. Positive and significant coefficients on these SBA lending variables would be evidence consistent with the hypothesis that SBA loan guarantees improve the efficiency of lending markets. As before, we include controls for market structure (*HERF* and *MSA*),economic conditions (*LNEMPR*, $\Delta LNEMPR$, and $LNPI_{t-1}$) in equation (2), as well as controls for level and growth in deposits ($LNDEP_{t-2}$, $\Delta LNDEP_t$, $\Delta LNDEP_{t-1}$). We also include the values of controls for the type of SBA lending in the market lagged two periods.

5. The empirical results

Levels regression

Equation 1 is estimated using weighted least squares at the local market level for every MSA (urban) and non-MSA county (rural) for which we have complete data over the period 1991 through 2001. We start the analysis in 1991 because our SBA loan data begins in 1990 and our empirical specification includes the lagged value of the dependent variable and the lagged small business lending variables on the right side of the equation. Equation (1) is reestimated over the urban and rural samples—excluding the MSA dummy variable. Descriptive statistics for the variables used in the regression can be found in table 2 and the estimation results are presented in table 3.

Consistent with our null hypothesis, the coefficient on the lagged SBA loan-to-deposit ratio is positive but not significantly different from zero for all three samples.[8] This result is not surprising; after all, SBA-guaranteed lending is a small part of the total banking market—less than 7.5 percent of market deposits on average. SBA-guaranteed lending may be too small economically for the data to yield a statistical relationship

[8] The results are essentially the same when equation (1) is estimated with the SBA variables (*SBADEP*, *SBAMR*, *SBA7AR* and *SBAGR*) on the right hand side are lagged two periods.

between it and per capita income. In other words, while an insignificant coefficient on $SBADEP_{t-1}$ is consistent with with SBA loan guarantees having no discernable impact on local economic growth, tests focusing on *levels* of economic activity may not have the power to reject the null hypothesis.

For the full sample and the urban (MSA) sample, the coefficients on $SBAGR_{t-1}$ and $SBA7AR_{t-1}$ are significantly negative, while the coefficient on $SBAMR_{t-1}$ is positive and significant. These results are largely in concert with an explanation that says lenders are relying more heavily on SBA loan guarantees to make loans in more depressed urban markets—ones with lower per capita income. Further results from our urban sample suggest that there are more opportunities for lenders to make loans to small businesses engaged in manufacturing when markets are more economically vibrant. The picture painted by our SBA lending structure variables is somewhat different for the rural (non-MSA) sample, where only the coefficient on $SBAGR_{t-1}$ is significantly different from zero. In other words, lenders in higher-income rural markets rely more heavily on SBA guarantees than lower-income ones. This result is likely due to differences in economic activity across rural markets and the operation of government-subsidized lending programs for agriculture, like the farm credit banks. To the extent that per capita income in rural markets is negatively related to the share of economic activity in agriculture, we would expect demand for SBA loan guarantees to be positively related to income. Hence, the positive and significant coefficient on $SBAGR_{t-1}$.

For all three samples the controls for economic activity—NBER dummy, $PICAP_{t-1}$, and *EMPR*—are significant and with the anticipated signs. The coefficient on *HERF* (deposit market Herfindahl index) is significantly negative for the full sample and

for the rural sample. The coefficient on *HERF* is negative but not significant in the urban sample. These results are in line with the industrial organization literature and may be explained in at least two ways. First, per capita income is higher in more competitive markets, and *HERF* is a proxy for market competition. Or, second, the negative correlation is the result of a set of market dynamics in which higher relative per capita income induces more commercial banks to enter the local market. Furthermore, considering the substantial fixed cost associated with market entry, markets with relatively larger aggregate income levels might also experience more entry. Both of these theories would support the perception that urban financial markets are more contestable than rural ones.

Rates of change regressions

The results for economic activity and small business lending in levels, equation (1), provides us with the empirical relationship between the amount of SBA-guaranteed lending scaled by market deposits and the level of per capita income. This, however, is a static view of the relationship between SBA lending and economic activity and an indirect test of the hypothesis that SBA loan guarantees improve social-welfare-reducing credit rationing in small business lending markets. A more direct test of this hypothesis is to look at the change in personal income over time as it relates to past levels of SBA lending activity and subsequent changes in SBA-guaranteed lending. To this end we estimate equation (2) using the same sample breakdowns as before, but over the 1992-to-2001 time frame because we need to lag *SBADEP* by two periods. Descriptive statistics for the variables used in equation (2) are found in table 4, and the regression results in table 5.

Table 5 shows that SBA-guaranteed lending does affect the growth of income in the market as the coefficient on $LNSBA_{t-2}$ (the natural log of SBA-guaranteed loans lagged two periods) is positive and significant for all three samples. Interestingly, the impact of SBA-guaranteed lending on income growth is more than 12 times larger in urban than rural markets. In addition, we find no impact of the year-over-year change in SBA lending on income growth as the coefficients on $\Delta LNSBA$ and $\Delta LNSBA_{t-1}$ are not significant in any of our samples.

The coefficient on the log level of deposits lagged two periods is negative and significant for the full sample and the MSA sample. It is positive but not significant for the non-MSA sample. In other words, growth in personal income does not appear to be related to the level of local deposits in non-MSAs. This result is consistent with Craig and Thomson's (2002) finding that community banks in rural counties are not funding constrained. However, in MSAs we interpret these results as being consistent with an explanation that says that the fastest-growing markets are able to attract capital from other regions, including foreign capital. The positive and significant coefficients on the log change in deposit variables ($\Delta LNDEP$ and $\Delta LNDEP_{t-1}$) for all three samples suggest that growth in the local funding markets positively affects income growth.

The three variables that capture the structure of SBA-guaranteed lending ($SBAGR_{t-2}$, $SBA7AR_{t-2}$ and $SBAMR_{t-2}$), lagged two periods, all enter with significantly negative coefficients for the full sample and MSA sample regressions. For the non-MSA sample regression $SBA7AR_{t-2}$ and $SBAMR_{t-2}$ have significantly negative and significantly positive coefficients, respectively—the coefficient on $SBAGR_{t-2}$ is negative and insignificant. These results suggest that lenders are less likely to rely on SBA loan

guarantees when making small business loans, and in particular loans to small manufacturers, in urban markets where they anticipate strong growth. As with the levels results, the positive sign on $SBAMR_{t-2}$ is likely the consequence of higher demand for manufacturing loans in rural markets, where income is growing the fastest. Finally, the coefficients on our controls for economic income and local market structure are generally in line with what we found for the levels regressions.

Overall, our regression results are consistent with the hypothesis that SBA loan guarantees have positive, albeit small net, social benefits. We find little evidence that the level of SBA-guaranteed lending activity (per $1000 of deposits) is related to the level of per capita income at the local market level. However, we find a strong relationship between the level of SBA-guaranteed lending and future income growth in the full sample and the urban and rural market subsamples. This impact of SBA-guaranteed lending on growth appears to be small, as the largest coefficient on the $LNSBA_{t-1}$ regressor is 50 basis points.

6. Conclusions and extensions to the analysis

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

market, there is a positive (although small) and significant relationship between the level of SBA lending in a market and future personal income growth.

These results should be considered preliminary, however. The difference between our results for per capita income and for per capita income growth suggest several possible mechanisms. First, the stock of personal income is so large (and so poorly measured) that annual policy regressions will not pick up any effect on it, while the flow of change of personal income might be more clearly measured. On the other hand, the first-differencing of personal income might represent a statistical method to take into account failures in the restrictions that are imposed on the model. There may be unobserved characteristics that are true of counties that influence both the level of personal income and the amount of small business lending. For example, SBA offices could be well developed in areas that are known to have been poorly developed but have a good potential. This 'potential' is an unobserved variable that may bias our regressions of levels of personal income, whereas first-differencing the variables may help with the bias. Further statistical work is needed to clarify the nature of our unobserved error term in order to sharpen our understanding of both the statistical structure of our data and our interpretation of the results.

Our initial estimation imposes other restrictions on the model which may not hold in practice. For instance, we can test the restriction that SBA-guaranteed lending has the same impact on income growth in markets with high and low income (as measured by whether it is above or below the median). Future work will relax these restrictions and thereby more fully utilize the information in our panel data. In addition, we plan on extending this work by adding controls for state and regional growth, differences in state

taxes, and credit cycles. Finally, before we can effectively apply our results to policy restrictions, our estimates need to be posed in the context of a structural model of credit constraints. Identifying such a model, both theoretically and empirically, is tough. This ambitious goal is the aim of our extended research project.

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Table 1: Variable Definitions

Variable	Definition	Source
SBADEP	SBA Guaranteed Loans per $000 of deposits	SBA, FDIC SUMD
HERF	Deposit market herfindahl	FDIC SUMD
EMPR	Employment rate	BLS
NBER	Dummy varaible = 1 if the year is a recession year, 0 otherwise	NBER
MSADUM	Dummy variable = 1 if observation is an MSA and zero otherwise	BEA
SBAGR	Portion of total SBA guaranteed loan balances covered by SBA guarantee	SBA
SBA7AR	Portion of total SBA guaranteed loan balances that are 7(a) loans	SBA
SBAMR	Portion of total SBA guaranteed loan balances that are loans to manufacturing concerns	SBA
PICAP	Per capita income	BEA
MDUM	Securities to assets ratio	June Call Report
LNPI	Natural log of personal income	BEA
LNSBA	Natural log of total SBA guranteed loans	SBA
LNDEP	Natural log of total deposits	FDIC SUMD
LNEMPR	Natural log of the employment rate	BEA
$\Delta LNSBA_{t-1}$	Natural log of SBA guaranteed loans at t-1 minus the natural log of SBA guaranteed loans at t-2	SBA
$\Delta LNDEP_{t-1}$	Natural log of deposits at t-1 minus the natural log of deposits at t-2	FDIC SUMD
ΔLNSBA	Natural log of assets at t minus the natural log of assets at t-1	SBA
ΔLNDEP	Natural log of deposits at t minus the natural log of deposits at t-1	FDIC SUMD
ΔLNEMPR	Natural log of the employment rate at t minus the natural log of the employment rate at t-1	BLS
ΔLNPI	Natural log of personal income at t minus the natural log of personal income at t-1	BEA

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, NBER -- National Bureau of Economic Research

Table 2: Descriptive Statistics for Equation (1) Variables

Variable	N	Mean	Std Dev	Minimum	Maximum
PICAP	24872	18.9273	4.5517	6.09	58.70
$SBADEP_{t-1}$[a]	24872	7.4450	100.8813	0	8754.2
HERF[b]	24872	0.5309	0.2884	0.03	1
EMPR (%)	24872	93.9186	3.2051	61.47	99.30
NBER	24872	0.1810	0.3850	0	1
MSADUM	24872	0.1389	0.3458	0	1
$SBAGR_{t-1}$	24872	0.6205	0.3536	0	1
$SBA7AR_{t-1}$	24872	0.6737	0.4263	0	1
$SBAMR_{t-1}$	24872	0.1149	0.2356	0	1
$PICAP_{t-1}$	24872	18.2244	4.3781	5.50	58.70
MDUM[c]	24872	0.2378	0.4257	0	1

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

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

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

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

Table 3: Weighted Least Squares Estimation of Equation (1)

$$PICAP_t = \alpha_0 + \alpha_1 PCIAP_{t-1} + \alpha_2 SBADEP_{t-1} + \alpha_3 EMPR_t + \alpha_4 NBER_t + \alpha_5 HERF_t + \alpha_6 MSA_t + \alpha_7 SBAG_{t-1} + \alpha_8 SBA7A_{t-1} + \alpha_9 SBAM_{t-1} + \alpha_{10} EMPR_{t-1} + \varepsilon_t$$

Dependent Variable:	Full Sample				MSAs				NonMSAs		
PICAP	Parameter				Parameter				Parameter		
	Estimate	t value	Prob > |t|		Estimate	t value	Prob > |t|		Estimate	t value	Prob > |t|
Intercept	-3.4711	-15.22	<.0001		-4.7193	-6.76	<.0001		-1.2004	-7.00	<.0001
$SBADEP_{t-1}$	0.00001	0.10	0.9169		0.0003	0.76	0.4479		0.00000	-0.07	0.947
HERF	-0.0442	-2.01	0.0448		-0.0622	-0.95	0.3446		-0.0967	-5.87	<.0001
EMPR	0.0506	26.02	<.0001		0.0659	11.62	<.0001		0.0110	6.66	<.0001
NBER	-0.6395	-60.84	<.0001		-0.6996	-25.13	<.0001		-0.2661	-23.20	<.0001
$SBAGR_{t-1}$	-1.3576	-13.53	<.0001		-1.7138	-5.63	<.0001		0.1874	2.53	0.0115
$SBA7AR_{t-1}$	-0.2903	-7.74	<.0001		-0.2950	-2.51	0.0122		-0.0005	-0.02	0.9845
$SBAMR_{t-1}$	0.1781	5.39	<.0001		0.3857	3.32	0.0009		0.0042	0.22	0.8276
$PICAP_{t-1}$	1.0490	1241.98	<.0001		1.0488	455.70	<.0001		1.0449	1120.19	<.0001
MDUM	-1.2779	-12.02	<.0001		-1.5420	-4.52	<.0001		0.2246	2.95	0.0032
MSADUM	-0.0748	-5.28	<.0001								
Adjusted R-Square	0.9910				0.9900				0.9883		
No. of Obs	24871				3453				21417		
Root-MSE	927.64				2262.06				388.94		
Dependent Mean	26.109				27.129				20.184		
Coeff-Var	3552.88				8338.27				1926.93		

Source: Authors' calculations.
Notes: Observations are weighted by the share of national personal income accounted for by the market in 1990.

Table 4: Descriptive Statistics for Equation (2) Variables

Variable	N	Mean	Std Dev	Minimum	Maximum
$LNPI_{t-1}$	22479	13.0605	1.5110	8.48	19.72
$LNSBA_{t-2}$	22479	10.3557	5.9782	0.00	20.36
$LNDEP_{t-2}$[a]	22479	12.1852	1.4866	6.21	19.56
$LNEMPR_{t-1}$ (%)	22479	4.5411	0.0358	4.12	4.60
$SBAGR_{t-2}$	22479	0.6239	0.3547	0	1
$SBA7AR_{t-2}$	22479	0.6749	0.4262	0	1
$SBAMR_{t-2}$	22479	0.1179	0.2385	0	1
$\Delta LNSBA_{t-1}$	22479	0.1584	5.7554	-15.26	15.32
$\Delta LNDEP_{t-1}$	22479	0.0132	0.2561	-5.00	3.71
$\Delta LNSBA$	22479	0.1493	5.6774	-15.26	15.32
$\Delta LNDEP$	22479	0.0130	0.2653	-5.00	3.42
$\Delta LNEMPR$	22479	0.0020	0.0139	-0.16	0.17
HERF[b]	22479	0.5352	0.2881	0.03	1.00
NBER	22479	0.0957	0.2942	0	1
MSADUM[c]	22479	0.1394	0.3464	0	1
MDUM	22479	0.3968	0.4892	0	1
$\Delta LNPI$	22479	0.0458	0.0481	-0.46	0.43

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

Notes: a. $000

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

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

Table 5: Weighted Least Squares Estimation of Equation (2)

$$\Delta LNPI_t = \beta_0 + \beta_1 LPI_{t-1} + \beta_2 \Delta LNSBA_t + \beta_3 \Delta LNDEP_t + \beta_4 \Delta LNEMPR_t + \beta_5 \Delta LNSBA_{t-1} + \beta_6 \Delta LNDEP_{t-1} + \beta_7 NBER_t + \beta_8 MSA_t + \beta_9 HERF_t + \beta_{10} LNSBA_{t-2} + \beta_{11} LNDEP_{t-2} + \beta_{12} LNEMPR_{t-1} + \beta_{12} LNSBAG_{t-2} + \beta_{14} LNSBA7A_{t-2} + \beta_{15} LNSBAM_{t-2} + \mu_t$$

Dependent Variable:	Full Sample			MSAs			NonMSAs		
ΔLNPI	Parameter			Parameter			Parameter		
	Estimate	t value	Prob > |t|	Estimate	t value	Prob > |t|	Estimate	t value	Prob > |t|
Intercept	-1.0419	-34.78	<.0001	-1.2354	-14.80	<.0001	-0.3040	-8.94	<.0001
$LNPI_{t-1}$	0.0015	5.10	<.0001	-0.0015	-1.65	0.0988	0.0027	7.72	<.0001
$LNSBA_{t-2}$	0.0027	18.49	<.0001	0.0050	8.55	<.0001	0.0004	2.42	0.0155
$LNDEP_{t-2}$	-0.0021	-11.09	<.0001	-0.0015	-3.30	0.0010	0.0000	0.04	0.9708
$LNEMPR_{t-1}$	0.2414	37.65	<.0001	0.2870	16.61	<.0001	0.0694	9.28	<.0001
$SBAGR_{t-2}$	-0.0295	-12.54	<.0001	-0.0390	-3.97	<.0001	-0.0033	-1.42	0.1551
$SBA7AR_{t-2}$	-0.0132	-11.84	<.0001	-0.0178	-4.71	<.0001	-0.0051	-4.88	<.0001
$SBAMR_{t-2}$	-0.0105	-8.51	<.0001	-0.0224	-5.79	<.0001	0.0024	2.27	0.0232
$\Delta LNSBA_{t-1}$	0.0000	-0.31	0.7589	0.0031	3.64	0.0003	-0.0001	-1.01	0.3105
$\Delta LNDEP_{t-1}$	0.0027	5.61	<.0001	0.0031	2.69	0.0072	0.0036	4.47	<.0001
ΔLNSBA	0.0001	0.57	0.5666	0.0026	2.80	0.0052	0.0000	-0.44	0.6573
ΔLNDEP	0.0016	3.33	0.0009	0.0016	1.42	0.1570	0.0041	5.09	<.0001
ΔLNEMPR	0.3068	16.81	<.0001	0.3106	6.39	<.0001	0.2082	10.58	<.0001
HERF	0.0020	2.24	0.0252	-0.0004	-0.15	0.8844	0.0031	2.96	0.0031
NBER	-0.0282	-49.41	<.0001	-0.0302	-21.31	<.0001	-0.0209	-24.72	<.0001
MDUM	0.0048	3.06	0.0022	0.0389	2.58	0.0098	0.0011	0.93	0.3540
MSADUM	-0.0016	-2.32	0.0206						
Adjusted R-Square	0.1903			0.2582			0.0552		
No. of Obs	22478			3133			19344		
Root-MSE	33.32			72.75			20.05		
Dependent Mean	0.0532			0.0542			0.0478		
Coeff-Var	62601.0			134331.0			41932.0		

Source: Authors' calculations.

Notes: Observations are weighted by the share of national personal income accounted for by the market in 1990.

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

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