United States Government Accountability Office

Report to Congressional Committees

September 2020

SMALL BUSINESS LOANS

SBA Generally Incorporated Key Elements for Estimating Subsidy Cost of 7(a) Program

Accessible Version

GAO-20-618

GAO Highlights

Highlights of GAO-20-618, a report to congressional committees

September 2020

SMALL BUSINESS LOANS

SBA Generally Incorporated Key Elements for Estimating Subsidy Cost of 7(a) Program

Why GAO Did This Study

The 7(a) program is SBA's largest loan guarantee program for small businesses, with about $95 billion in outstanding loan principal as of the end of fiscal year 2019. Federal agencies that provide credit assistance are generally required to estimate the net long-term cost to the government—known as the subsidy cost—for each annual cohort of loans. SBA initially estimated a zero subsidy cost for each cohort from fiscal years 2014 through 2019, but estimated that the fiscal year 2020 cohort would have a positive subsidy cost and require appropriations.

GAO was asked to evaluate SBA's subsidy estimation process for the 7(a) program. This report examines (1) how SBA estimates 7(a) subsidy costs, (2) the extent to which SBA incorporated key elements of subsidy cost estimation into its estimation process for the fiscal year 2020 budget, and (3) the changes SBA made in its estimation process for the fiscal year 2020 budget.

GAO reviewed SBA documentation on its estimation process, including information on SBA's cash flow model, and compared SBA's process to key elements that GAO previously identified (GAO-16-269). GAO also interviewed officials from SBA, the Office of Management and Budget, and outside auditors and contractors that annually review SBA's process and model.

View GAO-20-618. For more information, contact William B. Shear at (202) 512-8678 or shearw@gao.gov.

What GAO Found

The Small Business Administration (SBA) develops its subsidy cost estimates for the 7(a) loan guarantee program—that is, estimates of the program's net long-term cost to the government—using a cash flow model. The model uses historical data, econometric equations, and macroeconomic projections to estimate cash flows—such as guarantee fees, SBA purchases of defaulted loans, and recoveries on those loans—for the loans SBA expects to guarantee in the next fiscal year. The net present value of the cash flows (value in current dollars) is the subsidy cost estimate.

SBA generally incorporated key elements of subsidy cost estimation into its estimates for the 7(a) program for the fiscal year 2020 budget. Specifically, GAO found that SBA's estimation process was largely consistent with eight key elements GAO previously identified that help ensure subsidy estimates are supported, reliable, and reasonable. For example, SBA generally validated historical data, documented the cash flow model and key assumptions, analyzed the sensitivity of estimates to alternative assumptions, and had documented policies and procedures.

SBA made changes in its estimation process that collectively increased the 7(a) program's subsidy cost to $99 million for fiscal year 2020 (a 0.33 percent subsidy rate when expressed as the cost per dollar of credit assistance) from $0 for fiscal year 2019 (0 percent subsidy rate). Some of these changes were routine updates to data and economic assumptions used in the cash flow model, while others were revisions to the estimation process. Additionally, some individual changes increased the subsidy costs, while others decreased it. Some of the changes that had the largest impact on the subsidy rate included the following:

- Incorporating the President's economic assumptions for fiscal year 2020 decreased the rate by 0.27 percentage points.
- Updating the basis for the size and composition of the loan cohort SBA expected to guarantee in fiscal year 2020 increased the rate by 0.21 percentage points.
- Revising the methodology for estimating purchase amounts for defaulted loans to better reflect the outstanding loan balance at the time of purchase increased the rate by 0.21 percentage points.

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Abbreviations

FASAB	Federal Accounting Standards Advisory Board
FCRA	Federal Credit Reform Act of 1990
GDP	gross domestic product
OMB	Office of Management and Budget
SBA	Small Business Administration

U.S. GOVERNMENT ACCOUNTABILITY OFFICE
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September 30, 2020

Congressional Committees

The 7(a) program is the Small Business Administration's (SBA) largest loan guarantee program for small businesses, with about $95 billion in outstanding loan principal as of the end of fiscal year 2019.[1] The program provides guarantees generally of up to 85 percent for loans made to small businesses that are unable to obtain credit on reasonable terms in the private credit markets.[2] Similar to other federal agencies that administer credit programs, SBA is required to estimate the net long-term cost to the government—or subsidy cost—of its loan guarantees each year.[3] The Small Business Act generally requires SBA to set fees for the 7(a) program at a level that results in an initial estimated subsidy cost of zero in the federal budget.[4] SBA's budgets for fiscal years 2014–2019 estimated a zero subsidy cost for the program, but SBA's budget for fiscal year 2020 estimated a $99 million subsidy cost, absent new authority to increase program fees.[5] In years leading up to fiscal year 2020, SBA had increased fees within statutory limits or discontinued certain fee waivers to help achieve a zero subsidy cost. Because SBA did not receive new authority to increase fees, the program required a $99 million appropriation to continue operating in fiscal year 2020.

[1]The loan guarantee covers part of a lender's losses in the event of a borrower default, reducing the risk of lending to small businesses. Section 7(a) of the Small Business Act, codified at 15 U.S.C. § 636(a), provides the authority for the 7(a) program. SBA received authorization to guarantee $30 billion in new loans in fiscal year 2020.

[2]The CARES Act, enacted on March 27, 2020, created the Paycheck Protection Program under the 7(a) program and provided a 100 percent guarantee for loans under the program. Pub. L. No. 116-136 § 1102, 134 Stat. 281, 286 (2020). Paycheck Protection Program loans are outside the scope of this report.

[3]This net long-term cost is calculated on a present value basis and excludes administrative costs. While SBA reestimates these subsidy costs each year, this report focuses on SBA's initial subsidy cost estimates.

[4]15 U.S.C. § 636(a)(23)(A).

[5]Prior to fiscal year 2014, changes in assumptions related to the lingering economic downturn and temporary program changes (e.g., fee reductions) originally enacted under the American Recovery and Reinvestment Act of 2009 contributed to initial positive subsidy cost estimates for fiscal year 2010–2013 loans. Congress appropriated funds to cover the subsidy costs of those loans.

In light of changes to the initial estimated subsidy cost of the 7(a) program, you asked us to evaluate SBA's estimation process. This report examines (1) how SBA estimates the subsidy cost for the 7(a) program, (2) the extent to which SBA incorporated key elements of subsidy cost estimation into its estimation process for the fiscal year 2020 budget, and (3) the changes SBA made in its estimation process for the fiscal year 2020 budget.

To address objective 1, we reviewed SBA's policies, procedures, and supporting documentation for modeling program cash flows, generating initial subsidy cost estimates, and considering potential enhancements to the estimation process. We also interviewed SBA officials and Office of Management and Budget (OMB) staff responsible for generating or reviewing 7(a) subsidy cost estimates. Additionally, to provide perspective on key cash flows and SBA's budget assumptions about those cash flows, we analyzed historical SBA data on SBA's purchases of defaulted 7(a) loans and recoveries on those loans. We reviewed information on SBA's data validation procedures, interviewed SBA officials about data quality and interpretation, and corroborated elements of our analysis with existing SBA analysis. We determined that the data were sufficiently reliable for purposes of providing historical perspective on SBA's budget assumptions for 7(a) purchase and recovery rates.

To address objective 2, we compared documentation related to SBA's estimation process to the eight key elements of subsidy cost estimation we previously identified.[6] We reviewed these eight key elements and related subelements to determine the extent to which SBA met them in its estimation process.[7] Specifically, based on our classification of each subelement as met, partially met, or not met, we determined whether SBA met, generally met, somewhat met, or did not meet each of the eight key

[6]GAO, *Credit Programs: Key Agencies Should Better Document Procedures for Estimating Subsidy Costs*, GAO-16-269 (Washington, D.C.: July 13, 2016). We identified these key elements—discussed in Federal Accounting Standards Advisory Board guidance and our cost estimation guide—as the key elements of the subsidy cost estimation process based on their relevance to creating credible cost estimates. See Federal Accounting Standards Advisory Board, Accounting and Auditing Policy Committee Technical Release 6, *Preparing Estimates for Direct Loan and Loan Guarantee Subsidies under the Federal Credit Reform Act*; and GAO, *Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs,* GAO-09-3SP (Washington, D.C.: Mar. 2, 2009).

[7]The number of subelements for each overarching key element ranged from three to eight.

elements.[8] To supplement this evaluation, we compared SBA's estimation process to relevant key methodological elements and related economic concepts we identified previously to help guide assessment of economic analysis.[9] These elements and concepts were generally similar to the key elements for estimating subsidy costs.

To address objective 3, we reviewed SBA documentation and interviewed SBA officials about changes the agency made in its estimation process for the fiscal year 2020 budget. The documentation included SBA's analysis of the effect of individual changes on the estimated subsidy cost. Appendix I provides more detail on our scope and methodology.

We conducted this performance audit from June 2019 to September 2020 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

7(a) Program

Under SBA's 7(a) loan guarantee program, SBA guarantees loans of up to $5 million made by commercial lenders to small businesses for working

[8]As noted, for each key element, we determined whether SBA met, partially met, or did not meet each of the corresponding subelements. We then tallied the results of the subelement analysis and assigned an overall rating for the overarching key element using a four-tier scale as follows: "met key element" means all of the subelements were met; "generally met key element" means all of the subelements either were met or partially met, with one of the subelements rated partially met; "somewhat met key element" means two or more subelements were partially met or one or more, but less than a majority, of the subelements were not met; and "did not meet key element" means a majority to all of the subelements were not met.

[9]GAO, *Assessment Methodology for Economic Analysis*, GAO-18-151SP (Washington, D.C.: Apr. 10, 2018). The methodological elements to the baseline structure of an economic analysis that we identified include transparency and documentation.

capital and other general business purposes.[10] These lenders are mostly banks, but some are small business lending companies.[11] The guarantee (generally, from 50 to 90 percent of the outstanding balance) assures the lender that if a borrower defaults on a loan, the lender will receive an agreed-upon claim payment from SBA based on that guarantee. To be eligible for the 7(a) program, a business must be an operating for-profit small firm (according to SBA's size standards) located in the United States, and it must be unable to obtain conventional credit at reasonable terms.[12] In addition, there are several 7(a) subprograms that offer streamlined and expedited loan procedures for particular groups of borrowers, and the loan terms—including the maximum SBA guarantee—may vary by program.[13]

In the federal budget request presented to Congress, the 7(a) program is generally required to set fees at a level to cover estimated program costs associated with borrower defaults (in present value terms).[14] To offset some of the costs of the program, such as SBA purchases of defaulted loans, SBA assesses lenders two fees on each 7(a) loan. First,

[10]A borrower can use loan proceeds for most business purposes, including working capital, equipment, furniture and fixtures, land and buildings, leasehold improvements, and certain debt refinancing. The maximum size of the loan may vary by 7(a) subprogram.

[11]A small business lending company is a nondepository lending institution that is SBA-licensed and is authorized by SBA to only make loans pursuant to section 7(a) of the Small Business Act and loans to intermediaries in SBA's Microloan program. SBA has imposed a moratorium on licensing new small business lending companies since January 1982. 13 C.F.R. § 120.10.

[12]In establishing size standards, SBA considers economic characteristics of the industry, including degree of competition, average firm size, start-up costs and entry barriers, and distribution of firms by size. It also considers growth trends, competition from other industries, and other factors that may distinguish small firms from other firms. SBA's size standards seek to ensure that a firm meets a specific size standard and is not dominant in its field of operation.

[13]Examples of subprograms include SBA Express, which is designed to increase the availability of credit to small businesses by permitting lenders to use their existing documentation and procedures in return for receiving a reduced SBA guarantee on loans. It provides a 50 percent loan guarantee on loan amounts up to $350,000. Export Express is another subprogram and is designed to increase the availability of credit to current and prospective small business exporters that have been in business, although not necessarily in exporting, for at least 12 full months, particularly small businesses needing revolving lines of credit.

[14]15 U.S.C. § 636(a)(23)(A).

depending on the term of the loan, the lender must pay a guarantee fee.[15] This fee is based on the amount of the loan and SBA's guarantee percentage, and lenders can pass the fee on to the borrower.[16] Second, lenders must pay a yearly servicing fee based on the outstanding balance of the guaranteed portion of the loan.[17] This fee cannot be charged to the borrower.

As previously discussed, SBA estimated that, without new authority to increase program fees, it would require a subsidy of $99 million (or a subsidy rate of 0.33 percent when expressed as the subsidy cost per dollar of credit assistance) for 7(a) loan guarantees in fiscal year 2020. Accordingly, the President's budget for fiscal year 2020 requested that Congress grant SBA the flexibility to modify the fee structure—including increasing the 0.55 percent statutory limit on the yearly servicing fee—to achieve a zero subsidy cost. Congress did not grant SBA the fee flexibility and instead appropriated $99 million to cover the estimated subsidy cost.

Cost Estimation Requirements for Federal Credit Programs

The Federal Credit Reform Act of 1990 (FCRA) was enacted with the intent of improving the accuracy of the cost of federal credit programs reported in the President's budget. FCRA requires agencies to measure the government's net long-term cost for these programs to permit better cost comparisons both among credit programs and between credit and

[15]For a loan with a maturity of 12 months or less, the lender must pay the guarantee fee to SBA electronically within 10 business days after receiving SBA loan approval. For a loan with a maturity in excess of 12 months, the lender must pay the guarantee fee to SBA electronically within 90 days after SBA gives its loan approval. 13 C.F.R. § 120.220(b). Prior to September 2017, lenders were required to submit the guarantee fee at the time of the loan application for loans with maturities of 12 months or less.

[16]Pub. L. No. 108-447, Div. K., §102 established SBA's current maximum up-front guarantee fees as up to 2 percent of the SBA-guaranteed portion of 7(a) loans of $150,000 or less; up to 3 percent of the SBA-guaranteed portion of 7(a) loans exceeding $150,000 but not more than $700,000; and up to 3.5 percent of the SBA-guaranteed portion of 7(a) loans exceeding $700,000. In addition, 7(a) loans with an SBA-guaranteed portion in excess of $1 million can be charged an additional 0.25 percent guarantee fee on the guaranteed amount in excess of $1 million. 15 U.S.C. §636(a)(18)(A).

[17]The servicing fee cannot exceed 0.55 percent per year of the outstanding balance of the guaranteed portion and is to be "in an amount established once annually…in the Administration's budget request to Congress as necessary to reduce to zero the cost to the Administration of making guarantees." 15 U.S.C. § 636(a)(23)(A).

noncredit programs. The policies enacted under FCRA, sometimes referred to simply as credit reform, recognized that the actual cost of a direct loan or loan guarantee is not captured by its cash flows in any one year. Instead, the actual cost is the net present value—that is, the worth in terms of money paid immediately—of its cash flows over the life of the loan.[18]

FCRA requires agencies to estimate the net long-term cost to the government of extending or guaranteeing credit. To calculate these subsidy costs, agencies must calculate, by annual loan cohort, the net present value of the estimated cash outflows from the government (for example, payments to lenders to honor guarantees on defaulted loans) minus estimated cash inflows to the government (for example, fees paid by borrowers and lenders), over the life of the loan and excluding administrative costs.[19] The subsidy cost is included in the President's budget for the year the loans or loan guarantees are to be made. For the 7(a) program, cash flows include estimated fee income, SBA purchases of defaulted loans, and recoveries on those loans.[20]

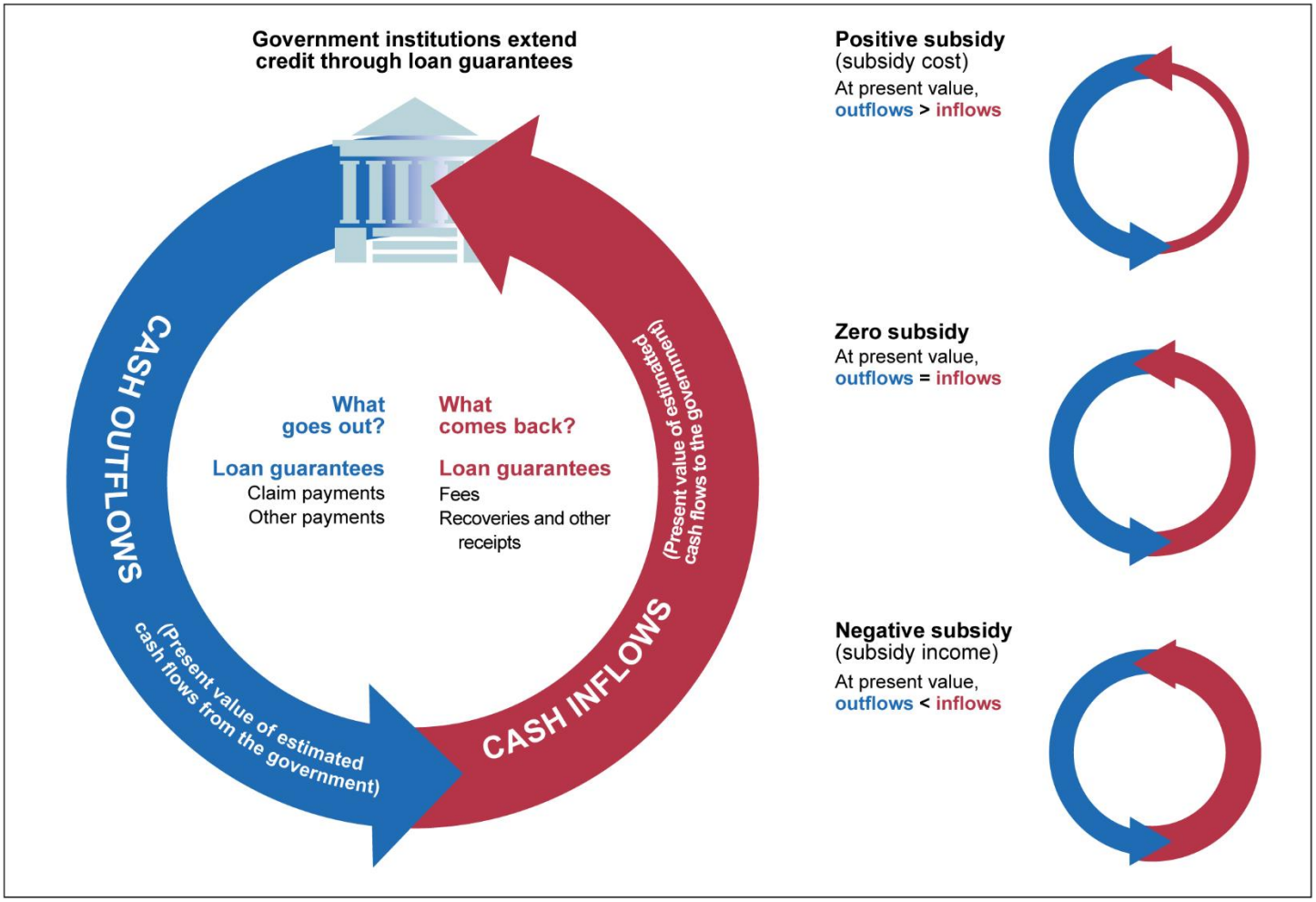
Figure 1 illustrates the types of cash flows that affect the subsidy cost for loan guarantees. If the present value of estimated cash outflows exceeds cash inflows, there is a positive subsidy cost. If the present value of estimated cash inflows exceeds cash outflows, there is a negative subsidy cost, referred to as subsidy income.

[18]The present value of a stream of future returns or costs is its worth in terms of money paid immediately. In calculations of present value under FCRA, prevailing interest rates on U.S. Treasury securities provide the basis for converting future amounts into their "money now" equivalents.

[19]Cohort refers to the fiscal year of commitment for loan guarantees.

[20]Following default, if SBA determines that it will honor the guarantee, SBA purchases the loan from the lender at the relevant guarantee percentage. The exact amount that SBA purchases is offset by any proceeds from the sale of collateral prior to purchase.

Figure 1: Subsidy Costs and Income for Loan Guarantees



Source: GAO. | GAO-20-618

FCRA requires that agencies have budget authority to cover a program's subsidy cost to the government in advance—before new loan guarantee commitments are made. The data used for budgetary subsidy cost estimates are generally updated—or reestimated—annually after the end of the fiscal year to reflect actual loan performance and to incorporate any changes in assumptions about future loan performance. Reestimates that increase subsidy costs are referred to as upward reestimates (an agency would need additional funds), while reestimates that decrease subsidy costs are referred to as downward reestimates (an agency would return funds to the Department of the Treasury). Agencies do not need to

request additional appropriations to cover upward reestimates because FCRA provides permanent indefinite budget authority for this purpose.[21]

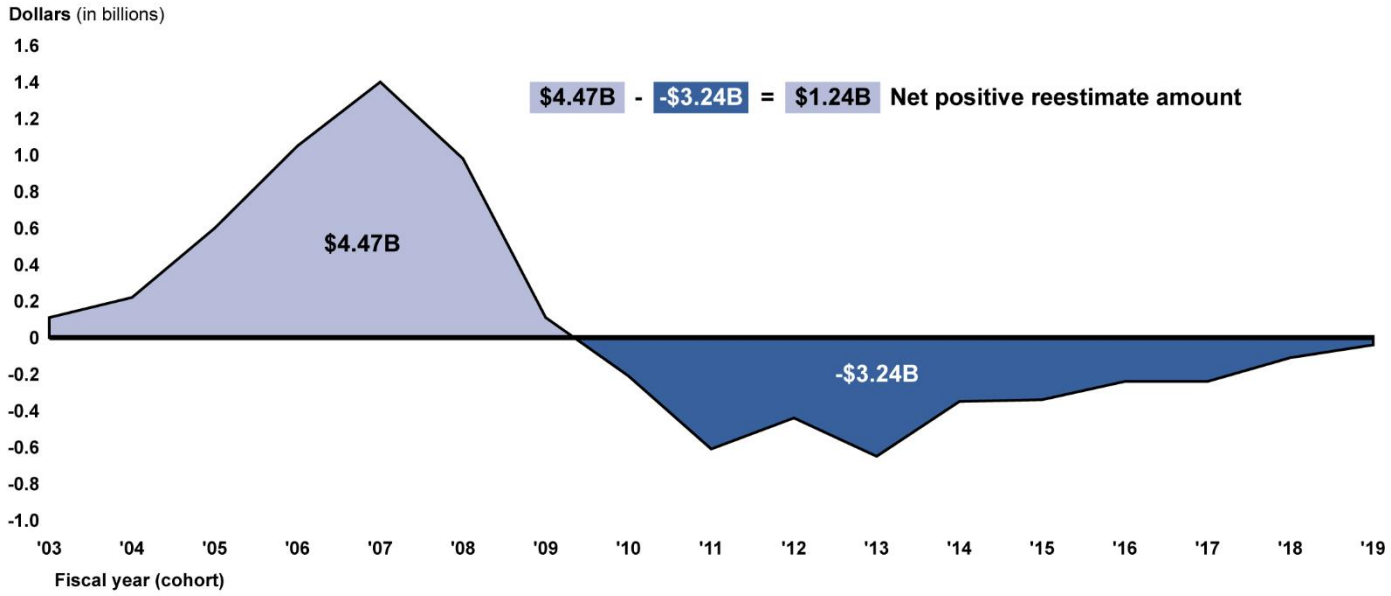
As shown in figure 2, 7(a) loan cohorts from fiscal years 2003 through 2009 all had upward lifetime reestimates ($4.47 billion collectively as of the end of fiscal year 2019), meaning their subsidy costs thus far have been higher than originally estimated.[22] In contrast, 7(a) loan cohorts from fiscal years 2010 through 2019 (the most recent cohort for which reestimates were made) all had downward lifetime reestimates ($3.24 billion collectively as of the end of fiscal year 2019), meaning their subsidy costs thus far have been lower than originally estimated.[23] As a result, the 7(a) program experienced a net positive reestimate of $1.24 billion for the fiscal year 2003 through 2019 cohorts combined.

[21]Permanent indefinite budget authority is available for obligation and expenditure without fiscal year limitation and is not limited to a specified amount or ceiling.

[22]We start with fiscal year 2003 because SBA began using an econometric model for subsidy cost estimates that year. We discuss SBA's model later in this report.

[23]A portion of the downward lifetime reestimates for fiscal year 2010–2019 loans represents appropriated funds returned to the Department of the Treasury because Congress appropriated funds to cover initial positive subsidy cost estimates for fiscal year 2010–2013 loans. The 2020 economic downturn caused by Coronavirus Disease 2019 can be expected to result in upward reestimates (higher costs) for many 7(a) loan cohorts.

Figure 2: Net Lifetime Subsidy Reestimates, Excluding Interest, for Small Business Administration 7(a) Loan Guarantees in Fiscal Years 2003–2019, as of Fiscal Year 2019



Source: GAO analysis of Federal Credit Supplement for fiscal year 2021. | GAO-20-618

Note: A portion of the negative lifetime reestimates for fiscal year 2010–2019 loans represents appropriated funds returned to the Department of the Treasury because Congress appropriated funds to cover initial positive subsidy cost estimates for fiscal year 2010–2013 loans. Total numbers do not add because of rounding.

Budgeting and accounting guidance has been developed to help agencies develop these subsidy cost estimates. OMB—to which FCRA assigned the responsibility for coordinating the cost estimates required by the act—is authorized to delegate to federal lending agencies the authority to estimate costs, based on OMB's written guidelines. These guidelines are primarily contained in OMB Circular No. A-11, *Preparation, Submission, and Execution of the Budget*. Further, the Federal Accounting Standards Advisory Board (FASAB) developed the primary accounting standard for federal credit programs, Statement of Federal Financial Accounting Standards No. 2, *Accounting for Direct Loans and Loan Guarantees*, which became effective in fiscal year 1994. This standard established financial accounting guidance consistent with FCRA for estimating the cost of direct loan and loan guarantee programs, and for recording direct loans receivable and the liability for loan guarantees for financial reporting purposes.

While OMB Circular No. A-11 and Statement of Federal Financial Accounting Standards No. 2 provide general guidance for agencies to develop subsidy cost estimates, detailed guidance on the preparation of

subsidy cost estimates is contained in FASAB Accounting and Auditing Policy Committee Technical Release 6, *Preparing Estimates for Direct Loan and Loan Guarantee Subsidies under the Federal Credit Reform Act*.[24] This technical release provides detailed guidance and specific practices that, if fully implemented by federal agencies, are intended to enhance their ability to reasonably estimate credit program costs.

Methods for Estimating Subsidy Costs

To implement FCRA and calculate subsidy costs, agencies estimate the expected cash outflows and inflows over the life of the loans for each loan cohort. Efforts to make reasonable subsidy cost estimates begin with establishing and using reliable records of historical loan performance data and taking into consideration current and forecasted economic conditions. Agency management is responsible for accumulating relevant, sufficient, and reliable data on which to base the estimates. Further, according to the primary accounting standard for direct loans and loan guarantees, subsidy cost estimates should be based on a systematic methodology to project expected cash flows into the future. To accomplish this task, an agency develops a cash flow model, which is a mathematical model that generally uses historical information and various assumptions related to future loan performance, including defaults, recoveries, and the timing of these events.

In addition to historical data, agencies may consider other relevant factors when estimating future loan performance. These factors may include (1) current and forecasted economic conditions that may affect loan performance, (2) financial and other relevant characteristics of borrowers, (3) the value of the collateral to loan balance, and (4) changes in recoverable value of collateral. Various budgeting and accounting guidance related to estimating subsidy costs requires agencies to establish internal controls over the calculations, including establishing and

[24]The Accounting and Auditing Policy Committee was organized in May 1997 by the Department of the Treasury, OMB, GAO, the Chief Financial Officers' Council, and the President's Council on Integrity and Efficiency to research accounting and auditing issues requiring guidance. The Accounting and Auditing Policy Committee serves as a permanent committee sponsored by FASAB. The committee's mission is to assist the federal government in improving financial reporting through the timely identification, discussion, and recommendation of solutions to accounting and auditing issues as they relate to the specific application of existing authoritative literature.

documenting policies and procedures and maintaining supporting documentation for subsidy cost estimates.

As we previously reported, all forecasts are uncertain for multiple reasons.[25] When relationships among economic variables are estimated, uncertainty may arise from the choice of variables used in the model, from the degree of precision with which the strength of the relationships is estimated, and from uncertainty about the future values of the variables used in the forecasting equation. In addition, unexpected external events, such as the outbreak of Coronavirus Disease 2019 and resulting economic turmoil, can affect the accuracy of the forecast.

SBA's Office of Financial Analysis and Modeling within the Office of the Chief Financial Officer is responsible for the 7(a) cash flow model. SBA sometimes uses contract support to help with its cash flow model.

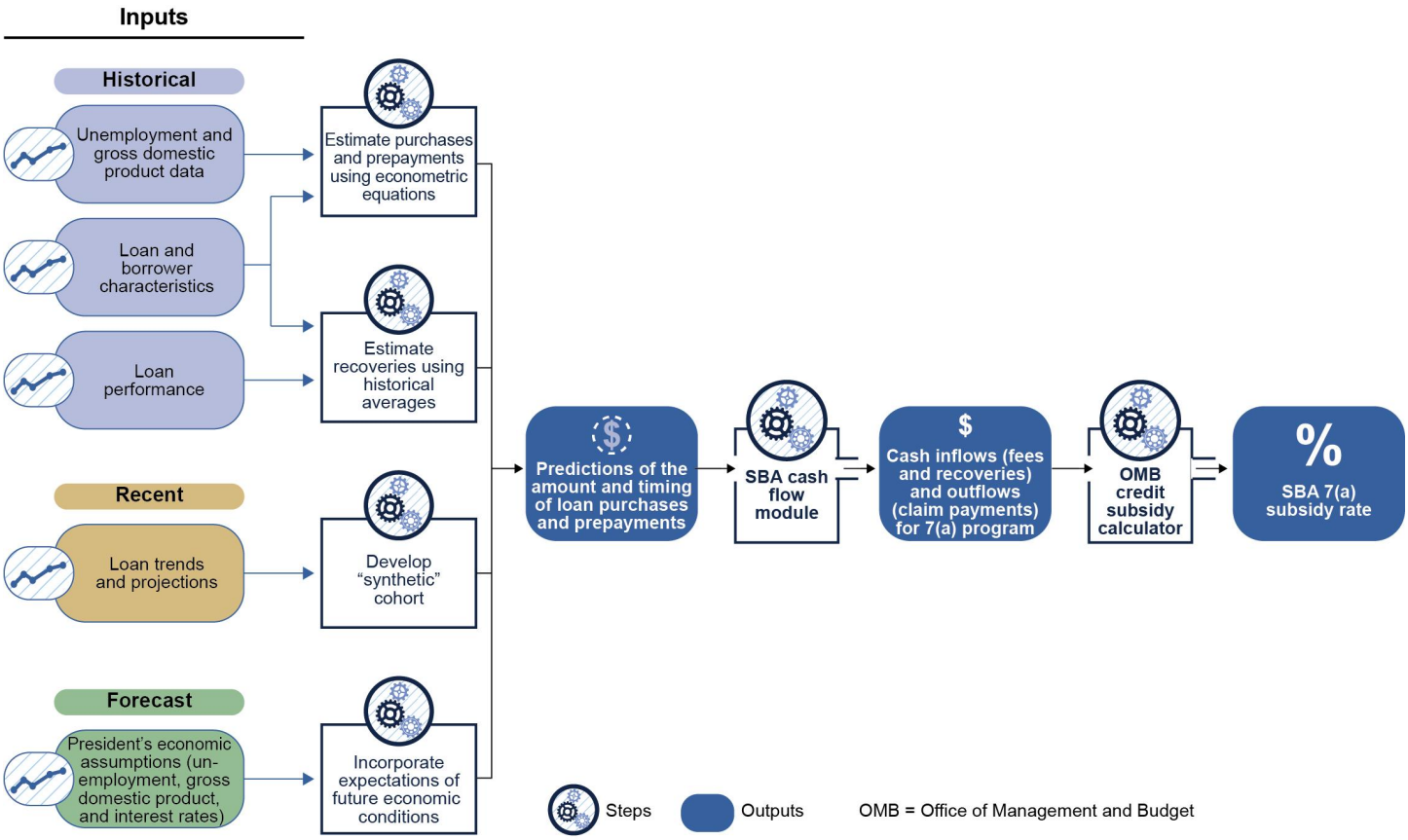
SBA Uses a Cash Flow Model to Estimate Subsidy Costs and Has a Process for Considering Enhancements

SBA's Estimation Process Involves Multiple Steps

SBA's process for estimating 7(a) subsidy costs centers on a cash flow model that has a number of components, including multiple data inputs and calculation steps (see fig. 3). According to SBA officials, the model uses historical data on every 7(a) loan and transaction since 1988, including loan characteristics, borrower characteristics, and performance information. For example, key performance information includes the dollar amount of defaulted loans SBA purchased and the dollar amount it recovered on those loans. Appendix II provides information on 7(a) purchase and recovery rates by loan cohort and historical context for SBA's purchase and recovery assumptions for the fiscal year 2020 budget.

[25]GAO, *Small Business Administration: Model for 7(a) Program Subsidy Had Reasonable Equations, but Inadequate Documentation Hampered External Reviews*, GAO-04-9 (Washington, D.C.: Mar. 31, 2004).

Figure 3: Overview of the Small Business Administration's (SBA) Cash Flow Model for Estimating 7(a) Subsidy Costs



Source: GAO analysis of SBA documents. | GAO-20-618

Key steps in the estimation process and related inputs are as follows:

Estimate purchases and prepayments using econometric equations.[26] SBA uses econometric equations to estimate the probabilities of purchase and prepayment at each quarter of the guaranteed loans' lives.[27] The equations are derived from data on historical 7(a) loan performance, loan and borrower characteristics, and

[26]Borrowers may prepay their loans in full or in part at any time by remitting the remaining principal balance and accrued interest to lenders.

[27]Econometric modeling is a series of techniques used to quantify relationships among a group of variables and is often used to forecast the value of economic variables, such as loan defaults.

macroeconomic factors.[28] As shown in table 1, the model incorporates independent variables such as the age of the loan, the borrower's region and industry, and changes in unemployment rates and gross domestic product.[29] The model also includes two unemployment variables to account for separate estimated effects of the current state unemployment rate and the change in the state unemployment rate since loan origination.[30]

[28]SBA combines these data to create an estimation panel dataset. The dataset contains one observation per loan, per quarterly period of loan life from disbursement to termination.

[29]Independent variables are also referred to as predictor variables. The independent variables in SBA's cash flow model have different estimated effects on the probability of purchase or prepayment (which are dependent or outcome variables). For example, the model for the fiscal year 2020 budget estimated that loans in the accommodations, food service, and entertainment sector would have higher purchase rates and that loans in the natural resources sector would have higher prepayment rates than loans in other industry sectors.

[30]The state unemployment rate variable reflects the current business climate in which the firm operates and can be associated with loan performance outcomes, such as whether a business will default, prepay, or continue paying on its loan. For example, in an environment with a low unemployment rate and a strong economy, consumers may have more purchasing power and spend money at a business supported by a 7(a) loan, which would increase revenue and allow the business to stay current on loan payments or potentially prepay the loan. According to SBA officials, the change in the unemployment rate since loan origination affects loan performance differently than the current unemployment rate. The officials told us that if the economy weakens after a group of loans was originated, defaults could increase because those loans were made during a different economic climate. For example, SBA officials found that the loans made in fiscal year 2006 were approved in a low unemployment rate environment (before the 2007 – 2009 recession), but as unemployment rates increased, the loans defaulted at higher rates than the historical average. According to SBA officials, the increase in default rates was greater than could be explained by the current unemployment rate itself. Conversely, SBA found that the loans made in fiscal year 2010 were approved under a high unemployment rate environment, but as unemployment rates decreased, the loans defaulted at lower rates than the historical average.

Table 1: Examples of Independent Variables in SBA's Fiscal Year 2020 Cash Flow Model for Estimating 7(a) Loan Purchases and Prepayments

Independent variable
Age of the loan, in 3-month intervals, from disbursement
Natural log of the dollar amount of the loan
Census region in which the borrower is located
Industry sector of the borrower
Loan term
Organization type (corporation, partnership, or sole proprietorship)
New business indicator
Percentage change in gross domestic product from prior quarter
Prime lending rate
Unemployment rate of the state in which the business is located
Change in state unemployment rate since loan origination

Source: GAO presentation of Small Business Administration (SBA) information. | GAO-20-618

Estimate recoveries using historical averages. SBA estimates the amount of recoveries lenders and SBA will share following the liquidation of defaulted 7(a) loans and attempts to recover cash to satisfy the borrower's debt. Any recoveries are shared based on SBA's relative guarantee percentage.[31] The cash flow model uses a set of time-dependent recovery rates, referred to as a recovery curve, which is applied to the defaulted borrowers' outstanding debt. The cash flow model applies different recovery assumptions, based on stratified historical averages, for each quarter after purchase and charge-off depending on the characteristics and amount of the purchased loan.[32]

Develop synthetic cohort. SBA develops expectations of future loan characteristics through the development of a "synthetic cohort." The synthetic cohort (also called the budget formulation cohort) represents the anticipated size and composition of the loan cohort SBA expects to guarantee in the next budget year. Loans from the most recent actual cohort serve as the base for the synthetic cohort. SBA develops the

[31]Recoveries are the amounts of defaulted loans that were eventually recouped by collection efforts, such as the liquidation of assets.

[32]Charge-off is an administrative action whereby SBA reclassifies the status of a loan from "liquidation" to "charge-off" and removes the loan's outstanding balance from its accounting records. Charging off a loan is appropriate when all reasonable efforts have been exhausted to recover the remaining balance. SBA stratifies the recovery curves along several dimensions, including loan approval amount, subprogram (Express or non-Express loans), and loan type (term loan or revolving line of credit).

synthetic cohort by adjusting the base to reflect recent trends and averages in the 7(a) portfolio—such as the number and dollar amount of loans guaranteed and the distribution of loans by region, industry, maturity term, and 7(a) subprogram. For example, according to SBA officials, if recent trends suggest that the cohort for the next budget year will contain more loans of a certain size, SBA staff would increase the numbers of loans of that size for the synthetic cohort.

Incorporate expectations of future economic conditions. SBA incorporates the long-term forecasts of macroeconomic variables such as unemployment rates, gross domestic product (GDP) growth, and prime interest rates that affect projected loan purchases and prepayments. According to SBA officials, among these variables, unemployment rates have the greatest effect on 7(a) subsidy cost estimates. The forecasted values are contained in the President's economic assumptions (part of the President's budget), which SBA and other federal credit agencies are required to use in developing subsidy cost estimates. OMB generally provides these assumptions to agencies each November. Appendix III provides additional information on inputs used in SBA's 7(a) cash flow model.

The above steps culminate in the model that produces the estimated cash flows required to estimate a subsidy rate for a cohort of guaranteed 7(a) loans. The cash flows span the entire life of the cohort—from disbursement of loan proceeds to maturity—and include guarantee and yearly fees, purchases of defaulted loans, and recoveries on purchased loans. SBA then enters these cash flows into the OMB Credit Subsidy Calculator, a tool agencies use to calculate the net present value of estimated cash flows, to produce the official credit subsidy rate for the President's budget.[33]

SBA's cash flow model undergoes several annual reviews. First, a contractor conducts an independent verification and validation of the model. Among other things, the contractor reviews the model's methodology to ensure it is consistent with FCRA guidance and industry

[33]According to OMB Circular A-11, all federal agencies must use the Credit Subsidy Calculator and associated discount rates to ensure government-wide comparability and uniformity of discounting. For loans made, guaranteed, or modified starting in fiscal year 2001, the calculator discounts the estimated cash flow for each year (or other time period) using the interest rate on a marketable zero-coupon Treasury security with the same maturity from the date of disbursement as that cash flow. For example, a cash flow expected to occur 1 year after the date of disbursement will be discounted at the 1-year zero-coupon Treasury rate.

standards and assesses the integrity of the model inputs and the accuracy of the outputs. Second, OMB staff said that they review SBA's subsidy cost estimates annually for consistency with OMB guidance and review any changes in the cash flow model and the underlying support for the changes. Finally, the independent auditor of SBA's annual financial statements reviews SBA's reestimates of 7(a) subsidy costs. According to the auditors, this review involves examination of methodologies, analysis, and documentation that are also relevant to initial subsidy cost estimates.[34]

SBA Has a Process for Considering Potential Enhancements

SBA maintains and annually reviews a running list of potential enhancements to its estimation process.[35] According to SBA's policies and officials, from January through June of each year, SBA staff evaluate and research suggestions from within SBA—including from staff in the Office of Financial Analysis and Modelling (modelling team) and Office of Capital Access (program office)—and from outside sources, including the modelling team's independent verification and validation contractor and SBA's independent financial statement auditor.

According to SBA officials, SBA begins the evaluation and research period by prioritizing the list of potential enhancements as follows:[36]

- **Required enhancements.** According to SBA, the highest-priority enhancements are those that must be made to comply with statutory and OMB requirements or meet accounting and auditing standards for loan guarantees. For example, this category

[34]The independent audits of SBA's financial statements for fiscal years 2018 and 2019 (the audits closest in time to development of the fiscal year 2020 budget) did not identify any material weaknesses or significant deficiencies directly related to SBA's 7(a) subsidy cost estimates.

[35]Not all of the potential enhancements focus on SBA's cash flow model for initial subsidy cost estimates. Some focus on the model SBA uses for reestimates or on procedures for conducting actuals-to-estimates and sensitivity analyses.

[36]In addition to the prioritized items, according to SBA officials, SBA periodically makes enhancements that have little or no effect on subsidy cost estimates but make the cash flow model run more efficiently (for example, updates to computer code). According to the officials, these changes are generally less resource-intensive to implement than the prioritized items.

includes standard annual updates to the estimation process—including updating data, assumptions, documentation, and reporting—needed to comply with OMB guidance. SBA officials said this category also includes any enhancements needed to resolve issues that could adversely affect audit opinions on SBA's financial statements. According to the officials, SBA's list as of mid-March 2020 did not contain any required enhancements except for routine documentation updates for the annual budget and financial statement audit cycles. However, the officials told us they subsequently added and executed a required enhancement to the cash flow model for subsidy reestimates to implement a provision in the CARES Act, which was enacted on March 27, 2020.[37]

- **Optional enhancements expected to affect subsidy cost estimates**. According to SBA, optional enhancements that are expected to affect subsidy cost estimates are the next-highest priority. SBA officials said they use their professional judgment—informed by SBA analysis and observation of the 7(a) portfolio and any relevant external analyses—to identify the enhancements that they believe would have the largest effect on subsidy cost estimates. According to the officials, SBA's implementation of these enhancements is subject to the availability of resources.

According to SBA officials, SBA researches and tests all prioritized potential enhancements before implementing them to determine whether they will improve model performance and to avoid introducing estimation errors. SBA policies require the modelling team to obtain management approval for modelling changes and to document how the changes were implemented and their resulting effect on estimated subsidy costs. While SBA can research and implement many of the potential enhancements within its annual process, some of the potential enhancements represent larger changes that may require multiple years of research and testing prior to implementation. SBA officials said that potential enhancements they do not research or implement in a given year remain on SBA's list, and new suggestions are added to the list as they arise.

[37]The act requires SBA to pay principal, interest, and any associated fees that are owed for certain 7(a) loans for 6 months. Pub. L. No. 116-136 § 1112(c), 134 Stat. at 309-310.

SBA Generally Incorporated Key Elements for Estimating Subsidy Costs into Its Estimation Process

As previously discussed, in prior work we identified eight key elements that agencies should consider when preparing subsidy cost estimates.[38] These elements are based on practices we identified in FASAB Technical Release 6 and our Cost Estimating and Assessment Guide that are relevant to creating credible cost estimates.[39] As shown in table 2, we found that SBA generally incorporated these elements into its estimation process for the fiscal year 2020 budget, based on our review of SBA documentation and interviews with officials. See appendix I for additional details on the key elements we evaluated, including the specific subelements we examined for each one.

Consistent with our findings, SBA's independent verification and validation contractor found no issues with the cash flow model that would have a material effect on the initial subsidy rate for the fiscal year 2020 7(a) cohort. Additionally, the independent audits of SBA's financial statements for fiscal years 2018 and 2019 (the audits closest in time to development of the fiscal year 2020 budget) did not identify any material weaknesses or significant deficiencies related to SBA's 7(a) subsidy cost estimates.[40]

[38]See GAO-16-269. In addition, as previously mentioned, certain key elements for estimating subsidy costs are similar to certain key elements GAO previously identified for assessing economic analysis; see GAO-18-151SP.

[39]Federal Accounting Standards Advisory Board, Accounting and Auditing Policy Committee Technical Release 6 and GAO-09-3SP.

[40]According to SBA's independent financial statement auditor, the audit also assessed SBA's compliance with FCRA requirements for credit subsidy reestimates and did not find any instances of noncompliance. The auditors said they reviewed documentation of SBA's cash flow model, policies and procedures, sensitivity analysis, decomposition analysis, and actuals-to-estimates comparisons.

Table 2: GAO Assessment of Key Elements of the Subsidy Cost Estimation Process for the Small Business Administration's (SBA) 7(a) Program

Key element	Definition	GAO assessment
Historical data validation	Management should accumulate sufficient, relevant, and reliable supporting data on which to base cash flow projections, such as data on prepayments, defaults, and recoveries. Subsidy cost estimates should be based on the best available data at the time the estimates are made.	Met key element
Informed opinion documentation	In certain limited instances, when relevant historical data, modeling capabilities, or both are not available, informed opinion may be used to support cash flow projections. When informed opinion is used, management should document the expert's qualifications. In addition, the basis for the stated opinion must be articulated and documented in detail, including an explanation for why the particular projection is appropriate for the program.	Not applicable[a]
Cash flow assumption documentation	Documentation must be developed to support the assumptions used by agencies in the subsidy cost calculations, including the data sources and calculation methods. Assumptions should also be coordinated between program and accounting offices.	Generally met key element[b]
Cash flow model documentation	Management should ensure that its cash flow models used to estimate subsidy costs are well-organized; documented; and, to reduce the chance of errors, require minimal manual data entry. Documentation should include the rationale for using the specific model; the mechanics of the model, including how to use and update the model and formulas and other mathematical functions within the model; and sources of supporting data. Management should also document the controls over the model, including management review and approval of the model. Often, because of the complexity of cash flow models, management will hire a private firm to conduct an independent verification and validation of the model, which entails ensuring that the model's calculations are accurate and consistent with the model documentation.	Met key element
Consistency with program design	Based on the laws and regulations that govern the credit program, management should document program design factors relevant to the cash flow model and assumptions, such as fees, grace periods, and maximum loan amounts. This documentation will help management ensure that credit subsidy cost estimates are prepared consistent with the terms and conditions of the program.	Met key element
Analysis of estimated cash flows	Management should conduct periodic comparisons of estimated loan performance to actual cash flows in the accounting system. This comparison allows agencies to identify and research significant differences and determine whether the cash flow model or assumptions related to expected future loan performance need to be revised. Further, if management identifies consistent trends in under- or overestimates of subsidy costs, such trends should be investigated and explained.	Met key element
Sensitivity analysis	Management should perform sensitivity analyses to identify which cash flow assumptions—such as defaults, recoveries, or prepayments—have the greatest effect on the cost of the credit program. Knowledge of these key assumptions provides management with the ability to monitor the economic trends that most affect the program's performance. These analyses also allow agencies to more efficiently focus their efforts on documenting the support for the key assumptions.	Met key element

Key element	Definition	GAO assessment
Policies and procedures for estimating subsidy costs	Management should establish and document policies and procedures for calculating subsidy cost estimates, including required supporting documentation and a formal review and approval process. In addition, preparing reliable and timely direct loan and loan guarantee subsidy cost estimates must be a joint effort between the budget, accounting, and program offices at each agency. These offices should work together to ensure that the procedures and internal controls are implemented and operating as designed. Further, documented policies and procedures are important internal controls that are designed to help ensure continuity when there is employee turnover and to calculate reliable, reasonable, and well-supported cost estimates.	Met key element

Source: GAO analysis of subsidy cost estimation guidance and SBA documents. | GAO-20-618

Note: For each key element, we determined whether SBA met, partially met, or did not meet corresponding subelements. We then tallied the results of the subelement analysis and assigned an overall rating for the overarching key element using a four-tier scale as follows: "met key element" means all of the subelements were met; "generally met key element" means all of the subelements either were met or partially met, with one of the subelements rated partially met; "somewhat met key element" means two or more subelements were partially met or one or more, but less than a majority, of the subelements were not met; and "did not meet key element" means a majority to all of the subelements were not met.

[a]This key element was not applicable because SBA did not lack relevant historical data or modeling capabilities and therefore did not rely on informed opinion as the primary basis to support any cash flow projections.

[b]This key element had five subelements, one for each of four categories of cash flow assumptions and one for the process of coordinating the assumptions between program and accounting offices. We determined that SBA fully documented the coordination process and three of the four categories of cash flow assumptions, and partially documented the remaining category. This level of documentation met our criteria for "generally met" for the overall key element.

Historical data validation. SBA met this key element because it based its cash flow projections on sufficient, relevant, and reliable data, and SBA's supporting data came from the best available sources.[41] For example, SBA's main source of data for the cash flow model includes detailed financial and static (e.g., loan origination) information on 7(a) loans and is updated and reconciled to the accounting general ledger daily. In addition, SBA performed and documented validations of these data.

Informed opinion documentation. This key element was not applicable because SBA did not lack relevant historical data or modeling capabilities and therefore did not rely on informed opinion as the primary basis to support any cash flow projections. SBA used historical loan data, econometric models, and historical averages to estimate cash flows. When developing the synthetic cohort, the modelling team finalized its expectations of future loan characteristics based on feedback from the

[41]This key element of subsidy cost estimation is similar to the "documentation" key element of economic analysis we identified in GAO-18-151SP, which states that the analysis should cite all sources used and document that the analysis is based on the best available economic information. Therefore, we determined that SBA's estimation process also aligned with this key element of economic analysis.

program office, but the foundation of these expectations was recent trends and averages in the 7(a) portfolio.

Cash flow assumption documentation. SBA generally met this key element because the agency's documentation, with few exceptions, supported the cash flow assumptions used in its estimation process.[42] For example, SBA's documentation fully supported cash flow assumptions related to loan performance, the distribution of loan characteristics, and fee income, and generally supported cash flow assumptions related to macroeconomic conditions. In addition, SBA documented the process for coordinating these assumptions between the program office and the accounting office.

SBA's documentation could have more completely supported certain macroeconomic assumptions. For example, SBA determined that incorporating a particular transformation of the unemployment rate variable into specific purchase and prepayment equations would improve the estimates, but did not explain how it chose the particular transformation. In response to a question from its independent verification and validation contractor, SBA explained that it wanted to use different intervals to reflect various strengths of the economy, such as a low unemployment rate interval to represent a strong economy and a high unemployment rate interval to represent a weak economy.[43] However, SBA has not included this explanation in its model documentation. In addition, SBA's documentation did not fully explain certain steps it takes to project state unemployment rates. More specifically, the documentation did not provide complete information on the data sources and calculation methods SBA used to generate state unemployment projections from ratios of state unemployment rates to national unemployment rates.[44]

[42]This key element of subsidy cost estimation is similar to the "transparency" key element of economic analysis we identified in GAO-18-151SP, which (among other things) states that the analysis should describe and justify the analytical choices, assumptions, and data used. Therefore, we determined that SBA's estimation process also generally aligned with this key element of economic analysis.

[43]SBA also uses two intervals between the high and low employment rate variables to represent a more normal economy and an economy that is in a mild recession or recovering from prior weakness.

[44]To project unemployment rates for the individual states, SBA analyzes data from the previous fiscal year on the relationship between each state's unemployment rate and the national rate and expresses that relationship as a ratio. SBA then applies that ratio to the 10-year national unemployment rate forecast in the President's economic assumptions for the budget year that corresponds with the synthetic cohort year.

SBA officials concurred with these observations and said they will include this information in their next documentation update.

Because SBA's documentation supported major cash flow assumptions and limitations in the documentation were relatively minor, we determined that SBA generally met this key element of subsidy cost estimation.[45]

Cash flow model documentation. SBA met this key element because its documentation described the mechanics of the model, mathematical functions within the model, sources of supporting data, and controls over the model, such as management review and approval. Similarly, SBA's independent verification and validation contractor found no issues with the model documentation, methodology, inputs, outputs, or operations that would have a material effect on the subsidy rate for the 7(a) budget formulation cohort.

Consistency with program design. SBA met this key element because it documented important aspects of the 7(a) program that are relevant to the cash flow model and assumptions. These aspects include loan fees, maximum loan amounts, and maximum guarantee percentages. Similarly, SBA's independent verification and validation contractor noted that the program description information for the fiscal year 2020 model was consistent with the program's design.

Analysis of estimated cash flows. SBA met this key element because it compared estimated cash flows to actual amounts, investigated and explained trends in under- or overestimates of subsidy costs, and made a corresponding modelling revision. For example, SBA discovered that its former estimation process was underestimating purchase amounts for cohorts 2005 through 2013. As discussed in more detail later in this report, SBA revised the purchase amount methodology within its estimation process for the fiscal year 2020 budget. According to SBA officials, this revision has improved projections and corrected the previous underprojection of purchase amounts.

[45]This key element had five subelements, one for each of four categories of cash flow assumptions and one for the process of coordinating the assumptions between program and accounting offices. We determined that SBA fully documented the coordination process and three of the four categories of cash flow assumptions (loan performance, distribution of loan characteristics, and fee income), and partially documented the remaining category (macroeconomic conditions).

Sensitivity analysis. SBA met this key element because staff conducted a sensitivity analysis on a number of cash flow assumptions related to loan performance, loan characteristics, and economic conditions to identify which assumptions have the greatest effect on the estimated subsidy rate.[46] Sensitivity analysis involves varying assumptions upward or downward within selected parameters to examine the effect on estimates. SBA adjusts the parameters depending on what is appropriate for each assumption. To illustrate, SBA's sensitivity analysis found that

- increasing and decreasing projected default rates by 10 percent caused the subsidy rate to increase and decrease by about 0.42 and 0.43 percentage points, respectively;
- increasing and decreasing the projected percentage of loans made to the service industry by 20 percent caused the subsidy rate to decrease by 0.12 percentage points and increase by 0.11 percentage points, respectively; and
- increasing and decreasing the unemployment rates projected in the President's economic assumptions by 20 percent caused the subsidy rate to increase by 0.64 percentage points and decrease by 0.48 percentage points, respectively.

Policies and procedures for estimating subsidy costs. SBA met this key element because the agency's policies and procedures describe how SBA calculates its subsidy cost estimates and considers potential changes to its model, as well as its processes for reviewing and approving the model. In addition, according to the policies and procedures, SBA's budget, accounting, and program offices all have a role in the estimation process.

The Overall Higher Subsidy Rate for Fiscal Year 2020 Is the Result of a Number of Model Changes and Data Updates

The overall higher initial subsidy rate for fiscal year 2020 was the result of a number of individual changes in SBA's estimation process. Some of

[46]This key element of subsidy cost estimation is similar to the "transparency" key element of economic analysis we identified in GAO-18-151SP, which (among other things) states that the analysis should assess how plausible adjustments to each important analytical choice and assumption affect the estimates. Therefore, we determined that SBA's estimation process also aligned with this key element of economic analysis.

these changes involved updating data—for example, data on 7(a) loan performance and macroeconomic forecasts—which SBA does routinely to incorporate the most current information available. Other changes resulted from efforts to refine aspects of the cash flow model. Once SBA officials implement a change or update to the model, they determine its effect. According to SBA officials, staff input the estimated cash flows generated by the model into OMB's Credit Subsidy Calculator after each implemented change and document the resulting effect on the subsidy rate.[47] Individually, some of the changes that SBA made for the fiscal year 2020 budget increased the subsidy rate, while others decreased the rate. Collectively, the changes resulted in a 0.33 percentage point increase relative to the initial rate for fiscal year 2019.

Changes That Increased the Rate

Examples of the main SBA changes and updates that resulted in increases in the subsidy rate relative to the rate for fiscal year 2019 included the following:[48]

Revising the methodology for estimating purchase amounts. To estimate purchase amounts, SBA relies on an assumption about the percentage of the outstanding principal balance that will not be recovered via the liquidation process and will be purchased on loans projected to default. This assumption involves a prediction of the outstanding principal balance at delinquency and subsequent liquidation, which depends on the predicted number of days from the time the loan defaults until the time it is purchased.

SBA's regular reviews of the cash flow model found that the model was underestimating the outstanding balance at delinquency and subsequent liquidation due to a 120-day limit imposed on the assumption for days of purchased interest.[49] This limit resulted in outstanding balance calculations that were too low and, therefore, predicted purchase

[47]According to SBA officials, the order in which the changes and updates are incorporated into the model can affect the estimated impact of each specific change or update but not the overall subsidy rate estimate.

[48]In addition, SBA made many minor changes and updates that had a small impact on the subsidy rate individually. The small changes that individually had an upward effect on the subsidy rate increased the subsidy rate by 0.27 percentage points.

[49]SBA purchases no more than 120 days of accrued interest for loans still held by their originating lenders.

amounts that were too low. To address this issue, SBA removed the 120-day limit and instead used the actual number of days a loan was delinquent prior to purchase recorded in its data system and subtracted the interest accrued past 120 days from the estimated purchase amount. Using the actual number of days a loan is delinquent results in higher (and, according to SBA officials, more accurate) outstanding balance calculations, and consequently higher predicted purchase amounts. Higher predicted purchase amounts represent a prediction that more money will leave SBA, and therefore increased the subsidy rate by 0.21 percentage points.

Updating base year for the synthetic cohort. SBA officials said they updated the basis of the synthetic cohort from loans approved in fiscal year 2017 to loans approved in fiscal year 2018, the most recent complete cohort at the time SBA made the fiscal year 2020 subsidy cost estimate. The officials noted that the overall profile of the fiscal year 2018 cohort was riskier than the profile of the 2017 cohort, mainly because of a shift toward more loans with maturities of between 7 and 14 years. SBA's calculations of historical purchase rates by loan maturity show that loans with terms of more than 7 years to 14 years have the highest purchase rates, followed by loans with terms of more than 14 years, and finally loans with terms less than or equal to 7 years. As previously noted, higher predicted purchases represent more money leaving SBA. Accordingly, updating the base year for the synthetic cohort increased the subsidy rate by 0.21 percentage points.

Updating the cohort composition assumptions. After updating the base year for the synthetic cohort, SBA updated its assumptions about the composition of the synthetic cohort. That is, SBA adjusted the characteristics of the base synthetic cohort to reflect its expectations about what the fiscal year 2020 cohort would look like. SBA based these adjustments primarily on recent trends and averages in the 7(a) portfolio, but also on feedback about those adjustments from the program office. According to SBA officials, the 7(a) portfolio has experienced several shifts in recent years—primarily related to business age, industry distribution, and regional distribution of the loans—that make more recent cohorts relatively more risky. SBA's adjustments to the synthetic cohort represent a prediction that more money will leave or less money will come in to SBA. Therefore, updating the cohort composition assumptions increased the subsidy rate by 0.06 percentage points (0.05 percentage points due to updates based on recent portfolio trends and averages and 0.01 percentage points due to program office feedback on those adjustments).

Updating the model forecast start date. As previously discussed, SBA's estimation process uses forecasts of unemployment rates, GDP growth, and benchmark interest rates from the President's economic assumptions. SBA officials told us that the projected unemployment rate has one of the largest effects on the subsidy rate each year. According to the officials, SBA used the projected unemployment rates from the midsession review of the fiscal year 2019 budget, but advanced along the 10-year schedule of projected rates by 1 year.[50]

The midsession review assumed that the unemployment rate would start at 3.8 percent in fiscal year 2019, start at 3.7 percent in fiscal year 2020, and then increase steadily to 4.8 percent in the remaining years of the forecast. To estimate the fiscal year 2020 subsidy rate, SBA updated the forecast start date from October 1, 2018 (the first day of fiscal year 2019) to October 1, 2019 (the first day of fiscal year 2020). As a result of this update, according to SBA officials, the loans effectively lost 1 year of low and relatively flat unemployment and instead were projected to be approved in an environment in which the unemployment rate starts increasing sooner and reaches the peak of 4.8 percent more quickly. Consequently, the model predicted an increase in loan purchases—more money leaving SBA—which increased the subsidy rate by 0.22 percentage points.

Changes That Decreased the Rate

Examples of the main SBA changes and updates that resulted in decreases in the subsidy rate relative to the rate for fiscal year 2019 included the following:[51]

Incorporating the President's economic assumptions for the fiscal year 2020 budget. As previously discussed, SBA's estimation process initially uses the President's economic assumptions for the budget from the previous year. Once the new assumptions are released, SBA can incorporate them into the model, which it does at a later step in the estimation process. According to SBA officials, incorporating the

[50]The midsession review is a supplemental summary to the President's budget that OMB is required to issue by July 15 of each year. The midsession review contains revised estimates of budget receipts, outlays, and budget authority and other summary information.

[51]Smaller changes that individually had a downward effect on the subsidy rate decreased the subsidy rate by 0.24 percentage points.

assumptions for the fiscal year 2020 budget had a downward effect on the subsidy rate due partly to the somewhat lower projected unemployment rates in the fiscal year 2020 assumptions compared to those in the 2019 assumptions. Because the fiscal year 2020 assumptions projected—among other things—somewhat lower unemployment rates, incorporating the assumptions resulted in predictions of better loan performance. Predictions of better loan performance represent a prediction that less money will leave or more money will come in to SBA, which decreased the subsidy rate by 0.27 percentage points.

Changing the methodology for estimating secondary market premiums. A lender can sell a 7(a) loan on the secondary market for (1) 100 percent of the guaranteed principal amount, (2) less than 100 percent of the guaranteed principal amount, or (3) more than 100 percent of the guaranteed principal amount, referred to as "selling at a premium."[52] SBA collects a one-time premium equal to 50 percent of any amount sold greater than 110 percent of the guaranteed principal amount. According to SBA officials, SBA's former methodology for estimating premium income—which used an average of the past few years or a trend when appropriate—was not very responsive to changes in the secondary market because it did not consider the characteristics of the loans being sold or their pricing distribution. As a result, SBA developed a new methodology based on assumptions about (1) which loans are expected to be sold on the secondary market and (2) the price at which those loans will sell, both calculated using stratified historical averages.[53] Because this new methodology ultimately estimated that SBA would receive more secondary market premium income than the previous methodology, this change increased the predicted amount of money coming in to SBA, and therefore decreased the subsidy rate by 0.13 percentage points.

[52]In the secondary market, lenders sell the guaranteed portion of their 7(a) loans to investors, which helps them raise funds for additional lending.

[53]In developing the assumptions, SBA analyzed the pricing trend by quarter, by loan-size bucket, and by maturity bucket for loans sold into the secondary market since July 2017.

Agency Comments

We provided a draft of this report to SBA and OMB for review and comment. Both agencies provided technical comments, which we incorporated as appropriate.

As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies of this report to the appropriate congressional committees, the Administrator of SBA, and the Director of OMB. In addition, the report will be available at no charge on the GAO website at http://www.gao.gov.

If you or your staff members have any questions about this report, please contact William B. Shear at (202) 512-8678 or shearw@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Major contributors to this report are listed in appendix IV.

William B. Shear
Director, Financial Markets and
Community Investment

List of Committees

The Honorable Marco Rubio
Chairman
The Honorable Benjamin L. Cardin
Ranking Member
Committee on Small Business and Entrepreneurship
United States Senate

The Honorable Nydia Velázquez
Chairwoman
The Honorable Steve Chabot
Ranking Member
Committee on Small Business
House of Representatives

The Honorable Andy Kim
Chairman
The Honorable Kevin Hern
Ranking Member
Subcommittee on Economic Growth, Tax and Capital Access
Committee on Small Business
House of Representatives

Appendix I: Objectives, Scope, and Methodology

Our objectives were to examine (1) how the Small Business Administration (SBA) estimates the subsidy cost for the 7(a) program, (2) the extent to which SBA incorporated key elements of subsidy cost estimation into its estimation process for the fiscal year 2020 budget, and (3) the changes SBA made in its estimation process for the fiscal year 2020 budget.

To examine how SBA estimates the subsidy cost for the 7(a) program, we reviewed SBA's policies, procedures, and supporting documentation for modeling program cash flows, generating initial subsidy cost estimates, and considering potential enhancements to the estimation process. The supporting documentation included the cash flow model overview for SBA's fiscal year 2020 subsidy cost estimate, related evaluation reports issued by SBA's independent verification and validation contractor, and SBA's lists of potential enhancements to its cash flow model or other aspects of the estimation process.[1]

Additionally, to provide some perspective on key cash flows and SBA's assumptions about those cash flows, we analyzed historical SBA data on SBA's purchases of defaulted 7(a) loans and recoveries on those loans (see app. II). Specifically, we calculated and graphed cumulative purchase rates for 7(a) loan cohorts from fiscal years 1992 through 2018 (the most recent cohort that had fully disbursed at the time the fiscal year 2020 budget was being prepared) and cumulative recovery rates for 7(a) loan cohorts from fiscal years 1992 through 2015.[2] We compared these rates with the purchase and recovery rates SBA assumed for the 7(a) program in the President's budget for fiscal year 2020. To assess the

[1]Small Business Administration, *SBA Section 7(a) Credit Subsidy Model: Model Overview* (Washington, D.C.: May 15, 2018); *Office of Financial Analysis and Modeling IV&V Final Findings Report: 7(a) Loans Cash Flow Model* (Washington, D.C.: June 11, 2018); and *Office of Financial Analysis and Modeling IV&V Final Findings Report: 7(a) Loans Cash Flow Model* (Washington, D.C.: Nov. 20, 2018).

[2]According to SBA officials, the peak purchase period for 7(a) loans is typically 4 years after loan origination. We end with fiscal year 2015 loans because recoveries follow purchases, and purchases for more recent loan cohorts were less likely to have peaked as of the time we conducted our analysis.

reliability of SBA's purchase and recovery data, we reviewed information on SBA's data validation procedures, interviewed knowledgeable SBA officials about data quality and interpretation, and corroborated elements of our analysis with existing SBA analysis. We determined that the data were sufficiently reliable for purposes of providing historical perspective on SBA's budget assumptions for 7(a) purchase and recovery rates.

To examine the extent to which SBA incorporated key elements of subsidy cost estimation into its estimation process for the fiscal year 2020 budget, we compared SBA's model documentation for its subsidy cost estimation process against eight key elements we previously identified that agencies should consider when preparing subsidy cost estimates.[3] The model documentation included the following types of information: policies and procedures, model overview, model execution guide, sensitivity analysis, actuals-to-estimates cash flow analysis, program description, and reports by SBA's independent verification and validation contractor.

For each of the eight key elements, we defined subelements and assessed whether SBA met, partially met, or did not meet each one (see table 3 for the elements and subelements assessed).[4] Based on SBA's consistency with the subelements, we then assessed the extent to which SBA met each overarching key element—whether SBA met, generally met, somewhat met, or did not meet the key element.[5] In addition, we

[3]GAO, *Credit Programs: Key Agencies Should Better Document Procedures for Estimating Subsidy Costs*, GAO-16-269 (Washington, D.C.: July 13, 2016). We identified these key elements—discussed in Federal Accounting Standards Advisory Board guidance and our cost estimation guide—as the key elements of the subsidy cost estimation process based on their relevance to creating credible cost estimates. See Federal Accounting Standards Advisory Board, Accounting and Auditing Policy Committee Technical Release 6, *Preparing Estimates for Direct Loan and Loan Guarantee Subsidies under the Federal Credit Reform Act*; and GAO, *Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, GAO-09-3SP (Washington, D.C.: Mar. 2, 2009).

[4]The number of subelements for each overarching key element ranged from three to eight.

[5]We tallied the results of the subelement analysis and assigned an overall rating for the overarching key element using a four-tier scale as follows: "met key element" means all of the subelements were met; "generally met key element" means all of the subelements either were met or partially met, with one of the subelements rated partially met; "somewhat met key element" means two or more subelements were partially met or one or more, but less than a majority, of the subelements were not met; and "did not meet key element" means a majority to all of the subelements were not met.

compared SBA's processes against a methodology we previously developed to assess economic analysis.[6] Many of these components are consistent with a key element for estimating subsidy costs.

Table 3: Key Elements and Subelements of Subsidy Estimation That GAO Assessed

Key element	Subelements evaluated
Historical data validation: Management should accumulate sufficient, relevant, and reliable supporting data on which to base cash flow projections, such as data on prepayments, defaults, and recoveries. Subsidy cost estimates should be based on the best available data at the time the estimates are made.	• Validations of these data performed and documented. • Historical data are relevant for estimating subsidy costs of the program. • Data source is sufficient to base cash flow projections on, in combination with the other data sources in the model. • Data used were the best available at the time the estimate was made.
Informed opinion documentation: In certain limited instances, when relevant historical data, modeling capabilities, or both are not available, informed opinion may be used to support cash flow projections. When informed opinion is used, management should document the expert's qualifications. In addition, the basis for the stated opinion must be articulated and documented in detail, including an explanation for why the particular projection is appropriate for the program.	If applicable: • Management documented the qualifications of the experts providing any informed opinion. • The basis for the opinion is articulated and documented in detail. • The basis for the opinion includes an explanation for why the projection is appropriate.
Cash flow assumption documentation: Documentation must be developed to support the assumptions used by agencies in the subsidy cost calculations, including the data sources and calculation methods. Assumptions should also be coordinated between program and accounting offices.	Documentation was developed to support cash flow assumptions regarding the following: • Loan performance • Distribution of loan characteristics • Fee income • Macroeconomic conditions The process for coordinating these assumptions between the program and accounting offices is documented.

[6]GAO, *Assessment Methodology for Economic Analysis*, GAO-18-151SP (Washington, D.C.: Apr. 10, 2018). The methodological elements to the baseline structure of an economic analysis that we identified include transparency and documentation.

Key element	Subelements evaluated
Cash flow model documentation: Documentation should include the rationale for using the specific model; the mechanics of the model, including how to use and update the model and formulas and other mathematical functions within the model; and sources of supporting data. Management should also document the controls over the model, including management review and approval of the model.	• The type of cash flow model used for the President's budget formulation estimates is documented. • The rationale for using that particular cash flow model is documented. • The process for using the model is documented. • The process for updating the model is documented. • All of the formulas and mathematical functions are documented and explained. • All of the sources of supporting data are documented. • The process for obtaining/updating all supporting data is documented. • Management reviewed and approved the model used to generate the subsidy cost estimates for the fiscal year 2020 President's budget.
Consistency with program design: Based on the laws and regulations that govern the credit program, management should document program design factors relevant to the cash flow model and assumptions, such as fees, grace periods, and maximum loan amounts. This documentation will help management ensure that subsidy cost estimates are prepared consistent with the terms and conditions of the program.	Documentation exists showing consistency with program requirements for the following: • Loan fees • Maximum loan amounts • Maximum guarantee percentages • Loan maturity • Grace periods • Interest rates
Analysis of estimated cash flows: Management should conduct periodic comparisons of estimated loan performance to actual cash flows in the accounting system. This comparison allows agencies to identify and research significant differences and determine whether the cash flow model or assumptions related to expected future loan performance need to be revised. Further, if management identifies consistent trends in under- or overestimates of subsidy costs, such trends should be investigated and explained.	• Management periodically compared estimated cash flows to actuals for all major cash flows. • Management identified consistent trends (if applicable). • Management investigated and explained any consistent trends identified (if applicable).
Sensitivity analysis: Management should perform sensitivity analyses to identify which cash flow assumptions—such as defaults, recoveries, or prepayments—have the greatest effect on the cost of the credit program. Knowledge of these key assumptions provides management with the ability to monitor the economic trends that most affect the program's performance. These analyses also allow agencies to more efficiently focus their efforts on documenting the support for the key assumptions.	• Management conducted sensitivity analyses on cash flow assumptions to help them identify assumptions with the greatest effect on cost. • The analysis includes testing of macroeconomic conditions (if applicable). • The analysis includes testing loan and borrower characteristics (if applicable). • The analysis includes testing loan performance (if applicable).

Key element	Subelements evaluated
Policies and procedures for estimating subsidy costs: Management should establish and document policies and procedures for calculating subsidy cost estimates, including required supporting documentation and a formal review and approval process. In addition, preparing reliable and timely direct loan and loan guarantee subsidy cost estimates must be a joint effort between the budget, accounting, and program offices at each agency. These offices should work together to ensure that the procedures and internal controls are implemented and operating as designed. Further, documented policies and procedures are important internal controls that are designed to help ensure continuity when there is employee turnover and to calculate reliable, reasonable, and well-supported cost estimates.	• Agency has documented policies and procedures for calculating subsidy cost estimates. • Policies and procedures include a description of required supporting documentation and a formal review and approval process. • Policies and procedures indicate that the budget, accounting, and program offices work together to produce the estimates and to ensure that the procedures and internal controls are implemented.

Source: GAO. | GAO-20-618

To examine the changes SBA made in its estimation process for the fiscal year 2020 budget, we reviewed SBA documentation and analyses identifying the changes and updates SBA implemented and their effect on the subsidy rate. We also reviewed budget documents, including the President's economic assumptions for fiscal year 2019 and fiscal year 2020 and the fiscal year 2020 Federal Credit Supplement.

For all of our objectives, we interviewed officials responsible for 7(a) modeling from SBA's Offices of Capital Access, Financial Assistance, and the Chief Financial Officer. In addition, we interviewed officials from SBA's independent verification and validation contractor and independent financial statement auditor, and staff from the Office of Management and Budget.

We conducted this performance audit from June 2019 to September 2020 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: Cumulative Purchase and Recovery Rates for 7(a) Loans

We analyzed historical data on purchases and recoveries for Small Business Administration (SBA) 7(a) loans to provide perspective on SBA's purchase and recovery assumptions in the President's budget for fiscal year 2020 and to illustrate how loan performance varies by annual 7(a) cohort. SBA assumed that 7(a) loans guaranteed in fiscal year 2020 would have a total 8.18 percent purchase rate and a total 37.49 percent recovery rate. The total purchase rate represents the total guaranteed dollar amount of loans SBA expects to purchase over the cohort's lifetime divided by the total dollar amount of loan disbursements. The total recovery rate represents the total guaranteed dollar amount of expected lifetime recoveries on purchased loans divided by the total guaranteed dollar amount of loans purchased.

Actual total purchase and recovery rates are generally not known until many years after loan origination because purchases and recoveries accumulate as the loans in a cohort mature. However, calculating cumulative purchase and recovery rates at regular points in time for individual cohorts facilitates comparisons across cohorts of different ages. Using SBA loan performance data, we calculated cumulative purchase and recovery rates by cohort for each quarter of the cohort's life, ending with the second quarter of fiscal year 2019.[1]

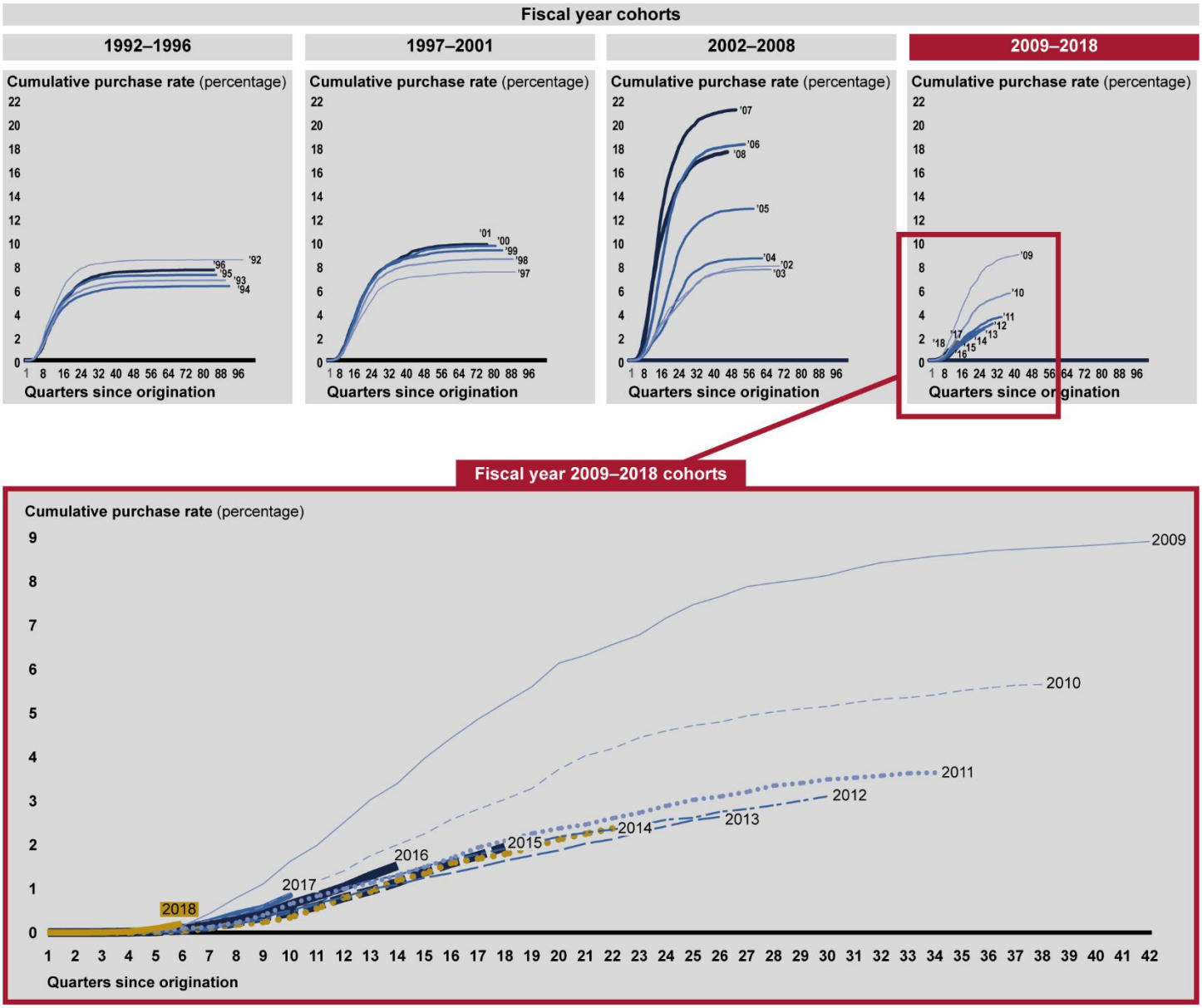
Cumulative Purchase Rates

As shown in figure 4, we graphed cumulative purchase rates for 7(a) loan cohorts from fiscal years 1992 (the first cohort subject to federal credit reform requirements) through 2018 (the most recent cohort that had fully disbursed at the time the fiscal year 2020 budget was being prepared).

[1]The data used in these calculations include the following types of loans: 7(a) General Business Loans, 7(a) General Business Loan Guarantees-Supplemental Terrorist Activity Relief, 7(a) General Business-Defense Loan and Technical Assistance, 7(a) General Business Loan Guarantees-American Recovery and Reinvestment Act of 2009, and 7(a) Business Loan Guarantees-American Recovery and Reinvestment Act Extension.

For any given cohort and quarter, the cumulative purchase rate is, by dollar volume, the sum of all purchases to that point divided by the total lifetime loan disbursements for the cohort.

Figure 4: Cumulative Purchase Rates for SBA 7(a) Loans, by Annual Loan Cohort, Fiscal Years 1992–2018 (as of March 31, 2019)



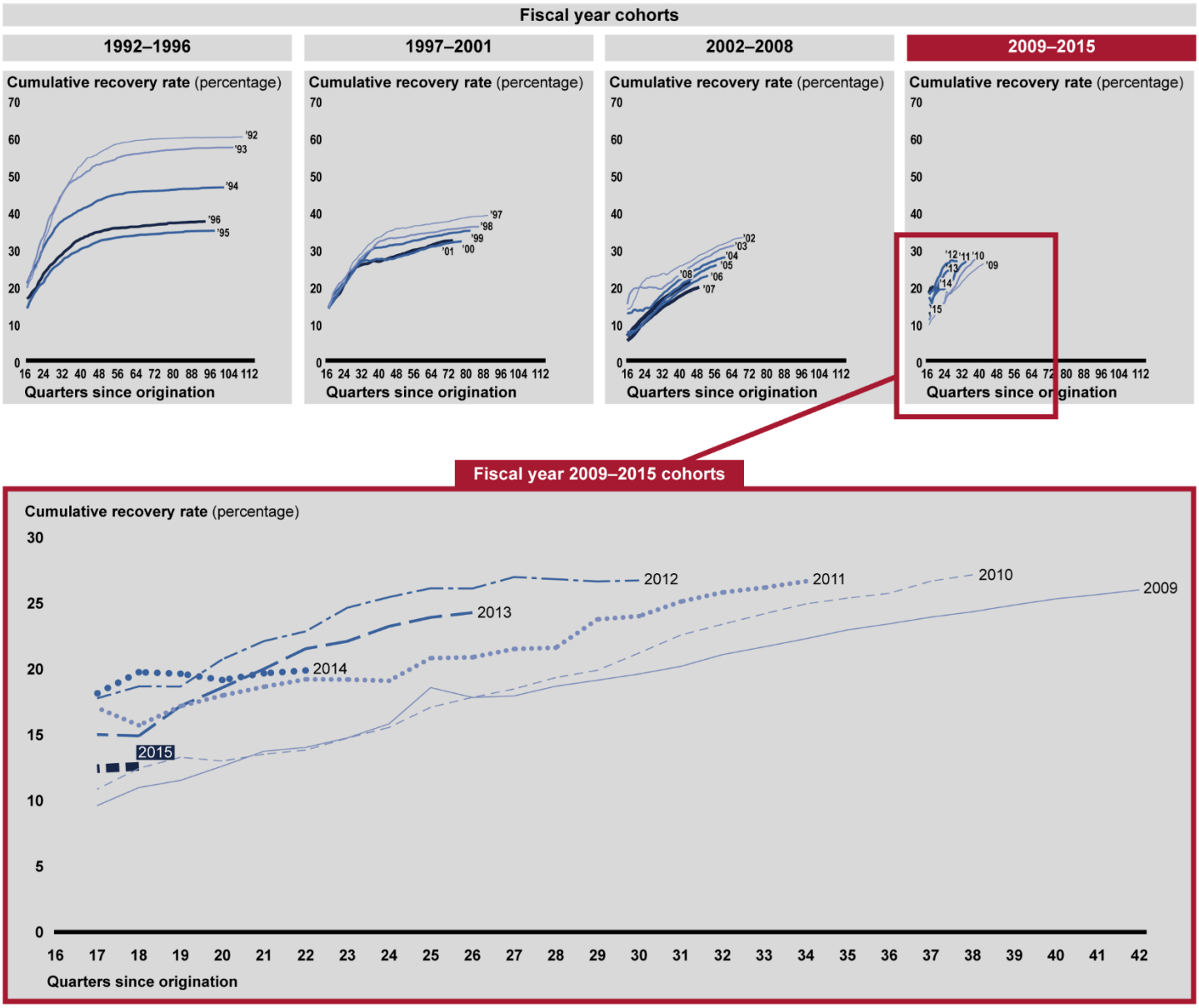
Source: GAO analysis of data from the Small Business Administration (SBA). | GAO 20-618

The 8.18 percent purchase rate that SBA assumed for the fiscal year 2020 cohort was within the range of historical experience. As seen in figure 4, the group of mature cohorts (more than 60 quarters old) from fiscal years 1992 through 2004 have cumulative purchase rates ranging from a low of about 6 percent to a high of about 10 percent. The substantially higher rates for the 2005–2008 cohorts suggest that the performance of those loans was heavily affected (worsened) by the 2007–2009 recession. Cumulative purchase rates for the 2011–2016 cohorts are lower at comparable points in time than for prior cohorts (consistent with the post-recession economic recovery), while the 2017–2018 cohorts have somewhat higher rates early in their lives than their immediate predecessors. Similar to the effect of the 2007–2009 recession, it is likely that the outbreak of Coronavirus Disease 2019 and the associated economic downturn will increase purchase rates for many 7(a) cohorts.

Cumulative Recovery Rates

As shown in figure 5, we graphed cumulative recovery rates for 7(a) loan cohorts from fiscal years 1992 through 2015. According to SBA officials, the peak purchase period for 7(a) loans is typically 4 years after loan origination. Therefore, for each cohort, we start the trend line at quarter 17 (the first quarter of the fifth year). The fiscal year 2015 loan cohort is the last one shown because purchases for more recent cohorts were less likely to have peaked as of the time we conducted the analysis. For any given cohort and quarter, the cumulative recovery rate is, by dollar volume, the sum of all recoveries to that point divided by the sum of all purchases to that point.

Figure 5: Cumulative Recovery Rates for SBA 7(a) Loans, by Annual Loan Cohort, Fiscal Years 1992–2015 (as of March 31, 2019)



Source: GAO analysis of data from the Small Business Administration (SBA). | GAO 20-618

Note: According to SBA, the peak purchase period for 7(a) loans is typically 4 years after loan origination. Therefore, for each cohort, the graph starts at quarter 17 (the first quarter of the fifth year of loan life). The fiscal year 2015 loan cohort is the last one shown because purchases for more recent cohorts were less likely to have peaked as of the time we conducted the analysis.

The 37.49 percent recovery rate that SBA assumed for the fiscal year 2020 cohort was within the range of historical experience. Although none of the cohorts since fiscal year 1999 had a cumulative recovery rate greater than 35 percent as of the last quarter of our analysis, SBA officials said that recoveries can extend more than 15 years past the purchase date. As a result, the recovery rates for many cohorts can be expected to rise. Similar to purchase rates, the 2005–2008 cohorts had the least favorable (in this case lower) cumulative recovery rates at comparable points in time, while the rates for newer cohorts are higher. However, the recent economic downturn may reduce expected recoveries for many loans.

Appendix III: Inputs to SBA's 7(a) Cash Flow Model for Fiscal Year 2020

The Small Business Administration's (SBA) cash flow model for estimating initial 7(a) program subsidy costs uses multiple inputs. The inputs include assumptions about loan and borrower characteristics, loan performance, macroeconomic conditions, and 7(a) program structure. Table 4 shows the 11 major categories of inputs and summarizes the methodology used to generate the inputs.

Table 4: Inputs to SBA's Cash Flow Model for Initial 7(a) Subsidy Cost Estimates for Fiscal Year 2020

Model input category	Description	Methodology
Loan dataset	Dataset with one observation per loan per cohort, which contains both static and time-dependent information	Based on the most recently issued cohort of loans adjusted for projected changes in portfolio characteristics
Assets in inventory	Inventory of assets held by SBA for which recovery on assets and charged-off loan estimates are calculated	Not estimated; downloaded directly from SBA 7(a) inventory reports
Charged-off loans	Loans that have been charged off and transferred to the Department of the Treasury and for which recovery on assets and charged-off loan estimates are calculated	Not estimated; downloaded directly from SBA 7(a) charge-off reports
Purchase and prepayment equation coefficients	Coefficients for equations used to estimate loan and time-period-specific purchase and prepayment probabilities	Econometric equations estimated from historical data
Unpaid principal balance curves	Percentage of outstanding unpaid principal balance in each period of loan life for loans with revolving line of credit. Different curves are estimated for each maturity term.	Historical average
Fee rates	Schedule of 7(a) program fees	Not estimated; defined by SBA policy
Recovery rates	Recovery cash flows as a percentage of purchased loan amount; dependent on time from loan purchase or charge-off	Historical average
Prepurchase delinquency period	Number of days of accrued interest on defaulted 7(a) loans	Historical average
Prepurchase liquidations	Percentage of guaranteed outstanding balance, less any accrued interest in excess of SBA policy, that is purchased on defaulted loans and is reduced due to prepurchase liquidations	Historical average
Prepurchase unpaid principal balance on revolving lines of credit	Percentage of available outstanding balance that is expected to default on revolving lines of credit	Historical average

Model input category	Description	Methodology
Macroeconomic forecast	Forecasts of gross domestic product growth, unemployment rates, and benchmark interest rates (prime rate and London Interbank Offered rate)	Not estimated; President's economic assumptions obtained from the Office of Management and Budget

Source: GAO presentation of Small Business Administration (SBA) information. | GAO-20-618

Appendix IV: GAO Contact and Acknowledgments

GAO Contact

William B. Shear, (202) 512-8678 or shearw@gao.gov

Staff Acknowledgments

In addition to the contact name above, Steve Westley (Assistant Director), Melissa Kornblau (Analyst in Charge), Daniel Newman (Analyst in Charge), Benjamin Bolitzer, Marcia Carlsen, Danielle Curet, Pamela Davidson, John McGrail, Marc Molino, and Jennifer Schwartz made significant contributions to this report.

Appendix V: Accessible Data

Data Tables

Accessible Data for Figure 2: Net Lifetime Subsidy Reestimates, Excluding Interest, for Small Business Administration 7(a) Loan Guarantees in Fiscal Years 2003–2019, as of Fiscal Year 2019

Cohort	Net Positive Reestimates ($B)	Net Negative Reestimates ($B)
2003	$0.11	
2004	$0.22	
2005	$0.60	
2006	$1.05	
2007	$1.40	
2008	$0.98	
2009	$0.11	
2010		-$0.21
2011		-$0.61
2012		-$0.44
2013		-$0.65
2014		-$0.35
2015		-$0.34
2016		-$0.24
2017		-$0.24
2018		-$0.11
2019		-$0.04

Accessible Data for Figure 4: Cumulative Purchase Rates for SBA 7(a) Loans, by Annual Loan Cohort, Fiscal Years 1992–2018 (as of March 31, 2019)

cohort	1992	1993	1994	1995	1996
rate	cumul_purch_rate	cumul_purch_rate	cumul_purch_rate	cumul_purch_rate	cumul_purch_rate
quarter_1	0.00000	0.00000	0.00000	0.00000	0.00000
quarter_2	0.00000	0.00001	0.00000	0.00001	0.00000
quarter_3	0.00006	0.00003	0.00021	0.00014	0.00003
quarter_4	0.00051	0.00023	0.00045	0.00042	0.00020
quarter_5	0.00167	0.00086	0.00128	0.00099	0.00105
quarter_6	0.00419	0.00281	0.00299	0.00327	0.00245
quarter_7	0.00696	0.00516	0.00496	0.00630	0.00492
quarter_8	0.01145	0.00778	0.00810	0.00985	0.00710
quarter_9	0.01613	0.01102	0.01211	0.01433	0.01017
quarter_10	0.02276	0.01542	0.01684	0.01854	0.01496
quarter_11	0.02868	0.01900	0.02110	0.02359	0.02014
quarter_12	0.03284	0.02484	0.02495	0.02783	0.02422
quarter_13	0.03777	0.02870	0.02834	0.03215	0.02880
quarter_14	0.04216	0.03256	0.03089	0.03577	0.03207
quarter_15	0.04677	0.03664	0.03504	0.03913	0.03665
quarter_16	0.05090	0.04113	0.03823	0.04295	0.04046
quarter_17	0.05507	0.04348	0.04083	0.04637	0.04435
quarter_18	0.05928	0.04598	0.04327	0.04918	0.04691
quarter_19	0.06277	0.04858	0.04503	0.05193	0.04969
quarter_20	0.06616	0.05058	0.04660	0.05406	0.05205
quarter_21	0.06812	0.05226	0.04868	0.05600	0.05380
quarter_22	0.06989	0.05388	0.04976	0.05735	0.05633
quarter_23	0.07195	0.05477	0.05096	0.05912	0.05852
quarter_24	0.07387	0.05611	0.05214	0.06061	0.06101
quarter_25	0.07512	0.05715	0.05305	0.06200	0.06277
quarter_26	0.07666	0.05762	0.05379	0.06319	0.06413
quarter_27	0.07781	0.05868	0.05456	0.06402	0.06546
quarter_28	0.07808	0.05993	0.05527	0.06481	0.06686
quarter_29	0.07897	0.06027	0.05578	0.06589	0.06774
quarter_30	0.07997	0.06087	0.05634	0.06664	0.06846
quarter_31	0.08062	0.06158	0.05693	0.06761	0.06956
quarter_32	0.08081	0.06206	0.05744	0.06815	0.07025

cohort	1992	1993	1994	1995	1996
rate	cumul_purch_rate	cumul_purch_rate	cumul_purch_rate	cumul_purch_rate	cumul_purch_rate
quarter_33	0.08106	0.06255	0.05798	0.06845	0.07077
quarter_34	0.08133	0.06282	0.05831	0.06896	0.07110
quarter_35	0.08155	0.06331	0.05866	0.06929	0.07172
quarter_36	0.08173	0.06384	0.05921	0.06955	0.07231
quarter_37	0.08196	0.06408	0.05964	0.06975	0.07252
quarter_38	0.08226	0.06445	0.05988	0.07012	0.07282
quarter_39	0.08251	0.06478	0.06009	0.07026	0.07318
quarter_40	0.08277	0.06505	0.06043	0.07047	0.07354
quarter_41	0.08294	0.06510	0.06054	0.07075	0.07377
quarter_42	0.08321	0.06532	0.06087	0.07083	0.07412
quarter_43	0.08337	0.06548	0.06109	0.07097	0.07424
quarter_44	0.08359	0.06578	0.06127	0.07099	0.07438
quarter_45	0.08372	0.06584	0.06133	0.07105	0.07443
quarter_46	0.08378	0.06608	0.06138	0.07119	0.07452
quarter_47	0.08394	0.06619	0.06144	0.07121	0.07457
quarter_48	0.08403	0.06646	0.06152	0.07133	0.07475
quarter_49	0.08412	0.06659	0.06156	0.07137	0.07486
quarter_50	0.08413	0.06662	0.06163	0.07140	0.07491
quarter_51	0.08417	0.06673	0.06168	0.07141	0.07498
quarter_52	0.08440	0.06675	0.06170	0.07145	0.07498
quarter_53	0.08440	0.06688	0.06172	0.07147	0.07504
quarter_54	0.08440	0.06689	0.06177	0.07147	0.07511
quarter_55	0.08440	0.06696	0.06177	0.07149	0.07518
quarter_56	0.08454	0.06699	0.06183	0.07151	0.07538
quarter_57	0.08454	0.06699	0.06187	0.07151	0.07538
quarter_58	0.08455	0.06699	0.06187	0.07154	0.07545
quarter_59	0.08460	0.06703	0.06190	0.07156	0.07555
quarter_60	0.08460	0.06703	0.06192	0.07162	0.07560
quarter_61	0.08460	0.06706	0.06192	0.07167	0.07563
quarter_62	0.08460	0.06708	0.06196	0.07167	0.07571
quarter_63	0.08460	0.06708	0.06199	0.07168	0.07583
quarter_64	0.08460	0.06714	0.06200	0.07168	0.07587
quarter_65	0.08460	0.06714	0.06203	0.07169	0.07586
quarter_66	0.08460	0.06716	0.06208	0.07175	0.07586
quarter_67	0.08460	0.06720	0.06211	0.07175	0.07589
quarter_68	0.08460	0.06720	0.06222	0.07182	0.07593

cohort	1992	1993	1994	1995	1996
rate	cumul_purch_rate	cumul_purch_rate	cumul_purch_rate	cumul_purch_rate	cumul_purch_rate
quarter_69	0.08460	0.06725	0.06227	0.07182	0.07594
quarter_70	0.08460	0.06726	0.06227	0.07187	0.07602
quarter_71	0.08460	0.06728	0.06229	0.07190	0.07602
quarter_72	0.08460	0.06731	0.06238	0.07192	0.07611
quarter_73	0.08460	0.06731	0.06241	0.07193	0.07611
quarter_74	0.08461	0.06731	0.06241	0.07193	0.07617
quarter_75	0.08467	0.06732	0.06244	0.07193	0.07617
quarter_76	0.08466	0.06732	0.06244	0.07193	0.07618
quarter_77	0.08466	0.06732	0.06246	0.07193	0.07622
quarter_78	0.08466	0.06732	0.06246	0.07192	0.07622
quarter_79	0.08463	0.06737	0.06246	0.07194	0.07622
quarter_80	0.08463	0.06737	0.06247	0.07195	0.07622
quarter_81	0.08463	0.06737	0.06247	0.07196	0.07622
quarter_82	0.08466	0.06741	0.06247	0.07197	0.07623
quarter_83	0.08466	0.06741	0.06247	0.07196	0.07623
quarter_84	0.08466	0.06741	0.06248	0.07196	0.07623
quarter_85	0.08466	0.06741	0.06247	0.07196	0.07623
quarter_86	0.08466	0.06741	0.06251	0.07196	0.07623
quarter_87	0.08468	0.06742	0.06251	0.07196	0.07623
quarter_88	0.08468	0.06742	0.06251	0.07196	0.07622
quarter_89	0.08468	0.06741	0.06250	0.07196	
quarter_90	0.08468	0.06741	0.06250		
quarter_91	0.08468	0.06741	0.06250		
quarter_92	0.08473	0.06741	0.06250		
quarter_93	0.08473	0.06744	0.06250		
quarter_94	0.08473		0.06250		
quarter_95	0.08473		0.06251		
quarter_96	0.08473				
quarter_97	0.08473				
quarter_98	0.08473				
quarter_99	0.08473				
quarter_100	0.08473				
quarter_101	0.08473				

cohort	1997	1998	1999	2000	2001
rate	cumul_purch_rate	cumul_purch_rate	cumul_purch_rate	cumul_purch_rate	cumul_purch_rate
quarter_1	0.00000	0.00000	0.00000	0.00000	0.00000
quarter_2	0.00000	0.00000	0.00000	0.00000	0.00000
quarter_3	0.00003	0.00006	0.00001	0.00006	0.00013
quarter_4	0.00018	0.00038	0.00020	0.00016	0.00039
quarter_5	0.00049	0.00100	0.00071	0.00095	0.00134
quarter_6	0.00187	0.00209	0.00137	0.00276	0.00296
quarter_7	0.00352	0.00386	0.00370	0.00549	0.00587
quarter_8	0.00577	0.00662	0.00609	0.00816	0.00970
quarter_9	0.00925	0.00970	0.00988	0.01225	0.01297
quarter_10	0.01249	0.01348	0.01419	0.01773	0.01882
quarter_11	0.01612	0.01790	0.01928	0.02209	0.02444
quarter_12	0.01980	0.02284	0.02497	0.02840	0.02941
quarter_13	0.02438	0.02767	0.03037	0.03370	0.03381
quarter_14	0.02759	0.03139	0.03607	0.03968	0.03755
quarter_15	0.03176	0.03578	0.04118	0.04488	0.04264
quarter_16	0.03498	0.04020	0.04662	0.04926	0.04928
quarter_17	0.03803	0.04507	0.05096	0.05324	0.05328
quarter_18	0.04078	0.04855	0.05517	0.05618	0.05634
quarter_19	0.04400	0.05267	0.05883	0.05975	0.05990
quarter_20	0.04726	0.05622	0.06240	0.06423	0.06306
quarter_21	0.04966	0.05847	0.06499	0.06632	0.06616
quarter_22	0.05241	0.06174	0.06746	0.06856	0.06920
quarter_23	0.05561	0.06537	0.06958	0.07103	0.07180
quarter_24	0.05853	0.06757	0.07284	0.07297	0.07375
quarter_25	0.05993	0.06935	0.07472	0.07445	0.07551
quarter_26	0.06138	0.07024	0.07625	0.07631	0.07674
quarter_27	0.06255	0.07186	0.07836	0.07797	0.07761
quarter_28	0.06355	0.07331	0.07995	0.07896	0.07914
quarter_29	0.06468	0.07427	0.08092	0.07973	0.08026
quarter_30	0.06563	0.07505	0.08192	0.08067	0.08177
quarter_31	0.06646	0.07583	0.08285	0.08130	0.08282
quarter_32	0.06743	0.07698	0.08339	0.08172	0.08365
quarter_33	0.06809	0.07750	0.08402	0.08258	0.08446
quarter_34	0.06830	0.07818	0.08458	0.08318	0.08561
quarter_35	0.06856	0.07864	0.08483	0.08450	0.08711
quarter_36	0.06899	0.07915	0.08517	0.08562	0.08761

cohort	1997	1998	1999	2000	2001
rate	cumul_purch_rate	cumul_purch_rate	cumul_purch_rate	cumul_purch_rate	cumul_purch_rate
quarter_37	0.06931	0.07970	0.08560	0.08620	0.08828
quarter_38	0.06978	0.07993	0.08608	0.08704	0.08915
quarter_39	0.07009	0.08026	0.08662	0.08761	0.09060
quarter_40	0.07034	0.08035	0.08677	0.08870	0.09197
quarter_41	0.07051	0.08056	0.08717	0.08911	0.09234
quarter_42	0.07065	0.08078	0.08773	0.08994	0.09280
quarter_43	0.07071	0.08119	0.08803	0.09132	0.09333
quarter_44	0.07081	0.08129	0.08842	0.09217	0.09366
quarter_45	0.07093	0.08146	0.08856	0.09241	0.09411
quarter_46	0.07106	0.08161	0.08895	0.09297	0.09440
quarter_47	0.07121	0.08214	0.08936	0.09344	0.09500
quarter_48	0.07128	0.08230	0.08996	0.09368	0.09526
quarter_49	0.07159	0.08251	0.09024	0.09381	0.09539
quarter_50	0.07173	0.08256	0.09054	0.09399	0.09583
quarter_51	0.07208	0.08286	0.09088	0.09435	0.09609
quarter_52	0.07246	0.08313	0.09107	0.09458	0.09640
quarter_53	0.07254	0.08328	0.09112	0.09485	0.09652
quarter_54	0.07260	0.08347	0.09134	0.09507	0.09666
quarter_55	0.07280	0.08359	0.09153	0.09523	0.09676
quarter_56	0.07300	0.08395	0.09154	0.09538	0.09688
quarter_57	0.07317	0.08407	0.09175	0.09543	0.09715
quarter_58	0.07336	0.08420	0.09188	0.09564	0.09722
quarter_59	0.07355	0.08432	0.09204	0.09567	0.09731
quarter_60	0.07363	0.08435	0.09207	0.09581	0.09737
quarter_61	0.07374	0.08444	0.09213	0.09587	0.09742
quarter_62	0.07376	0.08455	0.09216	0.09605	0.09742
quarter_63	0.07405	0.08464	0.09217	0.09611	0.09760
quarter_64	0.07413	0.08464	0.09226	0.09612	0.09773
quarter_65	0.07408	0.08468	0.09242	0.09617	0.09775
quarter_66	0.07409	0.08478	0.09243	0.09623	0.09775
quarter_67	0.07414	0.08489	0.09254	0.09625	0.09775
quarter_68	0.07418	0.08505	0.09256	0.09633	0.09774
quarter_69	0.07419	0.08510	0.09265	0.09635	0.09774
quarter_70	0.07429	0.08511	0.09267	0.09639	0.09774
quarter_71	0.07432	0.08511	0.09273	0.09641	0.09772
quarter_72	0.07443	0.08517	0.09274	0.09641	0.09777

cohort	1997	1998	1999	2000	2001
rate	cumul_purch_rate	cumul_purch_rate	cumul_purch_rate	cumul_purch_rate	cumul_purch_rate
quarter_73	0.07443	0.08522	0.09274	0.09641	0.09778
quarter_74	0.07443	0.08522	0.09274	0.09641	0.09778
quarter_75	0.07443	0.08529	0.09274	0.09642	
quarter_76	0.07444	0.08529	0.09277	0.09642	
quarter_77	0.07446	0.08529	0.09277	0.09643	
quarter_78	0.07446	0.08529	0.09277	0.09643	
quarter_79	0.07446	0.08529	0.09279		
quarter_80	0.07446	0.08529	0.09279		
quarter_81	0.07446	0.08530	0.09279		
quarter_82	0.07446	0.08530			
quarter_83	0.07446	0.08532			
quarter_84	0.07446	0.08532			
quarter_85	0.07449	0.08532			
quarter_86	0.07449	0.08532			
quarter_87	0.07449				

cohort	2002	2003	2004	2005	2006	2007	2008
rate	cp rate	cp rate	cp rate	cp rate	cp rate	cp rate	cp rate
quarter_1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
quarter_2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
quarter_3	0.00001	0.00010	0.00000	0.00000	0.00002	0.00004	0.00003
quarter_4	0.00015	0.00021	0.00012	0.00005	0.00042	0.00023	0.00056
quarter_5	0.00045	0.00068	0.00035	0.00064	0.00102	0.00081	0.00182
quarter_6	0.00137	0.00147	0.00097	0.00131	0.00224	0.00285	0.00525
quarter_7	0.00309	0.00291	0.00250	0.00275	0.00474	0.00770	0.01111
quarter_8	0.00500	0.00557	0.00434	0.00478	0.00880	0.01529	0.02105
quarter_9	0.00755	0.00790	0.00640	0.00711	0.01353	0.02555	0.03002
quarter_10	0.01029	0.01063	0.00902	0.00967	0.01988	0.03923	0.04110
quarter_11	0.01375	0.01373	0.01258	0.01286	0.02804	0.05364	0.05518
quarter_12	0.01940	0.01742	0.01540	0.01707	0.03650	0.06833	0.06747
quarter_13	0.02286	0.02010	0.01766	0.02148	0.04703	0.08220	0.07678
quarter_14	0.02591	0.02375	0.01984	0.02649	0.05961	0.09633	0.08861
quarter_15	0.02898	0.02740	0.02211	0.03324	0.07051	0.11250	0.09749
quarter_16	0.03206	0.03028	0.02503	0.03865	0.08178	0.12525	0.10403
quarter_17	0.03462	0.03231	0.02840	0.04548	0.09194	0.13426	0.11143
quarter_18	0.03853	0.03418	0.03207	0.05237	0.10188	0.14493	0.11806
quarter_19	0.04207	0.03607	0.03647	0.05954	0.11369	0.15270	0.12391
quarter_20	0.04455	0.03843	0.03960	0.06638	0.12277	0.15867	0.12955
quarter_21	0.04594	0.04052	0.04366	0.07238	0.12890	0.16495	0.13451
quarter_22	0.04857	0.04289	0.04767	0.07911	0.13667	0.16955	0.13986
quarter_23	0.04939	0.04512	0.05142	0.08720	0.14163	0.17498	0.14365
quarter_24	0.05071	0.04715	0.05508	0.09255	0.14598	0.18022	0.14807
quarter_25	0.05254	0.04947	0.05820	0.09642	0.15087	0.18346	0.15059
quarter_26	0.05408	0.05195	0.06155	0.10010	0.15466	0.18774	0.15299
quarter_27	0.05632	0.05401	0.06621	0.10382	0.15811	0.19056	0.15584
quarter_28	0.05760	0.05588	0.06930	0.10598	0.16110	0.19333	0.15948
quarter_29	0.05904	0.05811	0.07116	0.10840	0.16356	0.19496	0.16185
quarter_30	0.06107	0.05980	0.07303	0.11077	0.16644	0.19714	0.16376
quarter_31	0.06228	0.06248	0.07446	0.11269	0.16876	0.19835	0.16535
quarter_32	0.06391	0.06475	0.07545	0.11432	0.17091	0.20088	0.16673
quarter_33	0.06512	0.06643	0.07659	0.11616	0.17199	0.20300	0.16796
quarter_34	0.06667	0.06763	0.07761	0.11777	0.17316	0.20372	0.16876
quarter_35	0.06947	0.06904	0.07909	0.11884	0.17437	0.20459	0.16966

cohort	2002	2003	2004	2005	2006	2007	2008
rate	cp rate	cp rate	cp rate	cp rate	cp rate	cp rate	cp rate
quarter_36	0.07083	0.06985	0.08027	0.12014	0.17588	0.20554	0.17038
quarter_37	0.07160	0.07066	0.08111	0.12092	0.17687	0.20619	0.17118
quarter_38	0.07238	0.07112	0.08169	0.12183	0.17751	0.20680	0.17182
quarter_39	0.07284	0.07210	0.08224	0.12237	0.17818	0.20737	0.17244
quarter_40	0.07347	0.07286	0.08276	0.12364	0.17860	0.20808	0.17322
quarter_41	0.07376	0.07326	0.08305	0.12436	0.17881	0.20846	0.17369
quarter_42	0.07434	0.07368	0.08353	0.12490	0.17925	0.20907	0.17393
quarter_43	0.07483	0.07389	0.08385	0.12551	0.17939	0.20929	0.17420
quarter_44	0.07545	0.07441	0.08426	0.12573	0.17993	0.20984	0.17468
quarter_45	0.07631	0.07453	0.08462	0.12596	0.18025	0.21023	0.17523
quarter_46	0.07664	0.07484	0.08479	0.12615	0.18055	0.21052	0.17566
quarter_47	0.07714	0.07504	0.08494	0.12637	0.18077	0.21072	
quarter_48	0.07730	0.07538	0.08499	0.12666	0.18095	0.21089	
quarter_49	0.07743	0.07562	0.08510	0.12685	0.18110	0.21102	
quarter_50	0.07778	0.07585	0.08518	0.12711	0.18137	0.21121	
quarter_51	0.07805	0.07597	0.08526	0.12716	0.18162		
quarter_52	0.07838	0.07613	0.08538	0.12734	0.18180		
quarter_53	0.07858	0.07618	0.08558	0.12750	0.18199		
quarter_54	0.07871	0.07625	0.08561	0.12765	0.18210		
quarter_55	0.07883	0.07629	0.08565	0.12768			
quarter_56	0.07894	0.07634	0.08580	0.12775			
quarter_57	0.07899	0.07636	0.08593	0.12775			
quarter_58	0.07902	0.07641	0.08593	0.12781			
quarter_59	0.07906	0.07641	0.08593				
quarter_60	0.07921	0.07643	0.08594				
quarter_61	0.07924	0.07649	0.08595				
quarter_62	0.07927	0.07650	0.08600				
quarter_63	0.07933	0.07650					
quarter_64	0.07942	0.07653					
quarter_65	0.07942	0.07654					
quarter_66	0.07942	0.07657					
quarter_67	0.07942						
quarter_68	0.07947						
quarter_69	0.07947						
quarter_70	0.07951						

cohort	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
rate	cp rate	cp rate	cp rate	cp rate	cp rate	cp rate	cp rate	cp rate	cp rate	cp rate
quarter_1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00001
quarter_2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00002	0.00000
quarter_3	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00005	0.00002
quarter_4	0.00018	0.00049	0.00003	0.00001	0.00000	0.00002	0.00008	0.00006	0.00018	0.00018
quarter_5	0.00055	0.00097	0.00029	0.00014	0.00006	0.00015	0.00018	0.00031	0.00073	0.00086
quarter_6	0.00151	0.00184	0.00092	0.00041	0.00017	0.00037	0.00050	0.00083	0.00121	0.00199
quarter_7	0.00430	0.00272	0.00122	0.00064	0.00117	0.00101	0.00115	0.00165	0.00247	
quarter_8	0.00789	0.00391	0.00223	0.00188	0.00195	0.00177	0.00222	0.00271	0.00433	
quarter_9	0.01106	0.00595	0.00394	0.00303	0.00381	0.00238	0.00349	0.00405	0.00571	
quarter_10	0.01617	0.00903	0.00648	0.00452	0.00500	0.00340	0.00445	0.00640	0.00843	
quarter_11	0.01985	0.01165	0.00826	0.00647	0.00663	0.00545	0.00595	0.00829		
quarter_12	0.02502	0.01400	0.00995	0.01022	0.00807	0.00793	0.00792	0.01035		
quarter_13	0.03025	0.01754	0.01126	0.01186	0.00994	0.00936	0.00950	0.01297		
quarter_14	0.03397	0.01999	0.01302	0.01300	0.01092	0.01189	0.01143	0.01523		
quarter_15	0.03964	0.02245	0.01489	0.01507	0.01246	0.01336	0.01372			
quarter_16	0.04429	0.02574	0.01692	0.01661	0.01354	0.01583	0.01574			
quarter_17	0.04858	0.02809	0.01936	0.01779	0.01486	0.01683	0.01750			
quarter_18	0.05234	0.03035	0.02090	0.01914	0.01634	0.01789	0.01948			
quarter_19	0.05596	0.03278	0.02252	0.02040	0.01754	0.01935				
quarter_20	0.06134	0.03713	0.02370	0.02181	0.01870	0.02122				
quarter_21	0.06314	0.04028	0.02459	0.02275	0.02026	0.02250				
quarter_22	0.06559	0.04187	0.02601	0.02345	0.02123	0.02369				
quarter_23	0.06777	0.04437	0.02725	0.02436	0.02289					
quarter_24	0.07163	0.04595	0.02884	0.02571	0.02420					
quarter_25	0.07465	0.04714	0.03021	0.02614	0.02558					
quarter_26	0.07651	0.04791	0.03096	0.02750	0.02633					
quarter_27	0.07878	0.04936	0.03201	0.02812						
quarter_28	0.07966	0.05024	0.03346	0.02898						
quarter_29	0.08040	0.05096	0.03401	0.02998						
quarter_30	0.08133	0.05149	0.03487	0.03102						
quarter_31	0.08290	0.05238	0.03525							
quarter_32	0.08426	0.05318	0.03571							
quarter_33	0.08499	0.05350	0.03625							
quarter_34	0.08573	0.05412	0.03641							
quarter_35	0.08624	0.05512								
quarter_36	0.08694	0.05573								

cohort	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
rate	cp rate	cp rate	cp rate	cp rate	cp rate	cp rate	cp rate	cp rate	cp rate	cp rate
quarter_37	0.08728	0.05632								
quarter_38	0.08764	0.05653								
quarter_39	0.08790									
quarter_40	0.08826									
quarter_41	0.08867									
quarter_42	0.08907									

Accessible Data for Figure 5: Cumulative Recovery Rates for SBA 7(a) Loans, by Annual Loan Cohort, Fiscal Years 1992–2015 (as of March 31, 2019)

Quarters since origination	1992	1993	1994	1995	1996
16	0.19525	0.19503	0.20768	0.13995	0.16578
16	0.21212	0.22597	0.22349	0.15727	0.17212
16	0.22047	0.23656	0.23828	0.16846	0.18264
16	0.24256	0.26167	0.25104	0.18049	0.18961
16	0.25059	0.27903	0.25856	0.18912	0.19534
16	0.27509	0.30324	0.27155	0.19894	0.21113
16	0.28856	0.32293	0.28966	0.20546	0.21937
24	0.31644	0.33209	0.30364	0.20868	0.23282
24	0.33342	0.34973	0.31566	0.22239	0.24018
24	0.34563	0.37496	0.32615	0.22983	0.24747
24	0.36442	0.38888	0.33397	0.23983	0.25621
24	0.3906	0.39798	0.34285	0.247	0.25995
24	0.40411	0.4123	0.35534	0.25205	0.26659
24	0.41908	0.42102	0.36227	0.25609	0.2747
24	0.43023	0.43772	0.37017	0.26124	0.28024
32	0.44468	0.44675	0.37425	0.26706	0.28476
32	0.45468	0.45722	0.37977	0.27472	0.29213
32	0.46759	0.46604	0.38266	0.27675	0.29714
32	0.47882	0.47455	0.3867	0.28065	0.30206
32	0.48668	0.47942	0.38959	0.28604	0.30755
32	0.50054	0.48401	0.39434	0.28889	0.31474
32	0.50789	0.48633	0.39751	0.29176	0.32039
32	0.51882	0.49181	0.40267	0.29445	0.32272
40	0.52238	0.49412	0.40409	0.2993	0.32699
40	0.52993	0.49915	0.40818	0.30211	0.32867
40	0.53723	0.50422	0.41083	0.30455	0.33287
40	0.54485	0.50876	0.41308	0.30577	0.33412
40	0.54561	0.51071	0.41635	0.30883	0.33798
40	0.54751	0.51979	0.41936	0.3127	0.33994
40	0.55068	0.52267	0.4242	0.31554	0.34314
40	0.55296	0.52645	0.42844	0.31789	0.34488
48	0.55784	0.52624	0.43097	0.32071	0.34571

Quarters since origination	1992	1993	1994	1995	1996
48	0.56169	0.52838	0.4325	0.32291	0.34695
48	0.5652	0.5319	0.43556	0.32437	0.3499
48	0.56812	0.53293	0.43844	0.32512	0.35087
48	0.57107	0.53487	0.44039	0.32619	0.35194
48	0.57499	0.5365	0.44228	0.32697	0.35364
48	0.57819	0.53791	0.44399	0.32828	0.35565
48	0.58081	0.54007	0.44482	0.32989	0.35572
56	0.58202	0.54533	0.44611	0.33083	0.35582
56	0.58327	0.54653	0.44722	0.33133	0.35617
56	0.58541	0.54901	0.44748	0.33236	0.3571
56	0.5858	0.5508	0.44942	0.33336	0.357
56	0.5868	0.55178	0.45136	0.33355	0.35721
56	0.58771	0.55255	0.45219	0.33431	0.35857
56	0.58864	0.55356	0.45261	0.33488	0.35952
56	0.59043	0.55498	0.45317	0.33539	0.35923
64	0.59145	0.55529	0.45346	0.33649	0.35937
64	0.5918	0.55569	0.45402	0.33714	0.35971
64	0.5922	0.55663	0.45427	0.33786	0.36085
64	0.59249	0.55741	0.45442	0.33811	0.36202
64	0.59343	0.55887	0.45493	0.3381	0.36269
64	0.59366	0.55885	0.45472	0.3388	0.36289
64	0.59493	0.55989	0.45502	0.33902	0.36297
64	0.59507	0.56124	0.45552	0.33984	0.36376
72	0.59528	0.56134	0.45557	0.33994	0.36433
72	0.59541	0.56219	0.45576	0.3403	0.36537
72	0.59606	0.56261	0.45611	0.34053	0.36605
72	0.59601	0.56418	0.45615	0.34108	0.36654
72	0.59606	0.56442	0.45698	0.34233	0.36671
72	0.59666	0.56567	0.45758	0.34289	0.36668
72	0.5968	0.56592	0.45775	0.34347	0.3695
72	0.59714	0.56579	0.45883	0.3435	0.3696
80	0.59735	0.5663	0.45901	0.34362	0.36951
80	0.59752	0.56658	0.45928	0.34441	0.36978
80	0.5977	0.56711	0.46016	0.34459	0.3703
80	0.5978	0.56739	0.46044	0.34499	0.37066
80	0.59822	0.56758	0.46103	0.34514	0.37093

Quarters since origination	1992	1993	1994	1995	1996
80	0.59878	0.56791	0.46142	0.34669	0.3712
80	0.59883	0.56866	0.46121	0.34735	0.37135
80	0.59897	0.56895	0.46142	0.3474	0.37193
88	0.59899	0.57026	0.46155	0.34754	0.37213
88	0.59905	0.57056	0.4618	0.34769	0.37223
88	0.59918	0.57076	0.462	0.34787	0.37243
88	0.59924	0.57104	0.46231	0.34804	0.3732
88	0.59898	0.57112	0.46355	0.34811	0.37333
88	0.59902	0.57095	0.46401	0.34823	0.37342
88	0.59917	0.57108	0.46408	0.34832	0.3735
88	0.59923	0.57119	0.46429	0.34841	
96	0.59928	0.57132	0.46437	0.34852	
96	0.59932	0.57163	0.46459	0.34858	
96	0.5994	0.57192	0.46474	0.34865	
96	0.59945	0.57207	0.46491		
96	0.5995	0.57214	0.46496		
96	0.59955	0.57223	0.46501		
96	0.59961	0.57228	0.46515		
96	0.59965	0.57231			
104	0.5997	0.57233			
104	0.59973	0.57236			
104	0.60039	0.57239			
104	0.60047				
104	0.60048				
104	0.60079				
110	0.60081				

Quarters since origination	1997	1998	1999	2000	2001
16	0.1499	0.14128	0.13931	0.1418	0.14216
16	0.16243	0.15637	0.15594	0.15029	0.15368
16	0.17075	0.18028	0.16603	0.15776	0.16411
16	0.17599	0.19104	0.18136	0.16728	0.16727
16	0.18448	0.20017	0.18908	0.17652	0.17444
16	0.1899	0.20823	0.19513	0.18798	0.17987
16	0.20041	0.21121	0.20361	0.19567	0.19044
24	0.20627	0.21855	0.20762	0.2036	0.20386
24	0.22304	0.226	0.21313	0.21246	0.21172
24	0.23406	0.2357	0.22327	0.21935	0.22742
24	0.25112	0.24287	0.22953	0.22924	0.23486
24	0.26266	0.24642	0.23614	0.24296	0.2408
24	0.26991	0.2537	0.24483	0.24855	0.2477
24	0.2741	0.26115	0.25374	0.2536	0.25182
24	0.28362	0.27122	0.26342	0.26018	0.25462
32	0.28727	0.27628	0.2686	0.265	0.25673
32	0.29583	0.2816	0.27181	0.26788	0.25893
32	0.30254	0.28818	0.27974	0.27024	0.26026
32	0.30995	0.29231	0.28761	0.26846	0.26021
32	0.31395	0.29623	0.29511	0.26763	0.2634
32	0.31816	0.29883	0.29882	0.26945	0.26718
32	0.3247	0.3084	0.30252	0.27092	0.26792
32	0.32832	0.31465	0.30295	0.27341	0.26626
40	0.33082	0.31959	0.30351	0.27186	0.26529
40	0.33275	0.32213	0.30371	0.27364	0.26703
40	0.33733	0.32231	0.30518	0.27282	0.27029
40	0.34219	0.32555	0.30526	0.26998	0.27146
40	0.34577	0.32727	0.30733	0.27066	0.27356
40	0.34819	0.32885	0.30988	0.27339	0.27599
40	0.34913	0.32946	0.30961	0.27277	0.27807
40	0.3516	0.3281	0.31102	0.27407	0.27906
48	0.35481	0.32947	0.31156	0.27673	0.28147
48	0.35468	0.33004	0.31159	0.27882	0.28372
48	0.355	0.33098	0.31227	0.27989	0.28457
48	0.35652	0.33126	0.31308	0.28154	0.28722

Quarters since origination	1997	1998	1999	2000	2001
48	0.3553	0.33192	0.31535	0.2837	0.2884
48	0.35632	0.33419	0.31756	0.28427	0.29058
48	0.35794	0.33557	0.31883	0.28613	0.29294
48	0.35895	0.33762	0.32075	0.28806	0.29511
56	0.36132	0.33724	0.32266	0.28962	0.29713
56	0.36292	0.33832	0.32247	0.29201	0.29803
56	0.36216	0.34009	0.32389	0.29443	0.29883
56	0.36307	0.34073	0.32511	0.29773	0.30067
56	0.36393	0.34157	0.32689	0.29848	0.30158
56	0.36497	0.34156	0.32787	0.29997	0.30261
56	0.36639	0.34261	0.33064	0.302	0.30471
56	0.36599	0.34293	0.33185	0.30448	0.30844
64	0.36729	0.34417	0.33237	0.30631	0.30963
64	0.36884	0.34453	0.33332	0.30679	0.31242
64	0.36942	0.34536	0.33466	0.30713	0.31414
64	0.36988	0.34628	0.33554	0.309	0.31611
64	0.37056	0.34771	0.33637	0.30977	0.31739
64	0.37129	0.34988	0.33662	0.31171	0.31972
64	0.37177	0.35023	0.33925	0.31356	0.32064
64	0.37342	0.35195	0.33981	0.31508	0.32127
72	0.37352	0.3524	0.34163	0.31576	0.32158
72	0.37547	0.35266	0.34234	0.31683	0.32209
72	0.37713	0.35336	0.3432	0.31747	0.32311
72	0.37808	0.35366	0.34371	0.31846	
72	0.37958	0.35408	0.34418	0.31896	
72	0.38102	0.3557	0.34511	0.31988	
72	0.38232	0.35564	0.3462	0.32047	
72	0.38318	0.35664	0.34789		
80	0.38396	0.35735	0.34815		
80	0.38495	0.3583	0.3485		
80	0.38579	0.35886	0.34902		
80	0.38675	0.35942			
80	0.38723	0.3596			
80	0.38752	0.35961			
80	0.38791	0.35983			
80	0.3882				

Quarters since origination	1997	1998	1999	2000	2001
88	0.38868				
88	0.38947				
88	0.38997				

Quarters since origination	2002	2003	2004	2005	2006	2007	2008
16	0.13807	0.15122	0.12634	0.07544	0.0666	0.05369	0.06568
16	0.13965	0.17825	0.12784	0.0774	0.07043	0.05811	0.07199
16	0.14548	0.18676	0.1277	0.07991	0.07297	0.0626	0.08053
16	0.15959	0.19357	0.13721	0.07959	0.0763	0.06873	0.08789
16	0.17143	0.1945	0.13606	0.08178	0.08044	0.07565	0.093
16	0.18783	0.1947	0.13258	0.08661	0.08675	0.08355	0.09953
16	0.20144	0.19798	0.13712	0.09004	0.09361	0.09204	0.10752
16	0.21059	0.19575	0.13249	0.09697	0.09947	0.0964	0.11189
24	0.21554	0.19444	0.13972	0.10419	0.10438	0.10289	0.1177
24	0.22193	0.19531	0.14196	0.10893	0.11075	0.10711	0.12386
24	0.22133	0.19782	0.1407	0.11513	0.11647	0.11279	0.12926
24	0.22635	0.19707	0.14409	0.12142	0.12313	0.11649	0.13406
24	0.22653	0.19561	0.15208	0.12747	0.12892	0.1231	0.1398
24	0.22649	0.19649	0.15928	0.1325	0.13257	0.12628	0.147
24	0.2279	0.19323	0.16475	0.14178	0.14009	0.13161	0.1535
24	0.22967	0.19205	0.1721	0.14752	0.14432	0.13693	0.15721
32	0.23357	0.19313	0.17644	0.15539	0.14976	0.14224	0.16303
32	0.2338	0.19901	0.18365	0.16084	0.1534	0.14633	0.16738
32	0.23051	0.20353	0.18667	0.16915	0.15787	0.15019	0.17116
32	0.23416	0.20794	0.19227	0.17347	0.16109	0.15276	0.17482
32	0.23977	0.21045	0.19764	0.18157	0.1656	0.15668	0.17939
32	0.24251	0.21588	0.20239	0.18655	0.17206	0.15975	0.18407
32	0.24696	0.22219	0.20679	0.19115	0.17681	0.16438	0.18907
32	0.24948	0.22639	0.21267	0.19455	0.18185	0.16893	0.1912
40	0.25431	0.22801	0.21704	0.19823	0.18633	0.1724	0.19579
40	0.25483	0.23332	0.22001	0.20493	0.18931	0.17557	0.20046
40	0.25767	0.23763	0.2257	0.21015	0.193	0.17929	0.20375
40	0.26084	0.24324	0.22886	0.21227	0.19672	0.18272	0.20771
40	0.26293	0.24802	0.23124	0.21505	0.20081	0.18543	0.21089
40	0.26608	0.25222	0.23593	0.21733	0.2052	0.18798	0.21265
40	0.27001	0.25529	0.24001	0.22212	0.20902	0.19102	
40	0.27392	0.26007	0.24325	0.22705	0.21221	0.19315	
48	0.27844	0.26359	0.24566	0.23135	0.21436	0.1948	
48	0.28309	0.26743	0.2465	0.23513	0.21821	0.19709	
48	0.28508	0.2706	0.25272	0.23943	0.22229		
48	0.28714	0.2736	0.25674	0.24096	0.22391		

Quarters since origination	2002	2003	2004	2005	2006	2007	2008
48	0.28977	0.27694	0.25838	0.24486	0.2254		
48	0.29364	0.27924	0.26075	0.24758	0.22859		
48	0.29669	0.28092	0.26396	0.25111			
48	0.29899	0.28566	0.26598	0.25249			
56	0.30273	0.29026	0.26743	0.25449			
56	0.30567	0.29241	0.27085	0.25638			
56	0.30949	0.29665	0.27312				
56	0.31067	0.29955	0.27464				
56	0.31295	0.30068	0.27639				
56	0.31477	0.30301	0.2773				
56	0.31729	0.30463					
56	0.31967	0.30637					
64	0.32374	0.30781					
64	0.326	0.30975					
64	0.32781						
64	0.3286						
64	0.32978						
64	0.33015						

Quarters since origination	2009	2010	2011	2012	2013	2014	2015
16	0.09609	0.10858	0.17041	0.17767	0.15011	0.18135	0.1242
16	0.10982	0.12442	0.15717	0.18674	0.14911	0.19756	0.12595
16	0.11529	0.13282	0.17173	0.18659	0.17183	0.19635	
16	0.12608	0.13	0.17981	0.20729	0.18577	0.19159	
16	0.13741	0.13519	0.1864	0.22114	0.19997	0.19671	
16	0.14034	0.13828	0.19209	0.22855	0.21535	0.19881	
16	0.14754	0.14734	0.19196	0.24653	0.22104		
24	0.15822	0.15548	0.19097	0.2546	0.23239		
24	0.18581	0.17084	0.2082	0.26132	0.23919		
24	0.17831	0.17839	0.20888	0.26116	0.24279		
24	0.17948	0.18474	0.21516	0.26986			
24	0.18685	0.19342	0.21618	0.26827			
24	0.19142	0.19902	0.23768	0.26648			
24	0.19618	0.21212	0.24013	0.26737			
24	0.20195	0.22576	0.25117				
32	0.21087	0.23397	0.25819				
32	0.21681	0.24192	0.26183				
32	0.22297	0.24947	0.26662				
32	0.22967	0.25387					
32	0.23432	0.25752					
32	0.2394	0.26678					
32	0.2435	0.27159					
32	0.24861						
40	0.25331						
40	0.25654						
40	0.26013						

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