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Distribution of Paycheck Protection Program Funding During the Covid-19 Pandemic

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Distribution of Paycheck Protection funding during the COVID-19 Pandemic

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Abstract: We investigate racial disparities in the distribution of Paycheck Protection Program (PPP) loans, focusing on the third tranche and rural business impacts. Using a Cragg-Hurdle regression model, we analyze how a community's racial composition influenced PPP loan allocation. Our findings reveal a large increase in funding for majority-minority communities, particularly those with higher Black populations, during the third tranche compared to earlier rounds. This tranche introduced notable shifts in loan distribution patterns, influenced by nontraditional lenders and policy changes under the Biden-Harris Administration. We observe a marked difference in loan allocation based on racial composition and urban-rural distinctions: the Black population's share consistently correlates positively with both loan numbers and amounts, a trend amplified in the third tranche. In contrast, the relationship between the White population share and loan distribution varies, becoming less positive or more negative in different tranches and regions. These findings challenge prior assessments of racial equity in PPP loan distribution, underscoring the third tranche's critical role in shaping the overall program. Our study emphasizes the need for a revised understanding of racial disparities in PPP loan allocation, particularly in light of evolving lender practices and policy changes.

Keywords: Paycheck Protection Program, Minority business, Racial inequality

JEL Classification: H12, J15

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1. INTRODUCTION

The Paycheck Protection Program (PPP), part of the Coronavirus Aid, Relief, and Economic Security (CARES) Act, was established by the U.S. Congress to mitigate the economic impact of the COVID-19 pandemic on small businesses. One of the program's many ambitious goals was supporting underserved and rural markets, underscored by a Sense of the Senate resolution, emphasizing aid to socially and economically disadvantaged individuals and other vulnerable groups. Administered by the Small Business Administration (SBA) through qualified lenders, the PPP disbursed over $950 billion across three funding tranches from April 2020 to March 2021.

The program evolved significantly across its three tranches. The first tranche, initiated on April 3, 2020, was quickly exhausted by April 16. The second tranche followed on April 27 and continued until August 8, 2020. The third tranche, starting on December 27, 2020, introduced new provisions allowing for additional draws of funding. Notably, in February 2021, the Biden-Harris Administration introduced important policy changes, including prioritization for businesses with fewer than 20 employees and revised eligibility criteria for loan calculation, felonies, student loans, and lawful non-citizen residency.

Prior research has highlighted substantial disparities in PPP loan allocation, particularly during the initial tranches, with minority-owned businesses and communities receiving less funding. Smaller businesses faced greater challenges in accessing funds and the majority of the PPP’s allocations did not reach employees at risk of job loss. However, due to the delayed availability of third-tranche data, the racial equity dynamics in this final tranche have to this point remained underexplored.

Our study addresses this gap in the literature by examining the racial composition of ZIP codes and its impact on PPP loan distribution during the third tranche and the complete program. We extend previous methodologies by aggregating PPP loan data at the ZIP code level and applying a Cragg-Hurdle regression model. This is in contrast to much of the existing literature which relies on loan-level analyses. Our aggregation approach mitigates empirical limitations associated with loan-level analyses and allows for a nuanced understanding of how racial comptabosition of communities influenced loan allocation, particularly distinguishing between urban and rural areas. Limitations addressed in our study include: the nonrandom and insufficient reporting of business owners' races,[2] the inability to consider the allocation of funds to employees as well as business owners, and the inclusion of an additional metric of loan distribution, namely the number of loans. This approach also mitigates issues like survivorship bias and over-representation of densely populated areas, making it a more suitable and conservative method for examining the program's impact on diverse communities.[3] We enhance our empirical analysis by employing a Cragg-Hurdle regression model, which addresses the zero-inflated nature of the data and enables our variable coefficients to differ when estimating both whether a ZIP code receives any loans and the amount of funding it receives if it does. Previous studies have generally controlled for rurality but often combined urban and rural racial categories into a single variable. This overlooks the possibility that the same racial groups in urban and rural areas might have been treated differently under the PPP. To address this gap, we

[2] The share of loans reporting race across the three tranches are 20.8%, 16.8%, and 29.7%, chronologically. These numbers are higher than other studies have reported in their summary statistics, but a significant number of fraudulent loans were found after the conclusion of the program (my version of the data, published June 30th, 2023, contains about 400,000 fewer loans than the SBA's reported number as of 5/31/2021). It is possible that this is the reason for these differences, but I do not know this definitively.

[3] The benefits and costs of aggregation are discussed further in Section 3.

disaggregate the influence of the proportion of a ZIP code's White and Black populations in urban versus rural areas. We also perform heterogeneity analysis excluding loans from nontraditional lenders from our sample to compare results, as the acceptance of these lenders varied across tranches. Lastly, we analyze the impact of racial demographics over the course of the third tranche, examining changes before and after adjustments made by the Biden-Harris Administration. We rerun our regressions over seven two-week periods focused on the exclusive application window for the smallest businesses.

Prima facie, the third tranche looks markedly different from its predecessors. Without controlling for other factors, more loans and more funding flowed to majority-minority ZIP codes than had previously. Previewing our key findings, we observe a notable trend regarding the association between the White share of the population in urban ZIP codes and loan number. While initially positively correlated in the first tranche, this relationship progressively turns negative in the second and third tranches. In contrast, the relationship between the White share of the population in rural ZIP codes and loan number exhibits a more intricate pattern. Initially positive in the first tranche, it approaches no economically meaningful relationship in the second, and begins notably more negatively associated with loan number in the third tranche. However, this relationship is only negative when the value of Rural White Share is small. When Rural White Share is above ~48% the relationship becomes positive. Rural White Share is less positively associated with loan receipt in the first tranche and less negatively associated in later tranches than urban White Share. We find that Black share of the population is almost always positively associated with loan number in all three tranches as well as the overall program, and

this relationship is significantly larger in the third tranche than in the first and second.[4] These patterns hold true for loan amounts as well, where, at its peak, a percentage point increase in the Black share of an urban ZIP code's population is associated with more than $128 more per employee in that ZIP code during the third tranche (around 4% of the mean outcome in that tranche) and more than $212 overall (over 2% of the mean for the whole program). The third tranche (for the most part) heavily influences the results estimated for the full program, indicating that the analysis of the previous investigations into the inequities of loan distribution which did not include the third tranche are no longer representative of the program as a whole. Removing loans from nontraditional lenders reduces the magnitude of the negative relationship the White share in urban ZIP codes has with loan number and amount in the later tranches and decreases its significance in the overall model for loan number. Doing so also greatly reduces the positive relationship the Black share of a ZIP code's population has with loan number in the third tranche and program as a whole for both loan number and size. This suggests nontraditional lenders explain a large part (but not all) of the increase in the coefficients' magnitudes in the third tranche. Comparing the coefficients before and after the changes made to the third tranche reveals large differences. The White share of the population becomes much more negatively associated with loan number and size except in rural, majority-White ZIP codes. The Black share of the population becomes much more positively associated with both metrics of loan receipt, again displaying the largest shift of the three. The coefficients in the first part of the third tranche (before the changes) look much more like those seen in previous tranches, which would seem to suggest the changes made by the Biden-Harris Administration mark a turning point in the

[4] Our excluded category is non-Black minorities. The previous literature almost exclusively uses White as the base category. This change is likely what drives this difference in findings.

program. When we further break down the third tranche into two-week periods (as mentioned above, we use three periods before, a period containing the implementation of the changes, and three periods after to run a quasi-event-study), we observe shifts in the relationships prior to the Biden-Harris Administration's changes. If the shifts began before the Biden-Harris Administration's changes, they could not be the sole causer of these shifts. Over the course of the third tranche, the coefficients for our three variables of interest (urban and rural White share and Black share) largely converge until after the two-week exclusive application period when they become just as (if not more) separated than before.

In the next section, we summarize the previous literature as it relates to the PPP broadly as well as our paper specifically. We then discuss our data and methodology in Sections 3 and 4. We further motivate our analysis by extending Fairlie and Fossen's methods (2022) to the third tranche in Section 5. Section 6 presents the results of our models, and Section 7 discusses those results. We conclude in Section 8.

2. LITERATURE REVIEW

The effectiveness of the PPP in maintaining employment has been widely investigated. Hubbard and Strain (2020) compare businesses likely eligible for the PPP (1-500 employees) against those likely ineligible (500-1000 employees). They find that receiving a PPP loan had a positive effect on employment, with this effect increasing over time. Their study ends in August 2020, and they caution that the observed increase may be due to partial re-openings. Autor et al. (2022b) similarly compare employment levels of businesses likely eligible and ineligible based on size, using ADP payroll data. They find that the PPP boosted employment by 2-5% (approximately 3.6 million jobs) at eligible firms relative to ineligible ones, but this effect decreased by the end of 2020.

The program, however, was not without its flaws. The effects of the PPP on employment were quite small relative to the size of the program (Autor et al., 2022a; Granja et al., 2020), with Autor et al. (2022a) estimating the cost to be $169,000 to $258,000 per job-year retained. Granja et al. (2020) highlight that many firms spent their funding on non-payroll costs and savings. Autor et al. (2022a) estimate that only 23-34% of the program's funding went to employees who otherwise would not have kept their jobs, and about 72% of the program's funding went to the top quintile of households by income. Furthermore, the smallest businesses were less likely to be aware of the program early on, less likely to apply, and more likely to be denied a loan if they did apply (Humphries et al., 2020). Significant efforts have also been focused on the equity of loan distribution with regard to race.

2.1 Racial Equity

The racial equity of loan distribution in the first two tranches has been extensively analyzed in the literature. In the first tranche, Black-owned businesses received loans about half the size of their White-owned counterparts (Atkins et al., 2022), and minority communities received fewer loans per employer establishment and smaller total loan amounts per employee, even without controlling for other factors (Fairlie and Fossen, 2022). This disparity decreased slightly in the second tranche. The differences in loan amounts between Black- and White-owned businesses became insignificant over the course of the second tranche (Atkins et al., 2022), and minority communities received more loans per employer establishment (again, without controlling for other factors) (Fairlie and Fossen, 2022). Across all three tranches, Black-owned businesses that reported race received loans about half the amount their counterparts that did not report their owners' race received (specifically in Durham, NC) (Garcia and Darity, 2022).

Additionally, Black-owned businesses were more likely to be denied loans from traditional lending sources (Howell et al., 2024).

Analyzing loan distribution is complicated by several factors, including the various ways to define the metric itself (loan amounts, number of loans, forgiveness rates, etc.), and additional factors such as loan denial and loan officers' treatment of applicants, for which data is not provided. This complexity is reflected in the literature, where various papers employ different methods to measure loan distribution at multiple levels. These different approaches often respond to the same issue: reporting of business-owner characteristics was voluntary, and the majority of business owners did not self-report. This makes analyzing racial disparities in loan receipt challenging.

Methods for addressing the lack of self-reported business-owner race vary depending on the unit of analysis employed. Papers using loan-level analysis attempt to correct or fill in unreported race observations (e.g., Atkins et al., 2022; Garcia and Darity, 2022; Howell et al., 2024). Another method is to aggregate loan distribution data (e.g., Fairlie and Fossen, 2022), often at the ZIP code level, as this was the smallest standard geographical variable reported in the loan data. Aggregating data in this way circumvents the issue of non-random and incomplete race reporting by using the racial demographics of the community, although it comes at the cost of less precise identification of loan recipients' races.

Atkins et al. (2022) use a Heckman selection variable to account for the non-random self-reporting of business-owner race. This variable is constructed from a regression predicting the likelihood of not reporting race when applying for a loan, using various racial demographic variables at the ZIP code level, along with factors such as education, rurality, corporate form, industry, and state indicators. The resulting variable is then incorporated into their main

regression. Conversely, Garcia and Darity (2022) fill in race data using a variety of sources, including Black small business directories, company websites, and social media. The cost of this primary data collection is a significantly smaller sample size, as they limit their analysis solely to Durham, NC. Rather than hand-collecting data, Howell et al. (2024) employ a two-part process involving machine learning to predict borrowers' races. First, they estimate the probability that an individual belongs to a certain racial group based on their last name and location, using data from the 2000 Census on last names and census tract racial distributions from the American Community Survey. Next, they use this probability, along with racial distributions of first names and industries by employer status, as inputs to a random forest model. They argue that since loan officers would likely infer race from these characteristics (name and location) rather than directly observing race, these predicted races are more relevant. Loan officers would be more likely to view and react to applicants as the race most commonly associated with their name or location. This method is less precise than hand-collecting data but allows for analysis on the full sample of loans.

In contrast to these loan-level analyses, Fairlie and Fossen (2022) aggregate loans to the ZIP code level and use racial demographics as the variables of interest. This allows them to construct two measures of loan receipt: loan amount per employee (the sum of all loans to businesses in a ZIP code divided by the number of employees in that ZIP code) and number of loans per employer establishment (the number of loans to businesses in a ZIP code divided by the number of business establishments in that ZIP code). This also enables them to analyze a metric (loan number) which is not included in the loan-level analyses. Finally, they conduct a univariate analysis comparing their two measures of loan distribution against the minority share of ZIP codes' populations. These methods of analyzing loan distribution and accounting for the

sparse reporting of race suggest a tradeoff between the granularity of the analysis and the precision of the imputed race observations. Hand-collected data and aggregated data represent the two ends of this tradeoff. A more thorough discussion of the pros and cons of aggregating data is presented in the next section.

Wide-scale investigations into the program's (in)equity regarding race have largely ceased after the second tranche. The third tranche, however, introduced significant changes, including a two-week period of exclusive availability to firms with fewer than 20 employees and a revised funding formula for sole proprietorships, independent contractors, and self-employed individuals, which had previously received loans as small as $1. These changes make it unnecessary to employ the winsorization technique found in Atkins et al. (2022). Analyses which choose to winsorize these observations systematically overestimate aggregate measures of funding awarded to these types of businesses (a key part of our analysis later on). The above alterations to the program's rules, along with the additional tranche, underscore the importance of updating the literature's understanding of the program's inequities.

2.2. Nontraditional and Fintech Lenders

Due to the program's reliance on banks to approve and distribute loans, lending was significantly influenced by borrowers' pre-existing relationships with banks, and these relationships are not evenly distributed among business owners. Gopal and Schnabl (2022) show that non-bank lenders have captured much of the small-business lending market since 2008. Furthermore, Zeeuw and da Motta (2021) find that from 2016 through 2019, Black-owned businesses were 1.6 times more likely to apply for a loan from a CDFI than observationally similar White-owned businesses. Smaller, minority-owned firms were more likely to borrow from fintech and non-bank lenders during the PPP (Chernenko and Scharfstein, 2022). However,

nontraditional and fintech lenders were not widely approved to participate in the program until the second tranche. This change in the program's rules has been identified as a potential mechanism for reducing the disparities faced by Black and minority business owners, as fintech lenders are disproportionately used in majority-minority ZIP codes (Erel and Liebersohn, 2020).

Atkins et al. (2022) investigate this possibility by splitting their sample into a pre-May 1st sample and six two-week segments after April 30th, when non-traditional lenders were approved to participate in the program. They find that the coefficients for White and Black business owners (indicators relative to unreported race) converge after May 1st, 2020, and there is no statistically significant difference by late July.

Howell et al. (2024) utilize a dataset of PPP loan applications, including those that were denied, from Lendio, an online service that randomly matches applicants with lenders. They compare the denial rates faced by different racial groups from traditional and fintech lenders. The study finds no differences in the odds of receiving a loan from fintech lenders across racial groups. However, traditional lenders were 3.9 percentage points more likely to deny a loan to a Black-owned business. Additionally, Black-owned businesses were 5.8 percentage points more likely to be denied a loan from any traditional lender. The authors suggest that automation is the driving force behind these disparities, using a differences-in-differences model to show that after small banks automated their loan processes, the share of their loans to Black-owned businesses nearly doubled.

It is evident that nontraditional and fintech lenders have played a crucial role in mitigating the disparities experienced by Black and minority business owners.

3. DATA

We utilize the two dependent variables, the number of loans per employer establishment and the mean loan amount per employee, as outlined in Fairlie and Fossen (2022). Both variables are calculated using the loan data provided by the Small Business Administration (2023). The data in its original form is at the loan level, but we aggregate to the 5-digit ZIP code level. Loans without a reported ZIP code are therefore excluded. We also exclude loans to recipients outside the 50 states and District of Columbia, as well as those to independent contractors and self-employed individuals. We then use County Business Patterns (CBP) data from the United States Census Bureau (2022), supplemented with data on the counts of farms from the National Agricultural Statistics Service (2017), to obtain a count of employer establishments for each ZIP code. The CBP data must be supplemented with farm counts because it lacks data for businesses in Crop and Animal Production (NAICS beginning with 111 and 112). However, the farm count data does not include the number of employees, so these NAICS codes are excluded from the analysis of loan amounts per employee. Additionally, the CBP lacks data for several industries, including Rail Transportation; Postal Service; Pension, Health, Welfare, and Other Insurance Funds; Trusts, Estates, and Agency Accounts; Offices of Notaries; Private Households; and Public Administration,[5] So we exclude loans to businesses reporting these NAICS codes from both measures. To calculate the number of loans per employer establishment, we divide the number of loans to a ZIP code by the total number of employer establishments from the above sources. The mean loan amount per employee is calculated by totaling the value of all loans

[5] NAICS codes starting with 482, 491, 525110, 525120, 525190, 525920, 541120, 814, and 92

awarded to businesses in each ZIP code (excluding Crop and Animal Production) and dividing by the number of employees reported in the CBP data.

Aggregating to the ZIP code level offers several advantages over a loan-level analysis. Firstly, it addresses the challenge of low reporting rates of business owners' races, as noted by both Fairlie and Fossen (2022) and Atkins et al. (2022), and the non-random distribution of reported race data. While various methods can be employed to address this issue in loan-level analyses, they often overlook a crucial factor: PPP loans were intended primarily for payroll expenses, meaning the funding ultimately benefited employees alongside the owner. Thus, focusing solely on business owners' characteristics in loan-level analyses provides an incomplete picture of where PPP funding was directed. Secondly, aggregation allows for the analysis of loan numbers, which becomes particularly relevant with the introduction of second draws of funding during the third tranche. Treating these second draws as regular loans in a loan-level analysis would lead to double-counting of businesses that received a second draw, resulting in skewed estimates. Thirdly, a loan-level analysis excludes businesses that did not receive loans, introducing survivorship bias and potentially misestimating coefficients. By failing to account for these businesses, which effectively received loans of $0, loan-level analyses may not generalize well to the broader population. Fourthly, the SBA's directive to prioritize entities in underserved and rural markets suggests that applications were evaluated based on their community context to some extent. Lastly, including demographic variables in a loan-level regression could disproportionately emphasize the demographics of densely populated areas, leading to inflated statistical significance of predictors due to the large number of observations. In contrast, an aggregated analysis, while susceptible to aggregation bias, offers a more

conservative estimation technique by including fewer observations. Taken together, these factors indicate that a ZIP code-level analysis better aligns with our specific research objectives.

Aggregation in this manner relies on several assumptions. Firstly, it assumes homogeneity among businesses, workers, and loans within a ZIP code. However, this assumption may not always hold true as businesses vary in the goods and services they offer, and the impact of the COVID-19 pandemic differed across industries, leading to varying treatment by the SBA. Secondly, the aggregation assumes that each loan has an equal impact on the final variables. While plausible, there is no clear reason why larger or smaller loans, or loans to businesses in specific industries, should carry more or less weight. Thirdly, the aggregation assumes a linear relationship between the outcome variables and individual loans. This assumption seems reasonable given the nature of the analysis and the variables involved. Finally, aggregation to the ZIP code level assumes that loan receipt within a ZIP code is independent of loan receipt in other ZIP codes. While this assumption may be easier to justify for larger ZIP codes covering multiple areas, it may be less applicable to smaller ZIP codes where loan receipt in one area could potentially influence loan receipt in nearby areas.

Aggregation introduces several potential challenges for our model in achieving accurate estimations. One such challenge is Simpson's paradox, where trends in the data at one level of analysis may disappear or even reverse at other levels. This could result in estimates that misrepresent the direction, magnitude, and significance of the relationships experienced by individual businesses. Another issue arising from aggregation is the ecological fallacy, which involves assuming that characteristics observed at an aggregate level are also present at the individual level. For instance, our analysis might find that ZIP codes with a higher percentage of White population received more loans. However, it's crucial to note that this doesn't necessarily

imply that White business owners received more loans than they would have otherwise. This highlights an important limitation in the interpretation of our results. Our results describe the distribution of funding at the ZIP Code level and should not be interpreted in the context of individual businesses.

Our variables of interest, White Share and Black Share, represent the share of a ZIP code's population held by individuals classified as non-Hispanic Whites and Blacks or African Americans (regardless of ethnicity), respectively. We include squared terms for both of these variables as well as interactions with Rural Indicator for White Share and its square. Rural Indicator is a binary version of Rural (which measures the percentage of a ZIP code's population living in a rural area) equal to 1 if 50% or more of a ZIP code's population is living in a rural area and 0 otherwise. Controlling for rurality is important because rural business owners often faced several barriers to applying for loans (distance to physical locations, worse or limited access to Wi-Fi, lack of knowledge about the program, etc.), the rurality of an area often correlates with racial demographics (the variables of interest), and the SBA and its lenders may have treated rural businesses differently when considering their applications due to the fewer businesses and employment opportunities in their areas. This might disincentivize applying for a PPP loan. Our data uses the U.S. Census Bureau's definitions of urban and rural areas: urban areas are either "Urbanized areas, which contain 50,000 or more people" or "Urban clusters, which have at least 2,500 people but fewer than 50,000 residents" (U.S. Census Bureau, 2020). Any areas not classified as urban are classified as rural. We include indicators for Census Region (with West as the omitted category) to account for any location-based differences. We also control for education (via the percent of a ZIP code's population with at least a Bachelor's degree), per capita income, inequality (via the Gini coefficient), and the unemployment rate.

Business owners in more educated ZIP codes would theoretically be more likely to be aware of the program and how to apply and/or have business in sectors affected differently by the pandemic (office workers vs. fast food). The effect of higher per capita income would be similar. Because a large portion of the loan amount was required to go to payroll expenses, ZIP codes with higher levels of wealth inequality may have received more/larger loans in order to combat such inequality. Finally, ZIP codes with higher unemployment rates (prior to the pandemic) may have received a different number/size of loans depending on whether the smaller number of employees had a larger effect than any desire of the SBA to direct funding to underserved markets. All of these measures are taken from the National Historical GIS (NHGIS) which is part of the Integrated Public Use Microdata Series (Manson et al., 2023). Due to the small populations in some ZIP codes, we use ACS 5-Year Estimates ending in 2019 for these variables. Summary statistics for all variables are presented in Table 3.1.

Table 3.1. Summary Statistics

Variable	Mean	Std. Deviation	N	Year
Black Share (%)	7.338	14.877	33,499	2020
White Share (%)	73.976	24.494	33,499	2020
Rural (%)	64.658	44.045	33,499	2020
Rural Indicator	0.625	0.484	33,499	2020
Per Capita Income	31,230.72	14,503.82	32,227	2015-2019
Gini Coefficient	41.505	7.634	31,979	2015-2019
Unemployment Rate	5.407	6.045	32,330	2015-2019
% ≥ Bachelor's	24.541	16.865	32,465	2015-2019
Loans per Emp. Est.: 1	0.13	0.112	32,638	2020-2021
Loans per Emp. Est.: 2	0.234	0.187	32,638	2020-2021
Loans per Emp. Est.: 3	0.462	0.552	32,638	2020-2021
Loans per Emp. Est.: Total	0.825	0.676	32,638	2020-2021
Loan Amount per Emp.: 1	3,043.12	5,013.228	30,771	2020-2021
Loan Amount per Emp.: 2	1,881.202	3,078.1	30,771	2020-2021
Loan Amount per Emp.: 3	3,122.368	5,101.378	30,771	2020-2021
Loan Amount per Emp.: Total	8,046.69	9,379.916	30,771	2020-2021

Note: * denotes that the data is from the 2020 U.S. Census. † denotes that the variable has been generated using data from an otherwise mentioned source. ‡ denotes that the data is an American Community Survey 5-Year Estimate.

4. METHODOLOGY

As described above, in order to investigate loan distribution at the ZIP code level, we use the two outcome variables defined by Fairlie and Fossen (2022): the number of loans a ZIP code receives per employer establishment and the average loan amount per employee in a ZIP code. Histograms of these variables are presented in Figures 4.1 and 4.2. Note that, for the sole purpose of better visualization, the values are winsorized (capped) at 15,000 for the individual tranches and 45,000 for the program as a whole in Figure 4.1 and at 0.5, 1, 2, and 3 for the three tranches (in order) and the program as a whole, respectively, in Figure 4.2. These variables are not winsorized in the regression analysis.

The outcome variables are censored at zero, as a ZIP code could not receive a negative number of loans or loans for a negative amount, and often exhibit zero-inflation, with the positive values roughly following a bell curve. As we will demonstrate in the next section, we are able to replicate the results from Fairlie and Fossen (2022) on the first two tranches precisely.

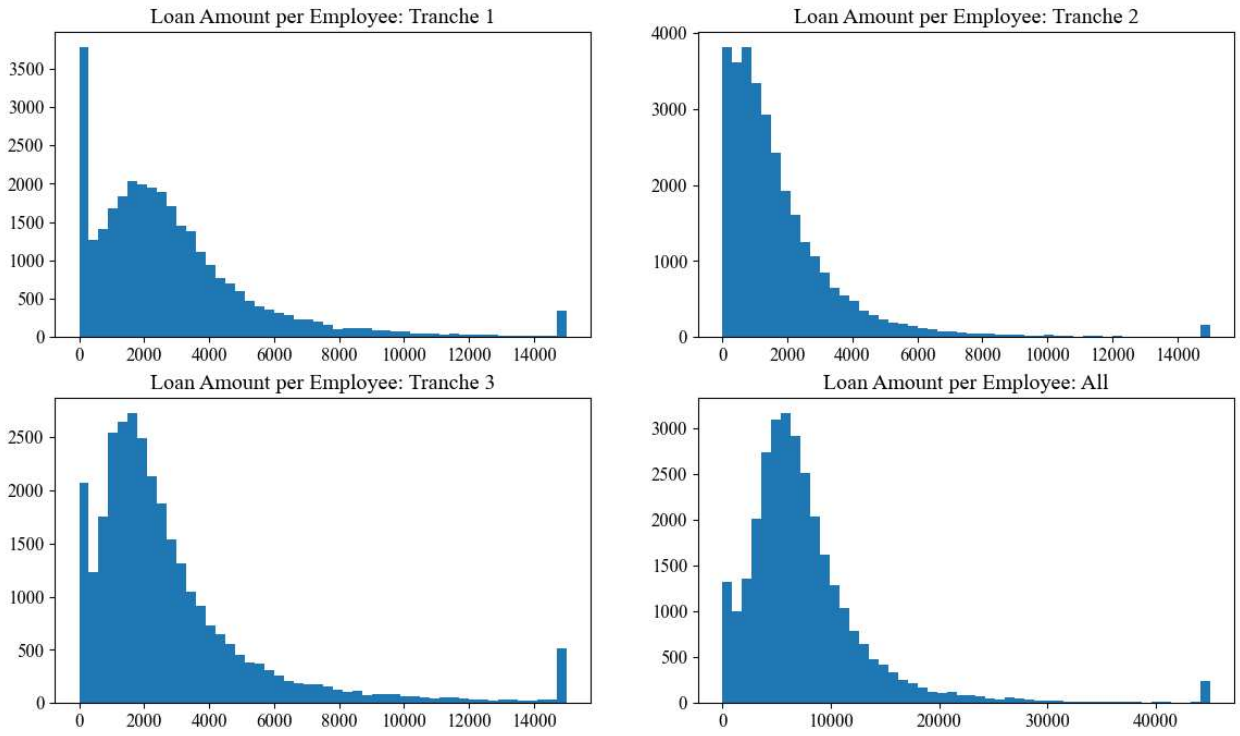

Figure 4.1. Histograms of Mean Loan Amount per Employee

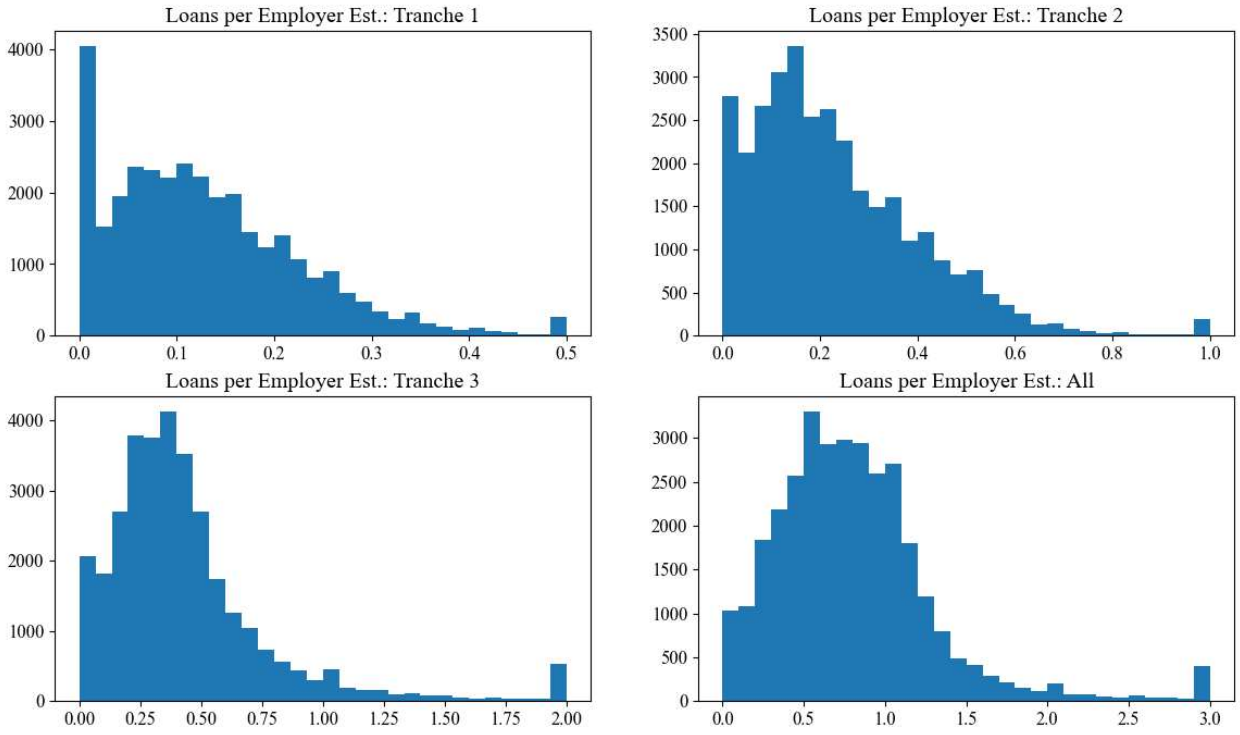

Figure 4.2. Histograms of Number of Loans per Employer Establishment

To address the non-normality of these variable distributions, we could employ a Tobit regression to analyze loan distribution. However, the Tobit model assumes that the relationship between a predictor and whether the outcome variable passes the censoring threshold is the same as the relationship between the predictor and the value of the outcome variable once it surpasses the censoring threshold. Yet, this assumption may not always hold true. For example, a ZIP code's per capita income might have a positive association with the likelihood of receiving more than zero loans but a negative association with the number of loans per employer establishment, given the government's aim to direct funding toward historically underserved markets. The Tobit model would amalgamate these distinct relationships into a single one.

Another approach, the Cragg-hurdle model, doesn't rely on this assumption. This two-part regression model initially evaluates the likelihood that an observation is censored or non-censored (i.e., zero or positive) and then assesses the relationships between the predictors and the

outcome variables using solely the observations with non-zero, positive values. Consequently, it permits the estimated relationships between the predictors and the odds of receiving any loans (and thus any loans of positive value) to differ from those between the predictors and the actual positive values of the outcome variables.

While the Tobit model requires an additional assumption, what it estimates (a singular relationship for all ZIP codes) is a valuable insight. Therefore, we estimate and present the Tobit model in the appendix. The Hurdle model remains our preferred specification.

The first part of the hurdle model is presented in Equation (4.1):

$$s_i = \begin{cases} 1 & if\ \mathrm{z}_i\gamma + u_i > 0 \\ 0 & if\ z_i\gamma + u_i \leq 0 \end{cases} \qquad \text{(Eq. 4.1)}$$

where s_i is a dummy variable which takes the value of 1 if ZIP code *i* receives any positive number of loans (or, analogously, loan amounts greater than zero) and zero otherwise, z_i is a vector of independent variables with coefficients in the vector γ, and u_i is the error term distributed normally with a mean of zero. The value of s_i is estimated using a Probit model formulated $P(s_i = 1) = z_i\gamma + u_i$.

The second part of the hurdle model, estimated using a truncated normal regression, is presented in Equation (4.2).

$$y_i = \begin{cases} x_i\beta + \epsilon_i & if s_i = 1 \\ 0 & otherwise \end{cases} \qquad \text{(Eq. 4.2)}$$

where x_i is a vector of independent, explanatory variables, β is a vector of coefficients, and ϵ_i is the error term distributed normally with a mean of zero.

4.1 Nontraditional Lenders

As mentioned in the literature review, the approval of nontraditional, fintech lenders after the first tranche has been pointed to as a mechanism for the reversal of the preference given to

White business owners (in the form of larger loans) during the first tranche. To investigate this at the ZIP code level, we remove loans facilitated by nontraditional lenders from the analysis using the tables provided by Erel and Liebersohn (2020). We then rerun our regressions and compare the results against those from the full sample. If traditional lenders also underwent a shift in loan distribution with regards to race, that would provide (further) evidence that the changes made to the program had an effect on loan distribution with regard to race. Even though this is a loan-level analysis, we do not expect removing loans from the data to have a confounding, downward effect on our coefficients. For example, if loan distribution were evenly distributed, its removal would result in a decreased constant term and identical coefficients. Thus, the constant term should change to accommodate the drop in total funding in our sample, leaving the remainder of our coefficients otherwise unaffected.

4.2 Two-Week Smallest Businesses Application Period

As part of the changes made to the PPP during the third tranche, the Biden-Harris administration enacted a two-week period during which only businesses with fewer than twenty employees could apply for a PPP loan. To analyze the effects of this period on loan distribution, we conduct two tests. First, we split the third tranche in two based on the enaction of the Biden-Harris Administration's changes to the program, allowing us to compare the coefficients before and after the changes. Second, we run the regression on loans approved during the two-week period as well as three two-week periods on either side (a total of seven regressions), functioning as a quasi-event study. Though the PPP data does not contain application dates, the subsequent periods would capture any delays in processing that may have occurred. This further decomposition allows us to determine when the changes (if there are any) observed in the first part of this analysis began to occur. Differences originating prior to the enaction of these changes

would suggest that another cause was responsible. Given the two-day difference between the announcement and implementation of the two-week exclusive application period, an anticipatory effect extending more than one period before the center period is unlikely.

5. MOTIVATION

Given that the aggregation proposed in Fairlie and Fossen (2022) is our preferred unit of analysis, we begin by applying the unaltered methodology described in their paper to the third tranche (the methodology and data described above differs from theirs in several key ways). This results in the graphs shown below. Figure 5.1 shows the mean Average Loan Amount per Employee for 20 bins of ZIP codes based on the minority shares of their populations. This mean is displayed both unweighted and weighted by the total population of the ZIP codes. Figure 5.2 displays the same for the Number of Loans per Employer Establishment. The results of univariate quadratic regressions are displayed in both figures in dashed lines.

Minority share of the population exhibits a negative association with loan amounts in the first tranche. This trend levels out in the second tranche. However, there is a slight increase observed with minority share, particularly notable when the values are weighted by population. The third tranche demonstrates perhaps the most nonlinear pattern of the three. Here, minority share is positively associated with loan amounts, but this is largely influenced by two prominent "spikes" at either end of the distribution.

In terms of loan numbers, the first two tranches pale in comparison to the third. The first tranche reveals a negative association between the minority share of the population and loan numbers. This trend is reversed in the second tranche. Additionally, there is a noticeable drop observed for the bins with the smallest minority share of the population, indicating a peak or slowdown in the increase within mostly-but-not-entirely-White ZIP code bins. During the third

tranche, loan numbers exhibit exponential growth with minority share, surpassing previous figures by triple (or nearly quintuple in the case of the weighted measure).

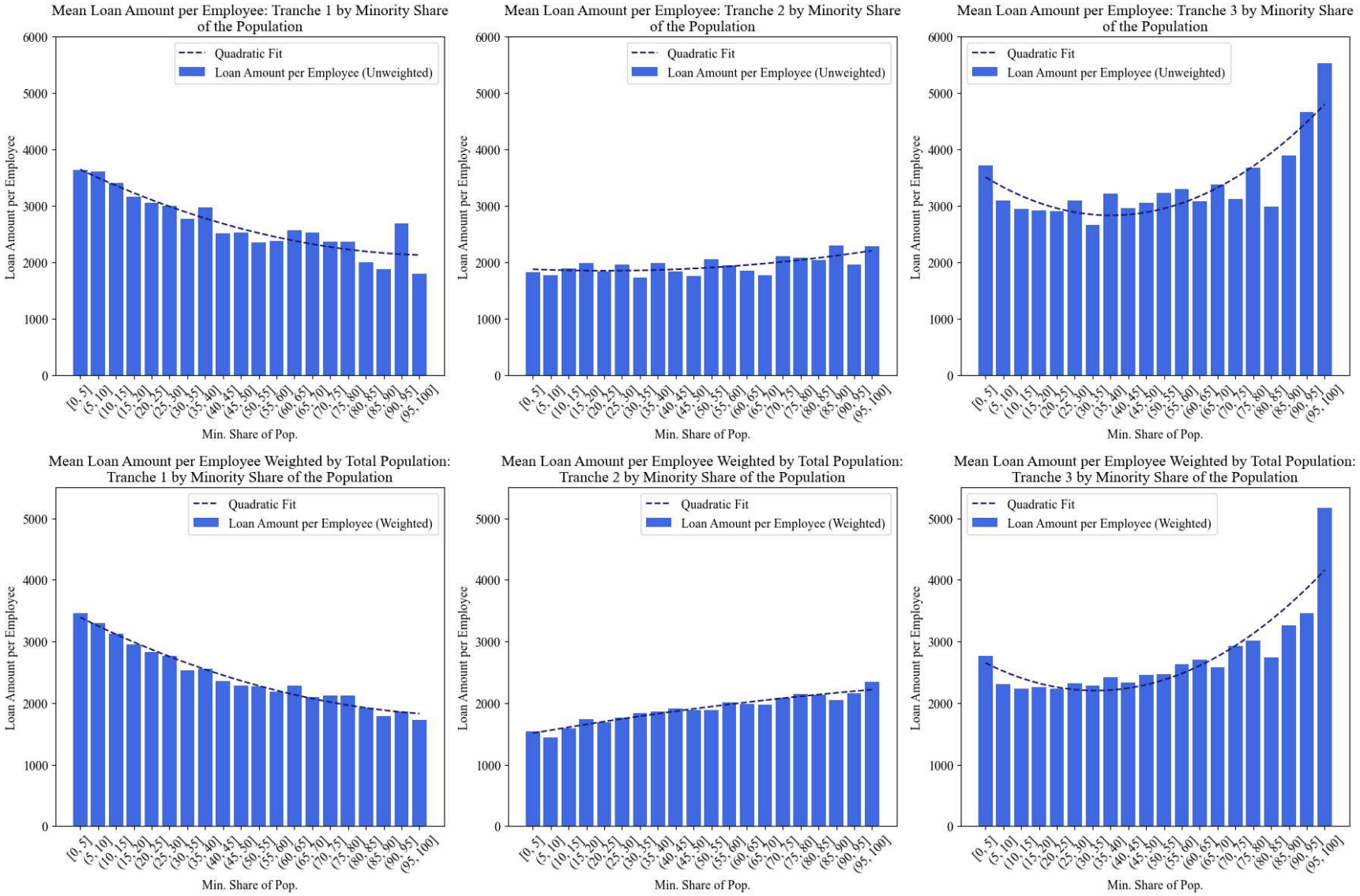

Figure 5.1. Mean Loan Amount per Employee by Minority Share of the Population

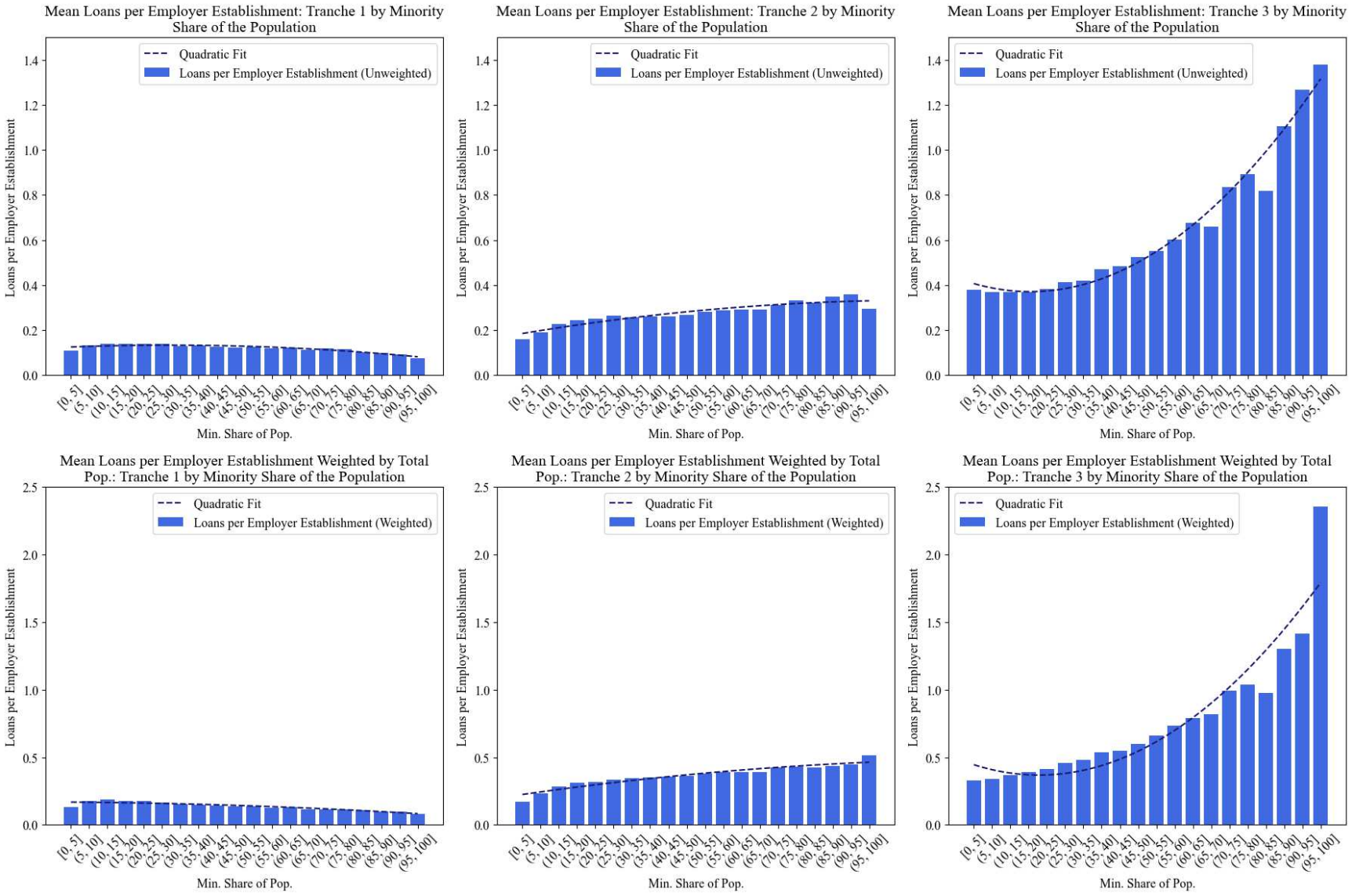

Figure 5.2. Number of Loans per Employee by Minority Share of the Population

Taken together, these figures illustrate a significant shift in the distribution of funds across the program's tranches, with the third tranche exhibiting crucial differences in distribution patterns. While these figures outline the actual variation in loan distribution concerning race, they do not shed light on the specific role of race. For example, ZIP codes on the lower portion of the x-axis often correspond to more rural areas. The nonlinearities observed in this geography suggest the potential for differential treatment between urban and rural majority-White communities, highlighting the importance of including interactions between White Share variables and a rural indicator. Moreover, the geographic distribution, as indicated by Census Regions, also shifts in alignment with minority share. The marked disparity between the third tranche and its predecessors, along with the correlations between race and confounding factors, further emphasize the necessity for the rigorous analyses outlined above.

6. RESULTS

Due to the non-linear relationships between exogenous variables and PPP loan receipt, coefficients vary as the predictors' values change. Coefficients for White Share and Black Share are computed (via the derivative) and interpreted at their population-weighted sample means (the sample is divided into urban and rural ZIP codes for White Share). However, while interpreting these coefficients at population-weighted means offers a helpful description of the relationships between the variables of interest and loan receipt for the average ZIP code, these points (often near the minimums or maximums of the polynomials described by the derivatives) may not capture the most intriguing aspects of the relationships between demographics and the number of loans received. Additionally, to enhance the readability of the regression tables, only coefficient estimates for the variables of interest are included. Full regression results for all variables are provided in the appendix.

6.1 Number of Loans per Employer Establishment

We start with the number of loans received per employer establishment in a ZIP code. Regression outcomes are displayed in Tables 6.1 and 6.2, while the derivatives of the variables with nonlinear terms are outlined in Table 6.3. Graphs illustrating those derivatives can be found in Figure 6.1.[6]

Graphs similar to those depicted in Figure 6.1 will be employed throughout the remainder of this paper, and it's essential to clarify their precise interpretation. With the incorporation of non-linear terms in our regression model, the coefficients for our variables vary as the values of those variables change. While one might intuitively assume that an upward-sloping line suggests a positive relationship, this is not necessarily true. Instead, it's the position of the line relative to a horizontal line at zero that indicates the direction of the relationship. The slope of the line reflects the rate at which the relationship is changing.

[6] The coefficients derived from the second part of a Cragg-Hurdle regression are not directly interpretable, and the derivatives must be taken to obtain the true coefficient values. The results of this are shown in Table 6.2. Final derivatives for the nonlinear terms are presented in Table 6.3 and graphed in Figure 6.1.

Table 6.1. First Stage Coefficients for Number of Loans

Loans per Employer Establishment	Tranche 1	Tranche 2	Trance 3	All
Constant	0.065705	0.341881***	0.127099	0.942891***
	(0.106834)	(0.130558)	(0.161293)	(0.238522)
White Share	0.017173***	0.020506***	0.034241***	-0.005128***
	(0.004334)	(0.005206)	(0.007402)	(0.001020)
White Share^2	-0.000170***	-0.000217***	-0.000359***	0.000023***
	(0.000048)	(0.000058)	(0.000081)	(0.000009)
White Share x Rural Ind.	0.009049**	0.003531	-0.002107	0.005480***
	(0.004589)	(0.005554)	(0.007835)	(0.001230)
White Share^2 x Rural Ind.	-0.000026	0.000036	0.000116	-0.000009
	(0.000050)	(0.000061)	(0.000085)	(0.000012)
Black Share	-0.001357	-0.000612	-0.036534*	0.013312***
	(0.005696)	(0.006785)	(0.019830)	(0.000896)
Black Share^2	0.000046	0.000058	0.001428**	0.000010
	(0.000091)	(0.000107)	(0.000610)	(0.000013)
Black Share x Rural Ind.	0.020492***	0.023435***	0.038503*	0.001108
	(0.006512)	(0.007800)	(0.020336)	(0.001558)
Black Share^2 x Rural Ind.	-0.000281***	-0.000301**	-0.001268**	0.000001
	(0.000103)	(0.000121)	(0.000615)	(0.000025)
N	31,314	31,314	31,314	31,314
Log Likelihood	51601	44703	27512	13548

Note: Table displays coefficient estimates from the first stage of a Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate.

For instance, a line that lies above zero but slopes downward indicates a positive, decreasing relationship (i.e., decreasing marginal returns to scale). In essence, these graphs illustrate how the coefficient's value changes across its predictor's range.

The first part of the Cragg-Hurdle model, which predicts whether an observation has a zero or non-zero value, is shown in Table 6.1. White Share in urban areas is positively associated with a ZIP code's chances of receiving more than zero loans (but decreasingly so as White Share

grows larger) for all three tranches. However, this relationship is flipped in the overall model: it shows a negative but increasing relationship.

Table 6.2. Derivatives of Second Stage Coefficients for Loan Number

Loans per Employer Establishment	Tranche 1	Tranche 2	Trance 3	All
White Share	0.001334***	-0.001688***	-0.003830***	-0.004079***
	(0.000167)	(0.000242)	(0.000555)	(0.000892)
White Share^2	-0.000001	0.000006***	0.000010**	0.000017**
	(0.000002)	(0.000002)	(0.000005)	(0.000008)
White Share x Rural Ind.	0.000900***	0.000699**	0.001328**	0.004839***
	(0.000204)	(0.000321)	(0.000660)	(0.001080)
White Share^2 x Rural Ind.	-0.000013***	0.000003	0.000016**	-0.000008
	(0.000002)	(0.000003)	(0.000006)	(0.000010)
Black Share	0.001518***	0.001592***	0.009401***	0.010530***
	(0.000172)	(0.000233)	(0.000636)	(0.000855)
Black Share^2	-0.000011***	-0.000006**	0.000010	0.000040**
	(0.000002)	(0.000003)	(0.000014)	(0.000016)
Black Share x Rural Ind.	-0.000335	0.002986***	-0.001637*	0.001965
	(0.000281)	(0.000411)	(0.000929)	(0.001396)
Black Share^2 x Rural Ind.	0.000007	-0.000031***	0.000009	-0.000027
	(0.000004)	(0.000006)	(0.000017)	(0.000024)
N	31,314	31,314	31,314	31,314
Mean Outcome	0.13	0.234	0.462	0.825
Log Likelihood	51601	44703	27512	13548

Note: Table displays derivatives of coefficient estimates from the second stage of a Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate. The coefficients of a Cragg-hurdle regression are not directly interpretable, and the first derivatives of each variable serve as the coefficient estimate.

The relationship for White Share in rural ZIP codes is mostly the same. However, Black Share is only significantly related to the odds of receiving more than zero loans in the overall model (and positively so). Furthermore, Black Share's relationship with the odds of receiving more than zero loans in rural ZIP codes is decreasingly significantly different from that in urban areas. In the

first and second tranches, Rural Black Share has a significantly more positive effect on the odds of receiving more than zero loans than Urban Black Share but a less positive increase.

Table 6.3. Derivatives of Cragg-Hurdle Model for Number of Loans Received

	Urban White Share	Rural White Share
Tranche 1	0.001334 – 0.000002x	0.002234 – 0.000028x
Tranche 2	-0.001688 + 0.000012x	-0.000989 + 0.000018x
Tranche 3	-0.003830 + 0.000020x	-0.002502 + 0.000052x
All	-0.004079 + 0.000034x	0.00076 + 0.000018x
	Urban Black Share	Rural Black Share
Tranche 1	0.001518 – 0.000022x	0.001183 – 0.000008x
Tranche 2	0.001592 – 0.000012x	0.004578 – 0.000074x
Tranche 3	0.009401 + 0.000020x	0.007764 + 0.000038x
All	0.010530 + 0.000080x	0.012495 + 0.000026x

Note: Table displays second derivatives of variables of interest from the second stage of a Cragg-Hurdle regression. Coefficients are included in the derivatives regardless of statistical significance.

In urban ZIP codes during the first tranche, the relationship between White Share and the number of loans received is almost entirely linear. At the mean (53.905%), a percentage-point increase is associated with 0.001227 more loans per employer establishment. In the second tranche, this relationship becomes negative but increases as White Share becomes larger (though it never becomes positive). In the third tranche, this relationship becomes even more negative. The relationship when analyzing the program as a whole is largely similar to that in the third tranche, starting negative (at a similar magnitude) but increasing slightly faster as White Share becomes larger, nearing zero at the upper end of the range.

White Share's relationship with the number of loans received per employer establishment is markedly different in rural ZIP codes. In the first tranche, the percentage of a rural ZIP code's

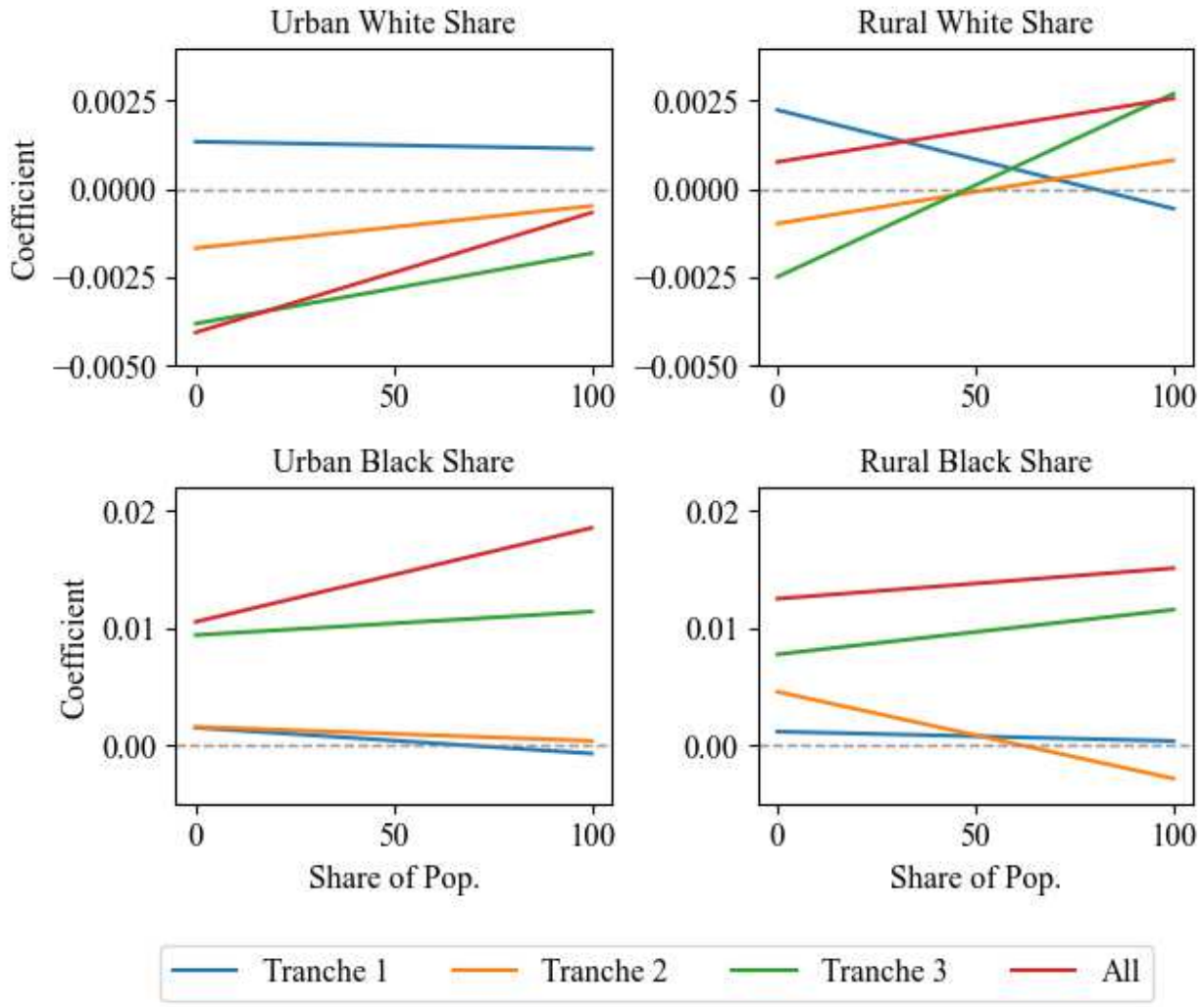

Figure 6.1. Derivatives of Cragg-Hurdle Model for Number of Loans Received per Employer Establishment

The percentage of a rural ZIP code's population classified as White is positively associated with loan number, but as this percentage increases, the relationship decreases and becomes negative after about 80%. At the mean, an additional percentage point of a rural ZIP code's population is associated with 0.000013 more loans per employer establishment. The relationship in the second tranche mirrors that of the first, starting negative, increasing, and becoming positive around 60%. This results in 0.000439 more loans per employer establishment for an additional percentage point of a rural ZIP code's population classified as White at the mean, all else being equal. The

relationship in the third tranche is a more extreme version of the one in the second, starting several times more negative and ending several times more positive. At the mean, a rural ZIP code could expect 0.001623 more loans per employer establishment for an additional percentage point in the share of its population classified as White. Unlike most of the other models, the pattern for the program as a whole looks quite different from that in the third tranche. Here, the relationship starts positive and becomes more positive as White Share increases. At the mean, an additional percentage point of a ZIP code's population classified as White is associated with 0.002188 more loans per employer establishment.

In urban ZIP codes, the relationship between the share of a ZIP code's population that is Black is positively associated with loan number for most of its range across every tranche and the program as a whole. It's important to note that the excluded category is the population share of non-Black minorities. Moreover, this positive relationship intensifies as the program progresses. At the mean, an additional percentage point in the share of the population classified as Black is associated with 0.001231 more loans in the first tranche, 0.001436 more in the second, 0.009662 more in the third, and 0.011573 more for the program as a whole in urban ZIP codes.

The only instance when Black Share's coefficients significantly differ in rural ZIP codes is during the second tranche, where, at the mean, a percentage point increase in Black Share is associated with 0.004084 more loans per employer establishment.

6.2 Mean Loan Amount per Employee

We now analyze the second measure of loan receipt at the ZIP code level: mean loan amount per employee. Regression results are presented in Table 6.4 and 6.5, the derivatives of the variables with nonlinear terms are presented in Table 6.6, and graphs of those derivatives are

Table 6.4. First Stage Coefficients for Mean Loan Amount per Employee

Mean Loan Amount per Employee	Tranche 1	Tranche 2	Trance 3	All
Constant	0.241**	0.563***	0.121	0.913***
	(0.117)	(0.151)	(0.175)	(0.277)
White Share	0.018***	0.020***	0.041***	0.027***
	(0.004)	(0.005)	(0.008)	(0.010)
White Share2	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
White Share x Rural Ind.	0.005	-0.001	-0.017**	0.000
	(0.005)	(0.006)	(0.008)	(0.011)
White Share2 x Rural Ind.	0.000	0.000	0.000***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Black Share	-0.009	-0.009	-0.055***	-0.080***
	(0.006)	(0.007)	(0.020)	(0.022)
Black Share2	0.000	0.000	0.002***	0.002***
	(0.000)	(0.000)	(0.001)	(0.001)
Black Share x Rural Ind.	0.020***	0.027***	0.062***	0.080***
	(0.007)	(0.009)	(0.021)	(0.024)
Black Share2 x Rural Ind.	-0.000**	-0.000**	-0.002***	-0.002***
	(0.000)	(0.000)	(0.001)	(0.001)
N	29,787	29,787	29,787	29,787
Log Likelihood	-230683	-221848	-237120	-266886

Note: Table displays coefficient estimates from the first stage of a Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate.

shown in Figure 6.2.

The effects of our predictors on the odds of receiving a loan amount per employee greater than zero are naturally similar to those of receiving more than zero loans per employer establishment, as any positive number of loans would imply a loan size per employee larger than zero. The slight differences are, then, due to data availability lowering the sample count. This portion of the results is not re-interpreted to avoid redundancy.

In urban ZIP codes, *White Share*'s relationship with loan size begins positive and

Table 6.5. Derivatives of Second Stage Coefficients for Mean Loan Amount per Employee

Mean Loan Amount per Employee	Tranche 1	Tranche 2	Trance 3	All
White Share	19.816***	-21.081***	-23.259***	-41.427***
	(5.255)	(3.251)	(4.670)	(10.678)
White Share^2	-0.048	0.072**	0.114**	0.316***
	(0.051)	(0.030)	(0.044)	(0.100)
White Share x Rural Ind.	14.555**	8.227*	7.751	51.274***
	(6.838)	(4.262)	(6.214)	(14.381)
White Share^2 x Rural Ind.	-0.137**	0.014	0.058	-0.272*
	(0.070)	(0.043)	(0.063)	(0.144)
Black Share	-5.999	-12.081***	-14.278***	-45.510***
	(5.648)	(3.242)	(5.377)	(10.699)
Black Share^2	0.159*	0.141***	0.716***	1.291***
	(0.083)	(0.044)	(0.116)	(0.165)
Black Share x Rural Ind.	-12.305	11.695**	12.148	16.886
	(9.808)	(5.887)	(9.093)	(19.793)
Black Share^2 x Rural Ind.	0.083	-0.182*	-0.047	0.010
	(0.158)	(0.093)	(0.168)	(0.327)
N	29,787	29,787	29,787	29,787
Mean Outcome	3,043.12	1,881.202	3,122.368	8,046.69
Log Likelihood	-230683	-221848	-237120	-266886

Note: Table displays derivatives of coefficient estimates from the second stage of a Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate. The coefficients of a Cragg-hurdle regression are not directly interpretable, and the first derivatives of each variable serve as the coefficient estimate.

and decreases gradually as White Share increases during the first tranche. At the mean, a percentage-point increase in the share of a ZIP code's population classified as White is associated with $14.64 larger loans per employee. The second and third tranches are largely similar to each other. Both start negative and are about identical in magnitude, increasing as White Share increases (though, this increase is somewhat faster in the third tranche). An additional percentage point of a ZIP code's population classified as White is associated with $13.32 smaller loans in the second tranche and $10.97 smaller loans in the third tranche. The relationship in the program as a

Table 6.6. Derivatives of Cragg-Hurdle Model for Mean Loan Amount per Employee

	Urban White Share	Rural White Share
Tranche 1	19.816 – 0.096 x	34.371 – 0.370x
Tranche 2	-21.081 + 0.144x	-12.854 + 0.172x
Tranche 3	-23.259 + 0.228x	-15.508 + 0.344x
All	-41.427 + 0.632x	9.847 + 0.088x
	Urban Black Share	Rural Black Share
Tranche 1	-5.999 + 0.318x	-18.304 + 0.484x
Tranche 2	-12.081 + 0.282x	-0.386 – 0.082x
Tranche 3	-14.278 + 1.432x	-2.130 + 1.338x
All	-45.510 + 2.542x	-28.624 + 2.602x

Note: Table displays second derivatives of variables of interest from the second stage of a Cragg-Hurdle regression. Coefficients are included in the derivatives regardless of statistical significance.

whole starts more negative than in the second and third tranches but increases faster, becoming positive after the 60% mark. This results in $7.36 smaller loans for an additional percentage point of a ZIP code's population classified as White in the overall program at the mean, all else being equal.

White Share's relationship with loan size in rural ZIP codes bears some resemblance to its relationship in urban ZIP codes. There is no significant difference during the first tranche, and the second and third tranches diverge (from the urban relationship) only in their starting points. The most notable contrast occurs for the program as a whole, closely aligning with the first tranche (as opposed to the second and third). This results in $16.83 larger loans per employee in the overall program for an additional percentage point of the population classified as White at the mean in rural ZIP codes.

In urban ZIP codes, Black Share's relationship with loan size follows its previous pattern: relatively small coefficients in the first and second tranches, followed by relatively larger, positive coefficients in the third tranche and program as a whole. In the first and second tranches,

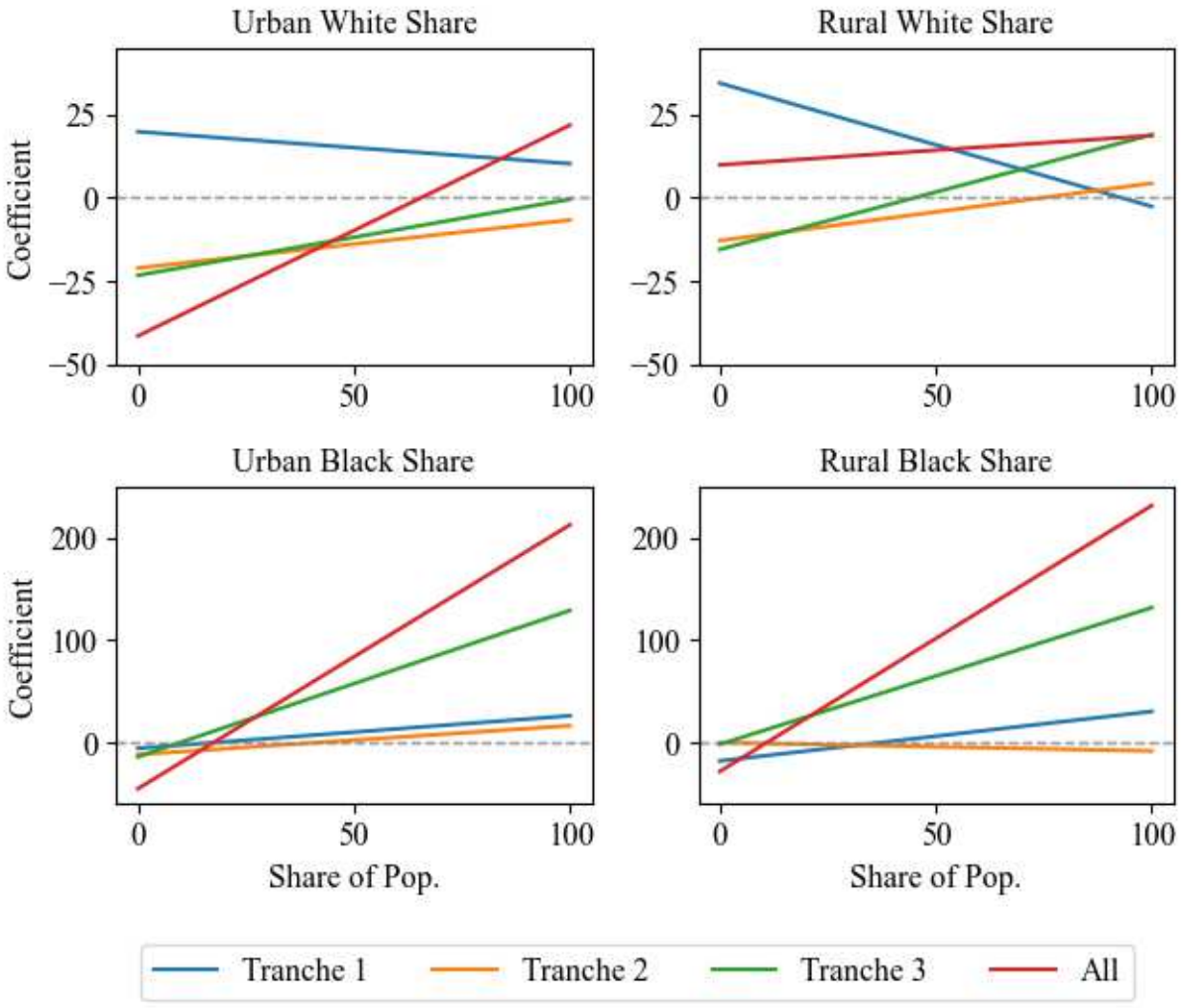

Figure 6.2. Derivatives of Cragg-Hurdle Model for Mean Loan Amount per Employee

An additional percentage point of a ZIP code's population classified as Black is associated with $1.85 and $8.41 smaller loans per employee at the mean. This increases in the third tranche to $4.39 larger loans per employee at the mean. While an additional percentage point is associated with $12.38 smaller loans per employee in the program as a whole at the mean, for majority-Black, urban ZIP codes, this increases to between $81.59 and $208.69 larger loans per employee, ceteris paribus. Black Share's coefficients are only significantly different in rural ZIP codes during the second tranche, where a percentage point increase is associated with $0.93 smaller loans per employee.

6.3 Traditional Lenders Only

The approval of nontraditional, fintech lenders during the second tranche has been investigated as a possible mechanism for mitigating or reversing the preference for White business owners during the first tranche (see Atkins et al., 2022). To investigate the same at the community level, we remove loans made by nontraditional lenders from the sample. If the pattern persists, that would indicate that some other mechanism was (at least partly) responsible. Note that this method does not rule out the approval of nontraditional lenders as a mechanism, just its exclusivity.

To accomplish this, we utilize the classifications provided by Erel and Liebersohn (2020) and exclude loans from the aggregation if the name of the listed lender matches the names in the tables in Erel and Liebersohn's Appendix B (after accounting differences like abbreviation). This method is likely not entirely guaranteed, and it is probable that some loans failed to be excluded due to potential typos or other inconsistencies in naming. However, given the sheer number of loans that have traditional lenders, we believe the impact of such failures to be minimal.

Rerunning the regressions on this subset of loans yields the derivatives displayed in Tables 6.7 and 6.8. The derivatives of the Cragg-hurdle model are depicted in Figures 6.3 and 6.4, with the derivatives from the full sample represented by dotted lines of the same color. Full regression results are provided in the appendix.

Examining loan numbers, White Share in urban ZIP codes exhibits a notably less negative association in later tranches. While the first tranche largely mirrors the full sample of loans, the second tranche shows a slight increase in positivity but maintains the same direction and trends as the full sample. However, the relationship in the third tranche is less than half the magnitude of that observed in the full sample.

Table 6.7. Derivatives of Second Stage Coefficients for Number of Loans – Traditional Lenders Only

Loans per Employer Establishment	Tranche 1	Tranche 2	Trance 3	All
White Share	0.001290***	-0.001005***	-0.001624***	-0.000840
	(0.000170)	(0.000201)	(0.000390)	(0.000691)
White Share^2	-0.000000	0.000004**	0.000005	0.000005
	(0.000002)	(0.000002)	(0.000003)	(0.000006)
White Share x Rural Ind.	0.001016***	0.000383	0.000289	0.002658***
	(0.000204)	(0.000272)	(0.000489)	(0.000872)
White Share^2 x Rural Ind.	-0.000015***	0.000003	0.000013***	-0.000002
	(0.000002)	(0.000003)	(0.000005)	(0.000008)
Black Share	0.001548***	0.000921***	0.001364***	0.002124***
	(0.000175)	(0.000188)	(0.000480)	(0.000665)
Black Share^2	-0.000011***	-0.000006**	0.000053***	0.000062***
	(0.000002)	(0.000002)	(0.000012)	(0.000014)
Black Share x Rural Ind.	-0.000597**	0.002609***	-0.000214	0.002794**
	(0.000280)	(0.000352)	(0.000692)	(0.001102)
Black Share^2 x Rural Ind.	0.000010**	-0.000022***	-0.000011	-0.000033
	(0.000004)	(0.000005)	(0.000014)	(0.000020)
N	31,314	31,314	31,314	31,314
Mean Outcome	0.126	0.203	0.35	0.678
Log Likelihood	51636	47682	33367	18038

Note: Table displays derivatives of coefficient estimates from the second stage of a Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate. The coefficients of a Cragg-hurdle regression are not directly interpretable, and the first derivatives of each variable serve as the coefficient estimate.

In the first two tranches, the association between loan number and White Share in rural ZIP codes for traditional lenders only is almost identical to that in the full sample. However, in the third tranche, the association is much less negative when White Share is small, but also less positive when White Share is large. It appears that majority-White, rural ZIP codes relied more on nontraditional lenders later in the pandemic compared to similar urban ZIP codes.

Likewise, Black Share's correlation with loan numbers from traditional lenders in both

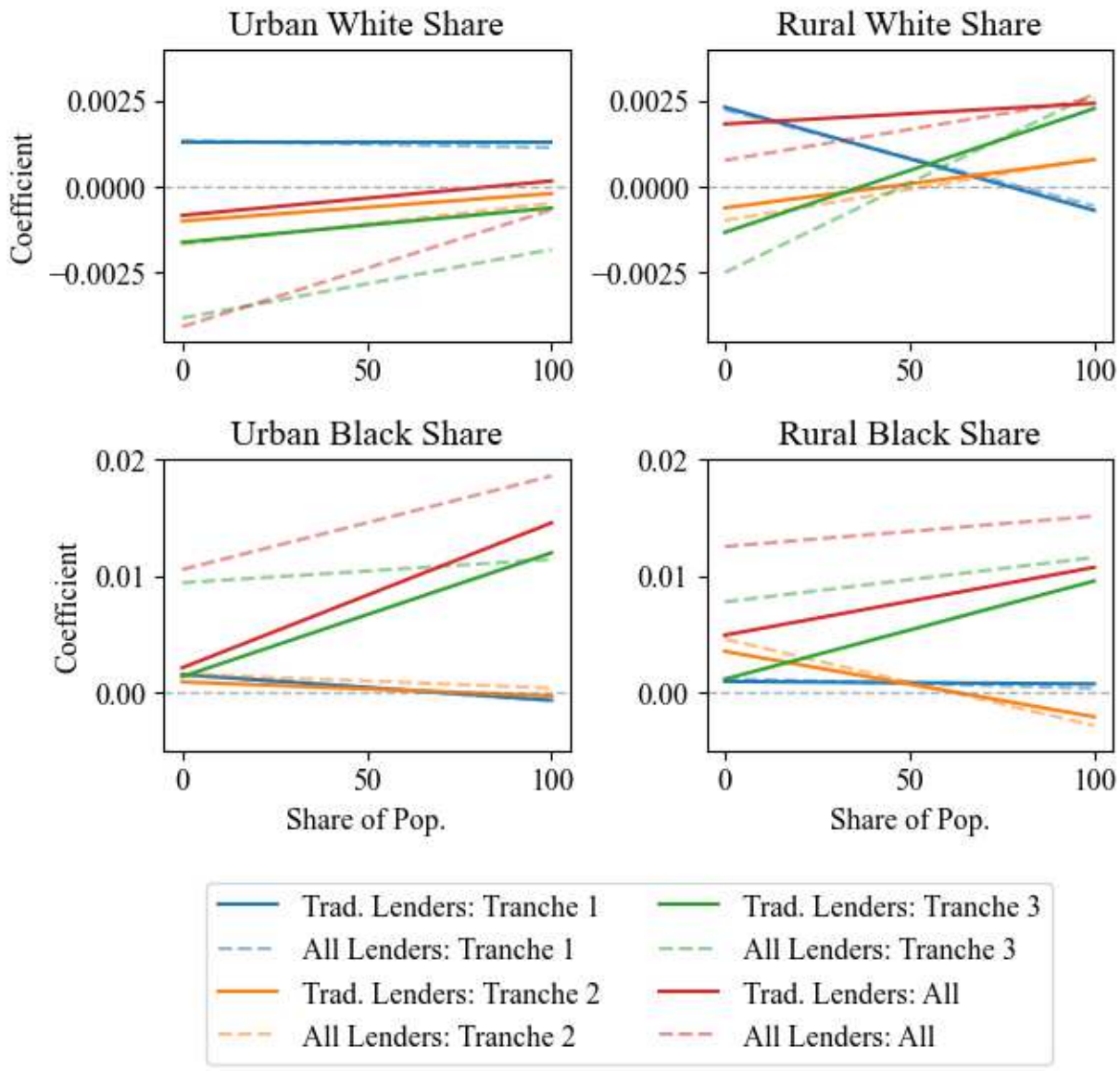

Figure 6.3. Derivatives of Cragg-Hurdle Model for Number of Loans – Traditional Lenders Only

urban and rural ZIP codes, the relationship between Black Share and loan numbers from traditional lenders differs notably from the full sample, particularly in the third tranche. While the first and second tranches closely resemble their counterparts in the full sample, the relationship in the third tranche starts relatively modest. However, it grows with Black Share and approaches the coefficient from the full sample for entirely Black ZIP codes.

The results remain largely consistent when examining loan amounts. Across the board, coefficients in the first and second tranches closely resemble those in the full sample model.

Table 6.8. Derivatives of Second Stage Coefficients for Mean Loan Amount per Employee – Traditional Lenders Only

Mean Loan Amount per Employee	Tranche 1	Tranche 2	Trance 3	All
White Share	20.283***	-17.310***	-15.161***	-28.862***
	(5.268)	(2.856)	(4.105)	(10.028)
White Share^2	-0.040	0.064**	0.090**	0.286***
	(0.051)	(0.027)	(0.039)	(0.094)
White Share x Rural Ind.	16.302**	6.765*	6.941	43.955***
	(6.808)	(3.870)	(5.544)	(13.683)
White Share^2 x Rural Ind.	-0.169**	0.010	0.031	-0.255*
	(0.070)	(0.039)	(0.057)	(0.138)
Black Share	-4.599	-11.854***	-32.046***	-57.823***
	(5.774)	(2.932)	(4.830)	(10.301)
Black Share^2	0.148*	0.104***	0.721***	1.098***
	(0.085)	(0.040)	(0.113)	(0.168)
Black Share x Rural Ind.	-17.090*	8.493	-2.169	5.381
	(9.774)	(5.491)	(8.137)	(18.985)
Black Share^2 x Rural Ind.	0.135	-0.139	-0.030	-0.138
	(0.157)	(0.089)	(0.156)	(0.321)
N	29,787	29,787	29,787	29,787
Mean Outcome	2,983.82	1,722.136	2,723.671	7,429.627
Log Likelihood	-229637	-218700	-232716	-264604

Note: Table displays derivatives of coefficient estimates from the second stage of a Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate. The coefficients of a Cragg-hurdle regression are not directly interpretable, and the first derivatives of each variable serve as the coefficient estimate.

For White Share, the exclusion of loans from nontraditional lenders results in increased coefficients during the third tranche and the entire program, both in urban and rural ZIP codes (although the impact is more pronounced in urban areas). Conversely, for Black Share, excluding loans from nontraditional lenders has the opposite effect, reducing coefficients in the third

tranche and the overall program. This reduction in coefficients is more significant for rural ZIP codes, suggesting a greater reliance on nontraditional lenders in those regions.

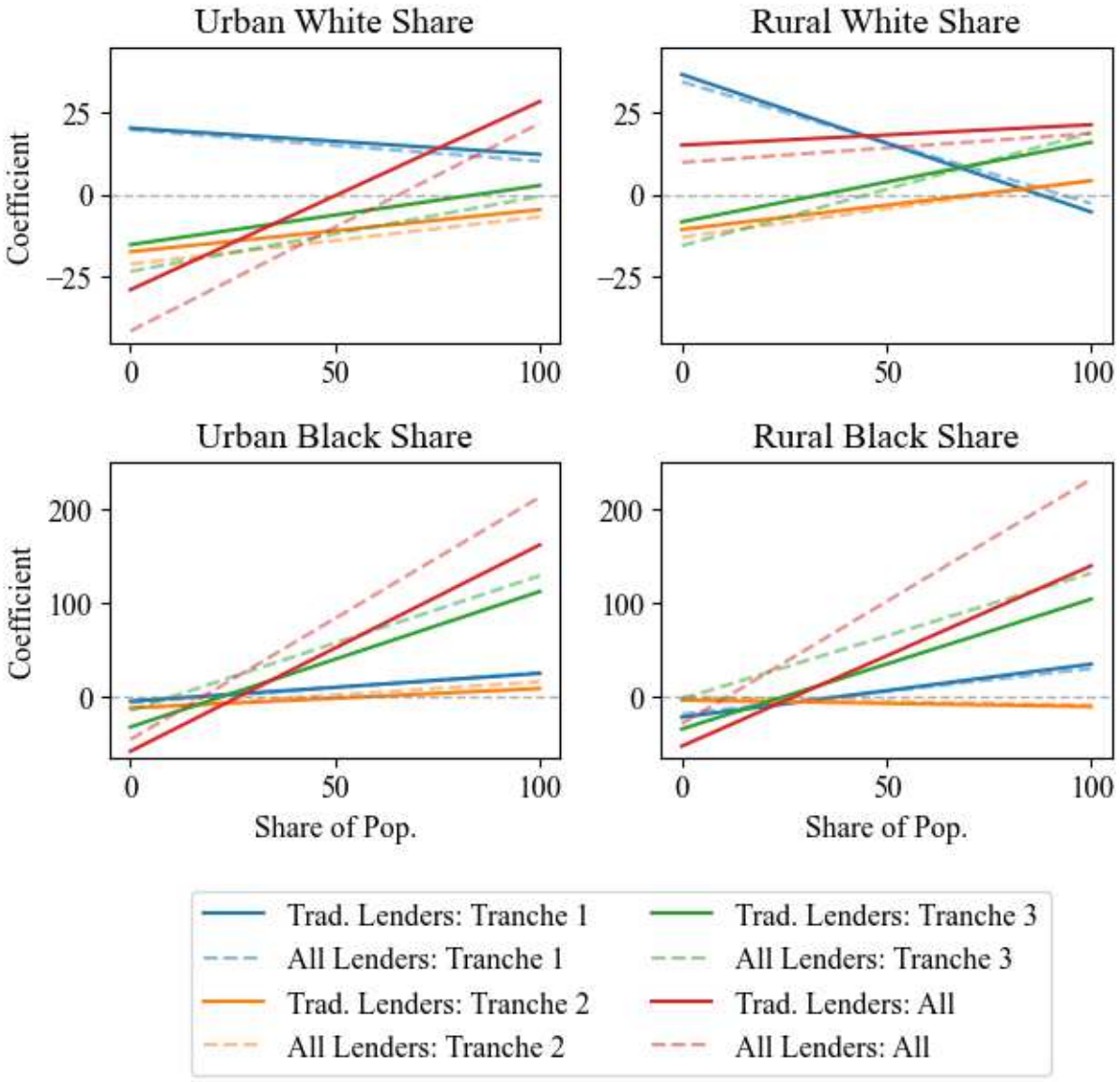

Figure 6.4. Derivatives of Cragg-Hurdle Model for Mean Loan Amount per Employee – Traditional Lenders Only

6.4 Two-Week Exclusive Application Period

Figures 6.5 and 6.6 depict the coefficients for White Share and Black Share in urban and rural ZIP codes before and after February 24th, 2021. Significant differences are observed in the coefficients for each variable before and after the program changes. Generally, the coefficients

for White Share in both urban and rural areas transition from resembling earlier tranches to closely resembling those of the third tranche when analyzed as a whole. For loan

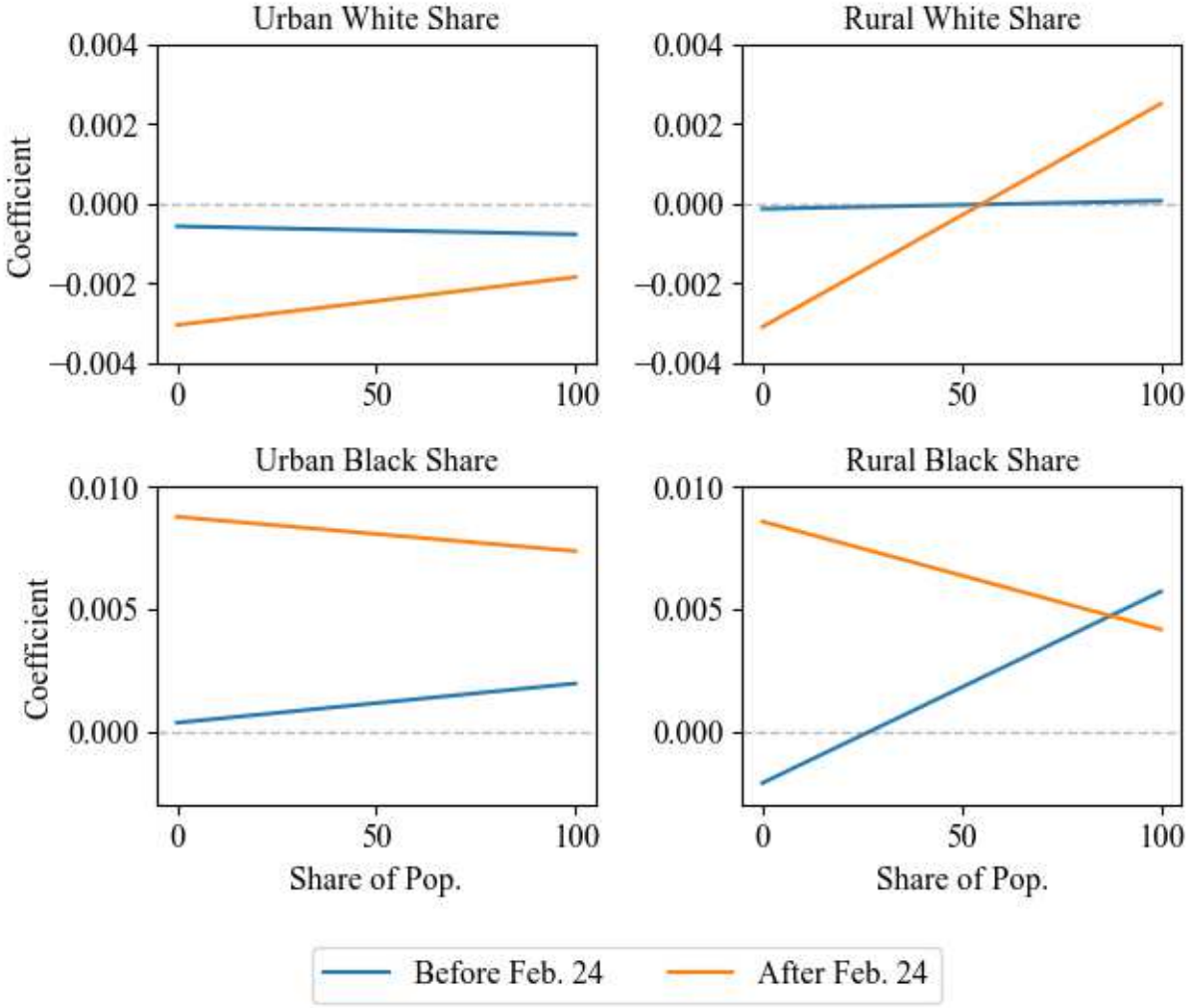

Figure 6.5. Derivatives of Cragg-Hurdle Model for Loan Number – Before and After Feb. 24th, 2021

number, the coefficients for White share of the population in urban ZIP codes become significantly more negative. In contrast, those for White share of the population in rural ZIP codes start with a much more negative value but increase at such a rate that they end up almost the same amount more positive than before February 24th. The coefficients for Black Share in urban and rural ZIP codes transition from starting negative and increasing to starting enormously

positive and decreasing, reflecting an overall increase in the coefficients. For loan amounts, the pattern is somewhat simpler. Coefficients for White Share in urban ZIP codes become almost uniformly more negative, by around $10. he coefficients for White Share in rural ZIP codes

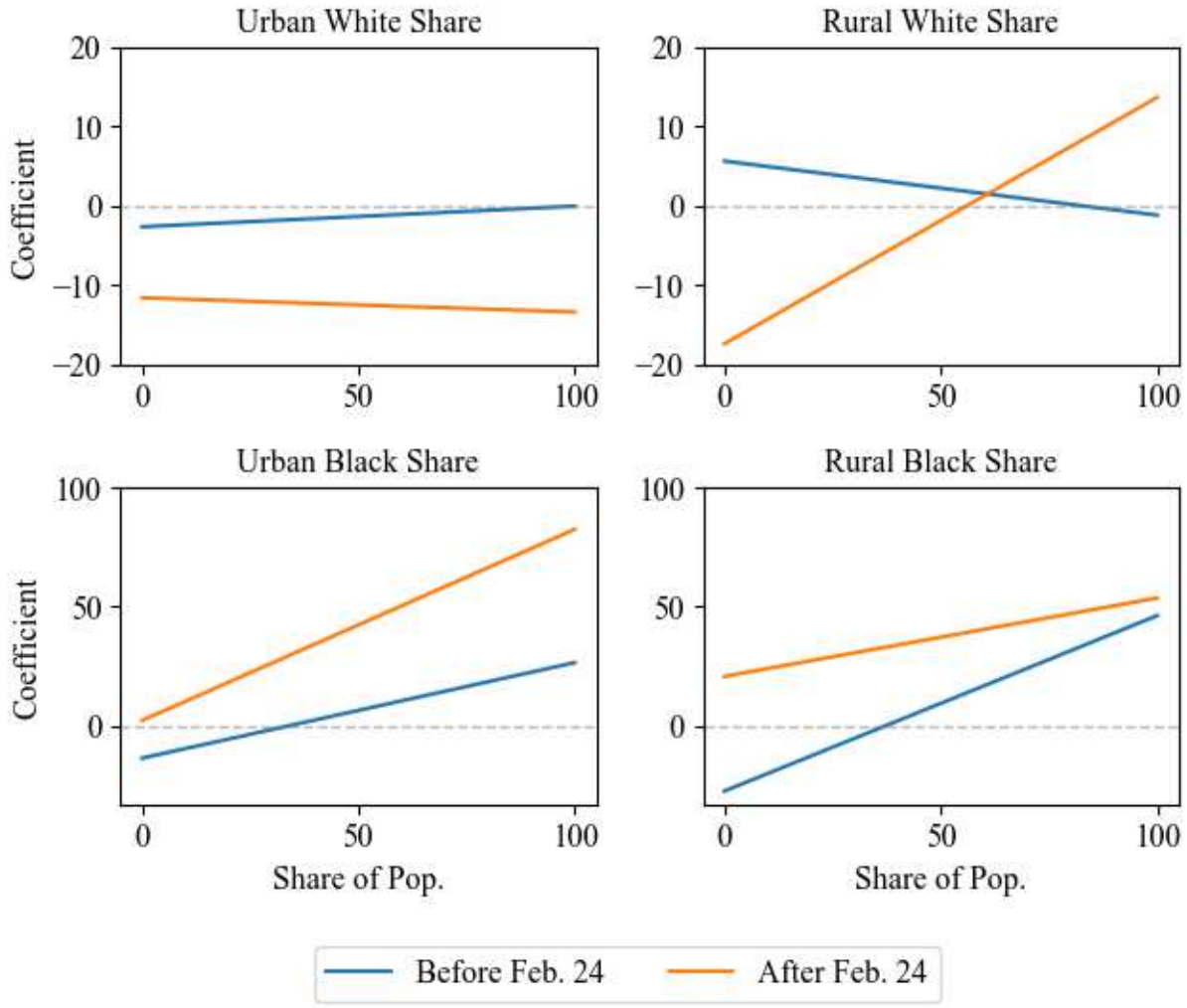

Figure 6.6. Derivatives of Cragg-Hurdle Model for Loan Amount – Before and After Feb. 24th, 2021

initially become more negative by around $20, but they are $15 more positive at the top end of White Share's range. On the other hand, coefficients for Black Share transition from being negative before February 24th to becoming more positive, and they remain more positive throughout.

Figures 6.7 and 6.8 illustrate the coefficients for Urban White Share, Rural White Share, Urban Black Share, and Rural Black Share across seven two-week periods. The middle period, termed "Period 0," corresponds to the time when only businesses with less than 20 employees could apply for a loan.

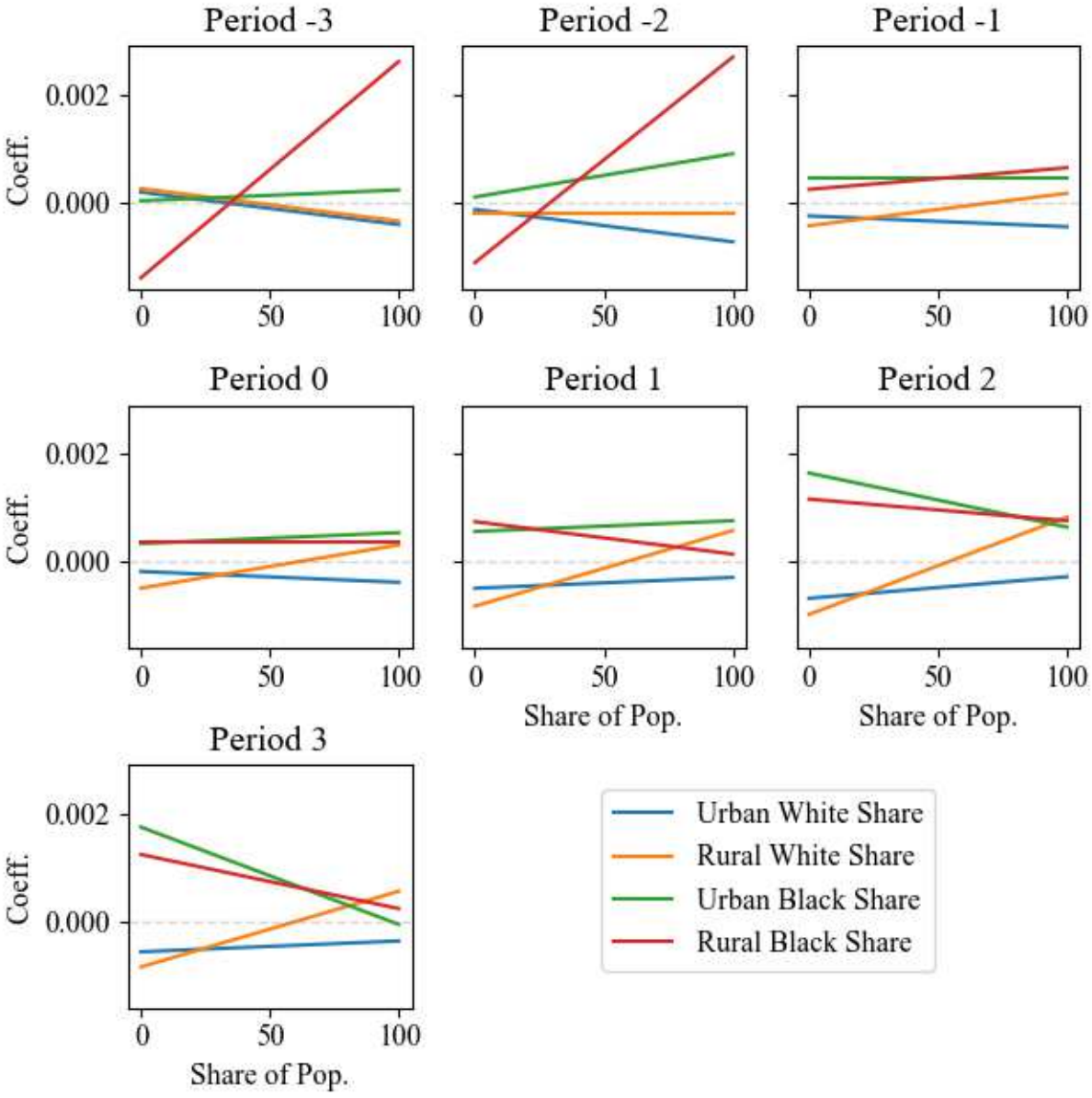

Figure 6.7. Derivatives of Cragg-Hurdle Model for Loan Number – Seven Two-Week Periods

Predicting loan number, the coefficients for Urban White Share consistently trend negative across its range for every period except the first, where they start slightly positive but quickly turn negative. Conversely, the coefficients for Rural White Share start negative in Periods -3 and -2 but gradually increase at the high end and decrease at the low end of Rural White Share's range over the course of the next five periods, growing in magnitude along the

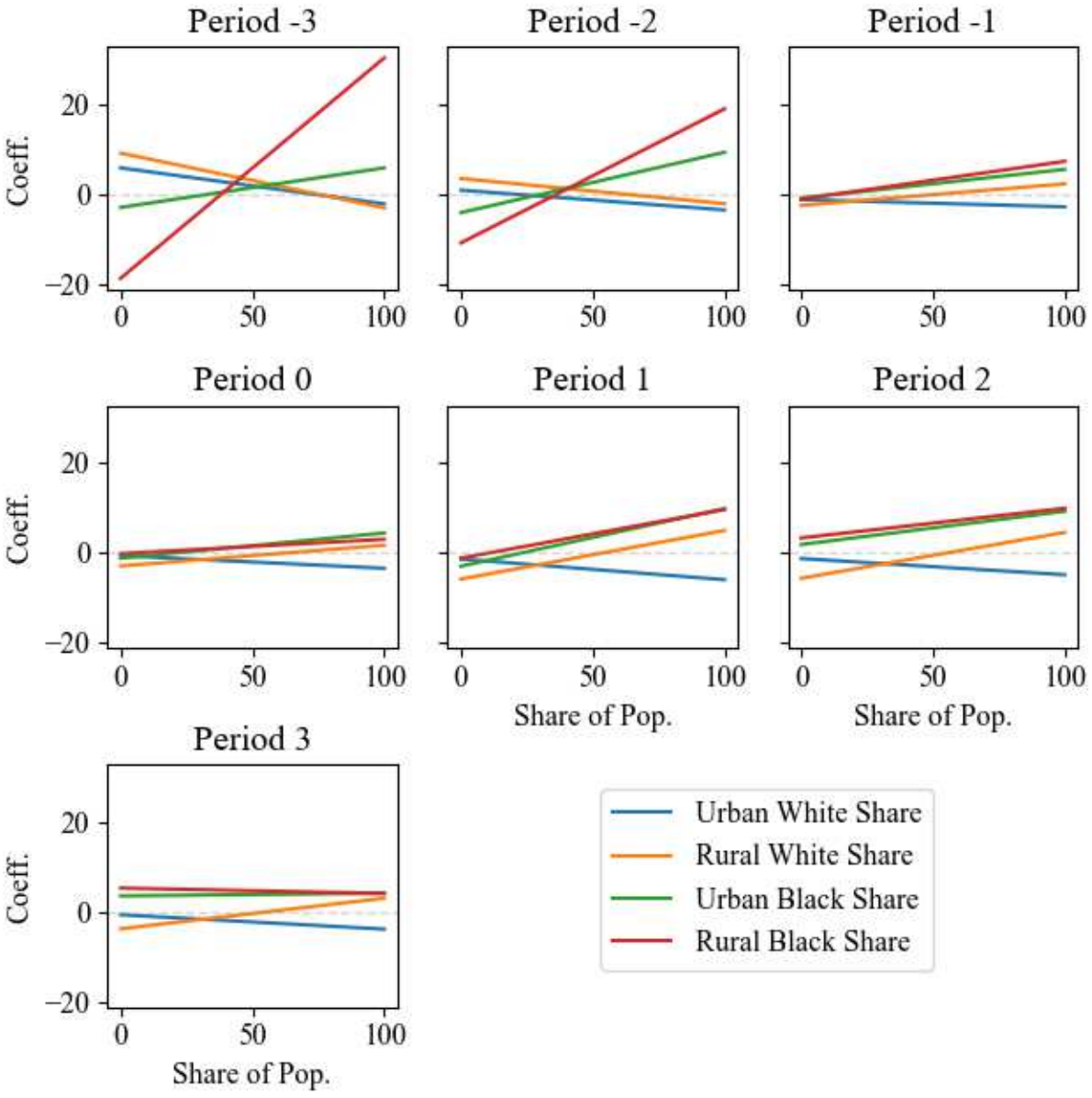

Figure 6.8. Derivatives of Cragg-Hurdle Model for Loan Amount – Seven Two-Week Periods

way. The coefficients for Urban Black Share exhibit a consistent pattern across the seven periods. Initially, in the first two periods, the coefficients for Black Share start near zero but rise rapidly, ending significantly positive. This trend stabilizes over the next three periods, with the exclusive application period showing almost no change before gradually becoming more positive and decreasing faster in the later periods. Rural Black Share follows a similar pattern but begins more negative (and ends more positive) in the first two periods. It is noteworthy that the period during which business size was explicitly considered shows some of the smallest differences and magnitudes in coefficients. When predicting loan amounts, although there are notable differences in direction and movement, the coefficients also follow a similar trend during the exclusive application period, with smaller differences between coefficients and some of the smallest coefficients overall. It is also noteworthy that the changes in coefficients began before the actual implementation of the program changes, as differences are observable as early as the first tranche. Given that these changes were announced shortly before implementation, an anticipatory effect seems unlikely, leaving the cause of these shifts presently unclear. Future research should explore potential mechanisms for this change.

7. DISCUSSION

The findings from the first two tranches generally align with existing literature. Initially, a positive relationship is observed between a higher proportion of White population in urban areas and the number of loans received per employer establishment, as well as loan amounts per employee. However, this association turns predominantly negative in the second tranche. One notable departure from the previous literature is the positive association of Black Share (with magnitudes similar to White Share) with both loan number and size in the first two tranches, contrasting with the 50% smaller loans observed in Atkins et al. (2022). These results are not inherently contradictory, as it's conceivable for businesses in areas with a higher Black population to receive more and larger loans, while Black-owned businesses may still receive smaller ones. Upon disaggregating the effects of predictors by rurality, significant differences emerge. In rural ZIP codes, White Share exhibits a less negative association with loan receipt in the second and third tranches compared to urban ZIP codes. Consequently, White Share in rural ZIP codes shows a positive association, growing over time, with both metrics of loan receipt throughout the program.

The third tranche is markedly different from the preceding tranches. In urban ZIP codes, Black Share exhibits the most substantial coefficients among all variables of interest for any individual tranche during the third phase. Specifically, the coefficient for loan number consistently approximates 2% of the mean outcome (representing an additional 0.01 loans per employer establishment), while the coefficient for loan size surpasses $128 per employee (roughly 4% of the mean). It's important to clarify that this metric aggregates all PPP funding within a ZIP code, divided by the total number of employees in that ZIP code, irrespective of whether their employer received a loan. The third tranche shapes the overall program’s

dynamics, suggesting that previous examinations of loan distribution inequities, which excluded this tranche, no longer capture the complete program landscape. While racial disparities identified in the first and second tranches appear relatively minor compared to those in the third tranche and the program as a whole, the delayed funding to Black communities likely resulted in irreparable harm that subsequent funding may not fully redress. However, it's essential to note that even the largest coefficients in our findings may not translate into significant economic impact. For instance, 0.0185 loans per employer establishment and $212.92 per employee (both for Black Share in urban ZIP codes over the entire program) represent relatively modest figures. These calculations are influenced significantly by businesses that did not receive any loans, complicating precise economic assessments of these results.

The process of excluding nontraditional lenders from our sample largely unfolds as expected. We observe minimal differences in coefficients during the first tranche, slight variances in the second, and notably significant differences in the third. For White Share, eliminating nontraditional lenders increases coefficients, suggesting a comparatively lower reliance on nontraditional lenders in areas with higher White populations. However, the most pronounced effects are seen with Black Share. As anticipated based on previous research, excluding loans from nontraditional lenders results in more negative coefficients across all categories. Nonetheless, the sign of these coefficients remains consistent throughout our analysis.

Comparing the results before and after the changes enacted by the Biden-Harris administration reveals significant heterogeneities. Coefficients before the changes resemble those observed in earlier tranches, whereas those after the changes represent more extreme versions of those seen in the initial stages of the third tranche. Further analysis of the third tranche, divided into two-week intervals centered on the exclusive application window for the smallest

businesses, yields intriguing findings. There are noticeable differences in coefficients for the White and Black population segments in both urban and rural areas leading up to and following the exclusive application window. However, these differences, along with the magnitudes of coefficients, diminish considerably during this period. The reason for this shift in coefficients following the restriction on business size is not immediately clear, highlighting the need for additional investigation in future research. Moreover, the fact that these changes appear to begin before the implementation of the Biden-Harris Administration's modifications suggests that other factors may have also influenced the observed shifts in relationships when segmenting the third tranche into two-week intervals.

The findings presented here are subject to several limitations. One key limitation is the absence of data on denied applications, which is critical for assessing statistical discrimination in the program. However, estimates by Autor et al. (2022) indicating that 94% of firms with fewer than 500 employees had received loans by the end of the second tranche suggest that the impact of this data gap may be limited. Additionally, disparities in the timing of application submissions across racial groups, as shown in the appendix, may influence the observed results more than discrimination by lenders or the Small Business Administration (SBA). Nevertheless, such disparities raise significant concerns, especially given previous studies indicating lower approval rates for applications from Black- and minority-owned businesses. This underscores the necessity for further investigation into these dynamics.

8. CONCLUSION

Racial inequities observed during the third tranche of the pandemic starkly contrast with those evident in the first two tranches and significantly characterize the entire PPP program. In this phase, the Black share of the population shows unprecedented positive associations with

both the number and amount of loans disbursed, aggregated at the ZIP code level. Our results when we exclude nontraditional lenders from the analysis suggests their substantial role in driving these shifts.

This study uniquely explores the distinct impacts of White and Black population shares in urban and rural settings on loan distribution—an area largely overlooked in existing literature. Large differences emerge in coefficients across individual tranches and notably in the overall program for White population share. Rural areas, in particular, exhibit a less negative association with loan receipt in the second and third tranches, ultimately showing an overall positive relationship compared to urban ZIP codes.

Further dissecting the third tranche across various time intervals before and after the Biden-Harris Administration's policy changes reveals striking disparities in funding inequities. Interestingly, these shifts appear to have begun prior to the official announcement of program rule changes, suggesting other underlying factors contributed to these variations.

While previous studies predominantly focused on racial disparities during the initial tranches, the findings from the third tranche underscore the need for updated literature on PPP funding inequities. It is crucial to acknowledge that even if past inequities were rectified, the delayed funding allocation to minority communities likely inflicted enduring damage on small businesses and workers in those ZIP codes, which subsequent funding may not fully mitigate.

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APPENDIX A

Figure A1 displays the shares of loans which reported race for each racial group (in blue) compared against the percentages of the same categories out of the U.S. population (in red). In terms of relative size, White loan recipients had the largest share of loans reporting race in all three tranches, taking up over half across the program as a whole. Whites are overrepresented in the first tranche but become underrepresented in the second and third tranches as well as the program as a whole. Blacks and African Americans start off severely underrepresented but hold a share of loans reporting race more than double their share of the U.S. population in the third tranche. It is worth noting that during the third tranche, the section of the form requesting information on business-owner race and ethnicity was moved to the front of the application.

While the over- and under-representation of these racial groups largely mirror the positive and negative relationships of the share of these racial groups in a ZIP code's population with the two measures of loan receipt, it is important to remember that these are measuring two different groups: loan applicants (business owners) and demographics. The positive relationship between one's race and the demographics of their location, however, makes the possibility that differences in application timing combined with the differences in funding between the tranches a possible and likely confounding factor which cannot be accounted for in our regression results.

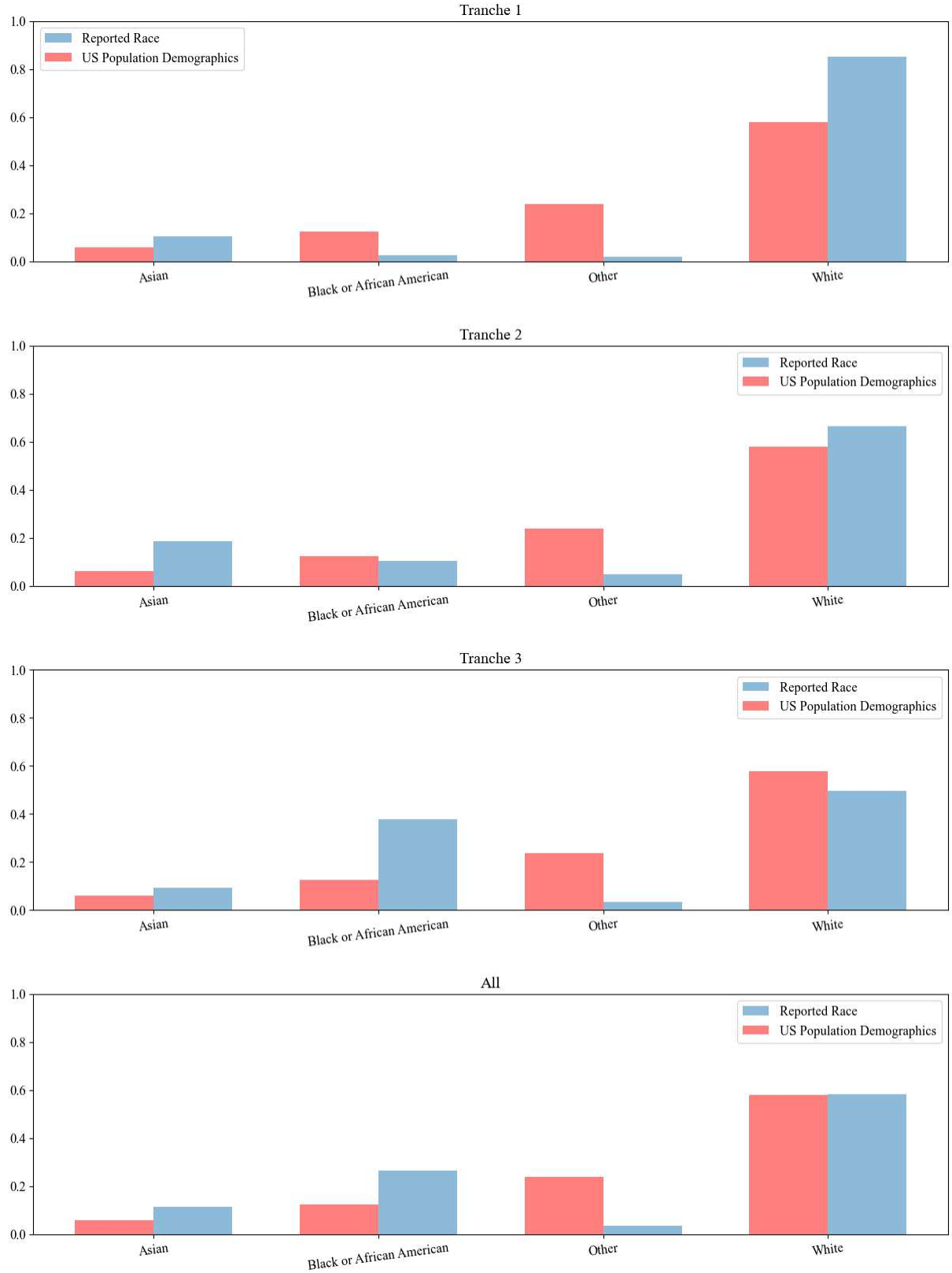

Figure A1. Percent of Reported Races Against U.S. Population Demographics

APPENDIX B

Table B1. Effects of Demographics on Number of Loans Received - Tobit

Loans per Employer Establishment	Tranche 1	Tranche 2	Trance 3	All
White Share	0.000551***	-0.002576***	-0.012440***	-0.015022***
	(0.000174)	(0.000280)	(0.001138)	(0.001293)
White Share^2	0.000006***	0.000009***	0.000083***	0.000103***
	(0.000002)	(0.000003)	(0.000011)	(0.000012)
White Share x Rural Ind.	0.001145***	0.000813**	0.006795***	0.008338***
	(0.000214)	(0.000323)	(0.000993)	(0.001184)
White Share^2 x Rural Ind.	-0.000017***	0.000004	-0.000040***	-0.000051***
	(0.000002)	(0.000003)	(0.000010)	(0.000012)
Black Share	0.001434***	-0.000127	0.001993	0.003350
	(0.000160)	(0.000304)	(0.002340)	(0.002533)
Black Share^2	-0.000012***	0.000018***	0.000328***	0.000332***
	(0.000002)	(0.000005)	(0.000046)	(0.000049)
Black Share x Rural Ind.	-0.000359	0.002473***	0.000533	0.002072
	(0.000270)	(0.000430)	(0.002717)	(0.002979)
Black Share^2 x Rural Ind.	0.000005	-0.000037***	-0.000204***	-0.000230***
	(0.000004)	(0.000007)	(0.000056)	(0.000060)
Rural	-0.000609***	-0.002383***	-0.003537***	-0.006145***
	(0.000054)	(0.000084)	(0.000211)	(0.000266)
Midwest	0.049925***	-0.011256***	0.216732***	0.239600***
	(0.001990)	(0.002967)	(0.008661)	(0.009994)
Northeast	0.058950***	0.032156***	0.011905*	0.096126***
	(0.002278)	(0.003445)	(0.006665)	(0.008776)
South	0.023274***	-0.019512***	0.025918***	0.025499***
	(0.001866)	(0.003008)	(0.007480)	(0.009082)
% ≥ Bachelor's	0.001256***	0.001740***	0.000748***	0.003490***
	(0.000089)	(0.000139)	(0.000219)	(0.000302)
Per Capita Income	-0.000001***	0.000002***	0.000001***	0.000003***
	(0.000000)	(0.000000)	(0.000000)	(0.000000)
Gini Coefficient	0.001123***	-0.000507***	0.000603	0.000003
	(0.000130)	(0.000179)	(0.000392)	(0.000488)
Unemployment Rate	-0.001011***	0.000553	-0.002590***	-0.002012**
	(0.000208)	(0.000339)	(0.000638)	(0.000796)
Constant	0.009572	0.372494***	0.714967***	1.166670***
	(0.006385)	(0.009834)	(0.029793)	(0.035406)
N	31,314	31,314	31,314	31,314
Mean Outcome	0.13	0.234	0.462	0.825
Log Likelihood	21280	12036	-18995	-24580

Note: Table displays coefficient estimates from Tobit regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate.

Table B2. Effects of Demographics on Mean Loan Amount per Employee - Tobit

Mean Loan Amount per Employee	Tranche 1	Tranche 2	Trance 3	All
White Share	11.252**	-22.861***	-33.816***	-59.579***
	(4.888)	(4.717)	(6.897)	(11.263)
White Share^2	-0.009	0.106***	0.212***	0.430***
	(0.048)	(0.039)	(0.057)	(0.098)
White Share x Rural Ind.	3.900	16.810**	15.240*	30.815*
	(8.893)	(6.686)	(8.190)	(15.826)
White Share^2 x Rural Ind.	0.027	-0.131**	-0.071	-0.188
	(0.098)	(0.065)	(0.085)	(0.163)
Black Share	-11.028**	-10.831**	-22.353***	-39.988***
	(5.323)	(4.682)	(7.400)	(12.197)
Black Share^2	0.239***	0.167*	0.820***	1.133***
	(0.064)	(0.093)	(0.130)	(0.208)
Black Share x Rural Ind.	17.240	-1.717	-25.912	-28.783
	(11.843)	(8.661)	(16.189)	(24.422)
Black Share^2 x Rural Ind.	-0.228	-0.050	1.064***	1.016**
	(0.170)	(0.142)	(0.326)	(0.440)
Rural	-2.803*	1.651	9.174***	18.069***
	(1.702)	(1.701)	(2.545)	(4.019)
Midwest	1,104.531***	-804.537***	224.571*	151.894
	(108.883)	(70.944)	(133.303)	(219.329)
Northeast	849.478***	-319.366***	205.165	504.521**
	(103.021)	(77.986)	(128.669)	(224.724)
South	521.006***	-627.064***	113.926	-189.756
	(101.305)	(71.397)	(103.698)	(187.120)
% ≥ Bachelor's	14.876***	4.660*	4.926	18.757***
	(3.245)	(2.783)	(4.061)	(7.209)
Per Capita Income	-0.001	0.025***	0.024***	0.053***
	(0.004)	(0.004)	(0.005)	(0.009)
Gini Coefficient	17.692***	-15.401***	-10.201*	-34.509***
	(6.532)	(4.294)	(5.922)	(10.868)
Unemployment Rate	-47.475***	4.774	-13.979	-30.852*
	(11.019)	(6.856)	(9.628)	(17.032)
Constant	361.636	2,767.972***	2,660.773***	7,390.060***
	(267.860)	(219.214)	(291.628)	(507.273)
N	29,787	29,787	29,787	29,787
Mean Outcome	3,043.116	1,881.202	3,122.368	8,046.69
Log Likelihood	-276382	-272012	-289974	-312137

Note: Table displays coefficient estimates from Tobit regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate.

Table B3. 1st Stage of Cragg-Hurdle Regression for Number of Loans Received

Loans per Employer Establishment	Tranche 1	Tranche 2	Trance 3	All
White Share	0.017173***	0.020506***	0.034241***	0.023424**
	(0.004334)	(0.005206)	(0.007402)	(0.009531)
White Share^2	-0.000170***	-0.000217***	-0.000359***	-0.000240**
	(0.000048)	(0.000058)	(0.000081)	(0.000106)
White Share x Rural Ind.	0.009049**	0.003531	-0.002107	0.006393
	(0.004589)	(0.005554)	(0.007835)	(0.010257)
White Share^2 x Rural Ind.	-0.000026	0.000036	0.000116	0.000020
	(0.000050)	(0.000061)	(0.000085)	(0.000113)
Black Share	-0.001357	-0.000612	-0.036534*	-0.064758***
	(0.005696)	(0.006785)	(0.019830)	(0.022273)
Black Share^2	0.000046	0.000058	0.001428**	0.002022***
	(0.000091)	(0.000107)	(0.000610)	(0.000701)
Black Share x Rural Ind.	0.020492***	0.023435***	0.038503*	0.065907***
	(0.006512)	(0.007800)	(0.020336)	(0.023323)
Black Share^2 x Rural Ind.	-0.000281***	-0.000301**	-0.001268**	-0.001829**
	(0.000103)	(0.000121)	(0.000615)	(0.000712)
Rural	-0.016168***	-0.013244***	-0.013091***	-0.014770***
	(0.000835)	(0.000975)	(0.001243)	(0.001953)
Midwest	0.665227***	0.448115***	0.624271***	0.510430***
	(0.037975)	(0.047441)	(0.057703)	(0.076287)
Northeast	0.369578***	0.161801***	0.071199	0.064201
	(0.042015)	(0.051018)	(0.057481)	(0.077306)
South	0.259169***	-0.006751	0.208411***	0.212175***
	(0.036309)	(0.044421)	(0.052977)	(0.069762)
% ≥ Bachelor's	0.015205***	0.012456***	0.009000***	0.009582**
	(0.001631)	(0.002111)	(0.002526)	(0.003895)
Per Capita Income	-0.000001	0.000005	0.000007*	0.000010
	(0.000002)	(0.000003)	(0.000004)	(0.000006)
Gini Coefficient	0.032913***	0.031601***	0.038361***	0.031190***
	(0.001741)	(0.002031)	(0.002370)	(0.003162)
Unemployment Rate	-0.016486***	-0.010318***	-0.015014***	-0.014462***
	(0.002018)	(0.002304)	(0.002556)	(0.002999)
Constant	0.065705	0.341881***	0.127099	0.942891***
	(0.106834)	(0.130558)	(0.161293)	(0.238522)
N	31,314	31,314	31,314	31,314
Log Likelihood	51601	44703	27512	13548

Note: Table displays coefficient estimates from the first stage of a Cragg-hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate.

Table B4. 2nd Stage of Cragg-Hurdle Regression for Number of Loans Received

Loans per Employer Establishment	Tranche 1	Tranche 2	Trance 3	All
White Share	0.007758***	-0.008061***	-0.009365***	-0.005128***
	(0.001111)	(0.000916)	(0.001128)	(0.001020)
White Share^2	0.000010	0.000038***	0.000035***	0.000023***
	(0.000010)	(0.000008)	(0.000010)	(0.000009)
White Share x Rural Ind.	0.005535***	0.002585**	0.002865**	0.005480***
	(0.001390)	(0.001243)	(0.001348)	(0.001230)
White Share^2 x Rural Ind.	-0.000095***	0.000009	0.000029**	-0.000009
	(0.000014)	(0.000012)	(0.000013)	(0.000012)
Black Share	0.011284***	0.006428***	0.021128***	0.013312***
	(0.001059)	(0.000824)	(0.001066)	(0.000896)
Black Share^2	-0.000084***	-0.000029***	-0.000036**	0.000010
	(0.000014)	(0.000011)	(0.000015)	(0.000013)
Black Share x Rural Ind.	-0.004854**	0.010519***	-0.004938***	0.001108
	(0.001910)	(0.001574)	(0.001772)	(0.001558)
Black Share^2 x Rural Ind.	0.000084***	-0.000104***	0.000068**	0.000001
	(0.000030)	(0.000024)	(0.000028)	(0.000025)
Rural	-0.004010***	-0.009916***	-0.006528***	-0.008443***
	(0.000310)	(0.000313)	(0.000362)	(0.000342)
Midwest	0.332157***	-0.041365***	0.542321***	0.385888***
	(0.014118)	(0.012313)	(0.012665)	(0.011036)
Northeast	0.414480***	0.133328***	0.127313***	0.193341***
	(0.014631)	(0.012333)	(0.012423)	(0.011052)
South	0.147836***	-0.149098***	0.113416***	0.051242***
	(0.014029)	(0.012577)	(0.012835)	(0.011473)
% ≥ Bachelor's	0.008297***	0.006541***	0.002134***	0.004735***
	(0.000482)	(0.000518)	(0.000401)	(0.000377)
Per Capita Income	-0.000004***	0.000008***	0.000003***	0.000003***
	(0.000001)	(0.000001)	(0.000000)	(0.000000)
Gini Coefficient	-0.000194	-0.005771***	0.000125	0.001745***
	(0.000749)	(0.000681)	(0.000646)	(0.000591)
Unemployment Rate	-0.001034	0.004914***	-0.004537***	-0.003626***
	(0.001289)	(0.001087)	(0.001075)	(0.000999)
Constant	-2.803946***	-1.028383***	-0.871642***	-0.364657***
	(0.041078)	(0.035368)	(0.039003)	(0.034894)
N	31,314	31,314	31,314	31,314
Log Likelihood	51601	44703	27512	13548

Note: Table displays coefficient estimates from the second stage of Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate.

Table B5. Partial Derivatives of 2nd Stage of Cragg-Hurdle Regression for Number of Loans Received

Loans per Employer Establishment	Tranche 1	Tranche 2	Trance 3	All
White Share	0.001334***	-0.001688***	-0.003830***	-0.004079***
	(0.000167)	(0.000242)	(0.000555)	(0.000892)
White Share^2	-0.000001	0.000006***	0.000010**	0.000017**
	(0.000002)	(0.000002)	(0.000005)	(0.000008)
White Share x Rural Ind.	0.000900***	0.000699**	0.001328**	0.004839***
	(0.000204)	(0.000321)	(0.000660)	(0.001080)
White Share^2 x Rural Ind.	-0.000013***	0.000003	0.000016**	-0.000008
	(0.000002)	(0.000003)	(0.000006)	(0.000010)
Black Share	0.001518***	0.001592***	0.009401***	0.010530***
	(0.000172)	(0.000233)	(0.000636)	(0.000855)
Black Share^2	-0.000011***	-0.000006**	0.000010	0.000040**
	(0.000002)	(0.000003)	(0.000014)	(0.000016)
Black Share x Rural Ind.	-0.000335	0.002986***	-0.001637*	0.001965
	(0.000281)	(0.000411)	(0.000929)	(0.001396)
Black Share^2 x Rural Ind.	0.000007	-0.000031***	0.000009	-0.000027
	(0.000004)	(0.000006)	(0.000017)	(0.000024)
Rural	-0.000806***	-0.002677***	-0.003361***	-0.007531***
	(0.000044)	(0.000080)	(0.000177)	(0.000307)
Midwest	0.055974***	-0.003315	0.270538***	0.341686***
	(0.002024)	(0.003135)	(0.006379)	(0.009900)
Northeast	0.062478***	0.035733***	0.062101***	0.168272***
	(0.002162)	(0.003176)	(0.006026)	(0.009725)
South	0.024322***	-0.037243***	0.058035***	0.047576***
	(0.002002)	(0.003187)	(0.006215)	(0.009986)
% ≥ Bachelor's	0.001376***	0.001823***	0.001187***	0.004243***
	(0.000071)	(0.000132)	(0.000196)	(0.000330)
Per Capita Income	-0.000001***	0.000002***	0.000001***	0.000003***
	(0.000000)	(0.000000)	(0.000000)	(0.000000)
Gini Coefficient	0.000500***	-0.000945***	0.000778**	0.001986***
	(0.000107)	(0.000173)	(0.000309)	(0.000512)
Unemployment Rate	-0.000405**	0.001063***	-0.002447***	-0.003358***
	(0.000184)	(0.000275)	(0.000518)	(0.000869)
N	31,314	31,314	31,314	31,314
Mean Outcome	0.13	0.234	0.462	0.825
Log Likelihood	51601	44703	27512	13548

Note: Table displays derivatives of coefficient estimates from the second stage of Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate. Actual coefficient estimates are not directly interpretable, and the partial derivatives must be used instead.

Table B6. 1st Stage of Cragg-Hurdle Regression for Mean Loan Amount per Employee

Mean Loan Amount per Employee	Tranche 1	Tranche 2	Trance 3	All
White Share	0.018***	0.020***	0.041***	0.027***
	(0.004)	(0.005)	(0.008)	(0.010)
White Share^2	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
White Share x Rural Ind.	0.005	-0.001	-0.017**	0.000
	(0.005)	(0.006)	(0.008)	(0.011)
White Share^2 x Rural Ind.	0.000	0.000	0.000***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Black Share	-0.009	-0.009	-0.055***	-0.080***
	(0.006)	(0.007)	(0.020)	(0.022)
Black Share^2	0.000	0.000	0.002***	0.002***
	(0.000)	(0.000)	(0.001)	(0.001)
Black Share x Rural Ind.	0.020***	0.027***	0.062***	0.080***
	(0.007)	(0.009)	(0.021)	(0.024)
Black Share^2 x Rural Ind.	-0.000**	-0.000**	-0.002***	-0.002***
	(0.000)	(0.000)	(0.001)	(0.001)
Rural	-0.015***	-0.011***	-0.012***	-0.013***
	(0.001)	(0.001)	(0.001)	(0.002)
Midwest	0.642***	0.332***	0.611***	0.597***
	(0.041)	(0.052)	(0.062)	(0.094)
Northeast	0.390***	0.175***	0.174***	0.203**
	(0.045)	(0.056)	(0.062)	(0.092)
South	0.374***	0.110**	0.264***	0.373***
	(0.040)	(0.051)	(0.058)	(0.091)
% ≥ Bachelor's	0.014***	0.009***	0.008***	0.006
	(0.002)	(0.002)	(0.003)	(0.005)
Per Capita Income	-0.000	0.000*	0.000	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)
Gini Coefficient	0.029***	0.027***	0.040***	0.033***
	(0.002)	(0.002)	(0.003)	(0.004)
Unemployment Rate	-0.014***	-0.009***	-0.013***	-0.015***
	(0.002)	(0.003)	(0.003)	(0.004)
Constant	0.241**	0.563***	0.121	0.913***
	(0.117)	(0.151)	(0.175)	(0.277)
N	29,787	29,787	29,787	29,787
Log Likelihood	-230683	-221848	-237120	-266886

Note: Table displays coefficient estimates from the first stage of a Cragg-hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate.

Table B7. 2nd Stage of Cragg-Hurdle Regression for Mean Loan Amount per Employee

Mean Loan Amount per Employee	Tranche 1	Tranche 2	Trance 3	All
White Share	0.004**	-0.012***	-0.009***	-0.005***
	(0.002)	(0.001)	(0.001)	(0.001)
White Share^2	0.000	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
White Share x Rural Ind.	0.004*	0.004**	0.003*	0.006***
	(0.002)	(0.002)	(0.002)	(0.002)
White Share^2 x Rural Ind.	-0.000**	0.000	0.000	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Black Share	-0.001	-0.005***	-0.002	-0.004***
	(0.002)	(0.002)	(0.001)	(0.001)
Black Share^2	0.000	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Black Share x Rural Ind.	-0.006**	0.004	0.001	0.001
	(0.003)	(0.003)	(0.003)	(0.002)
Black Share^2 x Rural Ind.	0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Rural	0.000	-0.003***	0.000	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)
Midwest	0.362***	-0.442***	0.104***	0.109***
	(0.021)	(0.021)	(0.020)	(0.018)
Northeast	0.251***	-0.201***	0.102***	0.089***
	(0.022)	(0.021)	(0.020)	(0.018)
South	0.195***	-0.305***	0.035*	-0.002
	(0.021)	(0.020)	(0.020)	(0.018)
% ≥ Bachelor's	0.004***	0.002*	0.003***	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)
Per Capita Income	0.000**	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Gini Coefficient	0.001	-0.004***	-0.000	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)
Unemployment Rate	-0.008***	0.004*	-0.001	-0.005***
	(0.002)	(0.002)	(0.002)	(0.002)
Constant	6.977***	7.582***	7.407***	8.305***
	(0.059)	(0.059)	(0.057)	(0.050)
N	29,787	29,787	29,787	29,787
Log Likelihood	-230683	-221848	-237120	-266886

Note: Table displays coefficient estimates from the second stage of Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate.

Table B8. Partial Derivatives of 2nd Stage of Cragg-Hurdle Regression for Mean Loan Amount per Employee

Mean Loan Amount per Employee	Tranche 1	Tranche 2	Trance 3	All
White Share	19.816***	-21.081***	-23.259***	-41.427***
	(5.255)	(3.251)	(4.670)	(10.678)
White Share^2	-0.048	0.072**	0.114**	0.316***
	(0.051)	(0.030)	(0.044)	(0.100)
White Share x Rural Ind.	14.555**	8.227*	7.751	51.274***
	(6.838)	(4.262)	(6.214)	(14.381)
White Share^2 x Rural Ind.	-0.137**	0.014	0.058	-0.272*
	(0.070)	(0.043)	(0.063)	(0.144)
Black Share	-5.999	-12.081***	-14.278***	-45.510***
	(5.648)	(3.242)	(5.377)	(10.699)
Black Share^2	0.159*	0.141***	0.716***	1.291***
	(0.083)	(0.044)	(0.116)	(0.165)
Black Share x Rural Ind.	-12.305	11.695**	12.148	16.886
	(9.808)	(5.887)	(9.093)	(19.793)
Black Share^2 x Rural Ind.	0.083	-0.182*	-0.047	0.010
	(0.158)	(0.093)	(0.168)	(0.327)
Rural	-5.884***	-6.759***	-1.740	-9.589***
	(1.457)	(0.951)	(1.386)	(3.326)
Midwest	1,440.469***	-859.983***	422.682***	1,002.088***
	(70.783)	(47.180)	(64.318)	(149.951)
Northeast	976.191***	-388.457***	352.201***	781.279***
	(72.867)	(45.770)	(65.018)	(153.037)
South	788.088***	-610.689***	151.535**	31.616
	(68.829)	(43.542)	(62.910)	(148.951)
% ≥ Bachelor's	19.542***	5.354***	9.694***	28.878***
	(2.463)	(2.061)	(2.611)	(6.231)
Per Capita Income	0.006**	0.030***	0.028***	0.059***
	(0.003)	(0.004)	(0.003)	(0.008)
Gini Coefficient	16.461***	-4.533*	4.388	31.541***
	(3.646)	(2.578)	(3.547)	(8.455)
Unemployment Rate	-31.681***	6.743	-4.843	-43.668***
	(6.717)	(4.197)	(5.864)	(14.379)
N	29,787	29,787	29,787	29,787
Mean Outcome	3,043.116	1,881.202	3,122.368	8,046.69
Log Likelihood	-230683	-221848	-237120	-266886

Note: Table displays derivatives of coefficient estimates from the second stage of Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate. Actual coefficient estimates are not directly interpretable, and the partial derivatives must be used instead.

Table B9. 1st Stage of Cragg-Hurdle Regression for Number of Loans Received – Traditional Lenders Only

Loans per Employer Establishment	Tranche 1	Tranche 2	Trance 3	All
White Share	0.016217***	0.019464***	0.027760***	0.021789**
	(0.004274)	(0.004894)	(0.006521)	(0.008978)
White Share^2	-0.000160***	-0.000207***	-0.000290***	-0.000219**
	(0.000047)	(0.000054)	(0.000071)	(0.000099)
White Share x Rural Ind.	0.008695*	0.004144	0.002609	0.009680
	(0.004525)	(0.005237)	(0.006902)	(0.009523)
White Share^2 x Rural Ind.	-0.000022	0.000034	0.000072	-0.000013
	(0.000050)	(0.000058)	(0.000075)	(0.000104)
Black Share	-0.002885	-0.002315	-0.040938**	-0.057943***
	(0.005667)	(0.006245)	(0.017863)	(0.021624)
Black Share^2	0.000065	0.000071	0.001683***	0.001921***
	(0.000091)	(0.000097)	(0.000589)	(0.000697)
Black Share x Rural Ind.	0.022608***	0.023838***	0.045737**	0.058430***
	(0.006459)	(0.007269)	(0.018234)	(0.022149)
Black Share^2 x Rural Ind.	-0.000305***	-0.000305***	-0.001645***	-0.001847***
	(0.000103)	(0.000111)	(0.000591)	(0.000699)
Rural	-0.016227***	-0.013750***	-0.014250***	-0.014980***
	(0.000824)	(0.000939)	(0.001152)	(0.001790)
Midwest	0.680510***	0.479695***	0.676504***	0.607028***
	(0.037485)	(0.046199)	(0.054725)	(0.071449)
Northeast	0.371026***	0.128221***	0.052681	0.085613
	(0.041486)	(0.049031)	(0.054242)	(0.070353)
South	0.269893***	-0.000744	0.208385***	0.242983***
	(0.035832)	(0.042988)	(0.048941)	(0.064642)
% ≥ Bachelor's	0.015371***	0.012765***	0.010166***	0.011081***
	(0.001603)	(0.001997)	(0.002342)	(0.003513)
Per Capita Income	-0.000001	0.000003	0.000006*	0.000005
	(0.000002)	(0.000003)	(0.000003)	(0.000005)
Gini Coefficient	0.033027***	0.032595***	0.038337***	0.031970***
	(0.001722)	(0.001976)	(0.002236)	(0.002887)
Unemployment Rate	-0.016609***	-0.010354***	-0.014800***	-0.013404***
	(0.002010)	(0.002272)	(0.002481)	(0.002900)
Constant	0.051333	0.325074***	0.126605	0.854790***
	(0.105773)	(0.124454)	(0.147097)	(0.210707)
N	31,314	31,314	31,314	31,314
Log Likelihood	51636	47682	33367	18038

Note: Table displays coefficient estimates from the first stage of a Cragg-hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate.

Table B10. 2nd Stage of Cragg-Hurdle Regression for Number of Loans Received – Traditional Lenders Only

Loans per Employer Establishment	Tranche 1	Tranche 2	Trance 3	All
White Share	0.007793***	-0.006060***	-0.005933***	-0.001683*
	(0.001172)	(0.000868)	(0.001023)	(0.000948)
White Share^2	0.000018*	0.000033***	0.000028***	0.000011
	(0.000011)	(0.000008)	(0.000009)	(0.000008)
White Share x Rural Ind.	0.006640***	0.001485	0.000660	0.003506***
	(0.001434)	(0.001210)	(0.001303)	(0.001201)
White Share^2 x Rural Ind.	-0.000112***	0.000012	0.000033***	-0.000002
	(0.000014)	(0.000012)	(0.000013)	(0.000011)
Black Share	0.012096***	0.004450***	0.005905***	0.004320***
	(0.001126)	(0.000749)	(0.000931)	(0.000779)
Black Share^2	-0.000090***	-0.000031***	0.000059***	0.000043***
	(0.000015)	(0.000009)	(0.000013)	(0.000011)
Black Share x Rural Ind.	-0.007303***	0.010438***	-0.002985*	0.002569*
	(0.001960)	(0.001551)	(0.001650)	(0.001457)
Black Share^2 x Rural Ind.	0.000113***	-0.000080***	0.000057**	-0.000003
	(0.000030)	(0.000024)	(0.000025)	(0.000023)
Rural	-0.003417***	-0.008737***	-0.003816***	-0.006579***
	(0.000319)	(0.000304)	(0.000345)	(0.000334)
Midwest	0.384394***	-0.003820	0.626393***	0.449541***
	(0.014565)	(0.012173)	(0.012734)	(0.011088)
Northeast	0.455867***	0.118897***	0.169478***	0.216803***
	(0.015212)	(0.012201)	(0.012392)	(0.011105)
South	0.192933***	-0.139606***	0.166052***	0.089626***
	(0.014531)	(0.012362)	(0.012762)	(0.011435)
% ≥ Bachelor's	0.008199***	0.006110***	0.003279***	0.005279***
	(0.000505)	(0.000496)	(0.000394)	(0.000371)
Per Capita Income	-0.000004***	0.000007***	0.000002***	0.000002***
	(0.000001)	(0.000001)	(0.000000)	(0.000000)
Gini Coefficient	-0.000041	-0.005623***	0.001105*	0.002580***
	(0.000765)	(0.000668)	(0.000643)	(0.000587)
Unemployment Rate	-0.001453	0.004878***	-0.005861***	-0.004198***
	(0.001317)	(0.001108)	(0.001092)	(0.000992)
Constant	-2.935407***	-1.275588***	-1.379295***	-0.759483***
	(0.042601)	(0.034460)	(0.037112)	(0.033517)
N	31,314	31,314	31,314	31,314
Log Likelihood	51636	47682	33367	18038

Note: Table displays coefficient estimates from the second stage of Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate.

Table B11. Partial Derivatives of 2nd Stage of Cragg-Hurdle Regression for Number of Loans Received – Traditional Lenders Only

Loans per Employer Establishment	Tranche 1	Tranche 2	Trance 3	All
White Share	0.001290***	-0.001005***	-0.001624***	-0.000840
	(0.000170)	(0.000201)	(0.000390)	(0.000691)
White Share^2	-0.000000	0.000004**	0.000005	0.000005
	(0.000002)	(0.000002)	(0.000003)	(0.000006)
White Share x Rural Ind.	0.001016***	0.000383	0.000289	0.002658***
	(0.000204)	(0.000272)	(0.000489)	(0.000872)
White Share^2 x Rural Ind.	-0.000015***	0.000003	0.000013***	-0.000002
	(0.000002)	(0.000003)	(0.000005)	(0.000008)
Black Share	0.001548***	0.000921***	0.001364***	0.002124***
	(0.000175)	(0.000188)	(0.000480)	(0.000665)
Black Share^2	-0.000011***	-0.000006**	0.000053***	0.000062***
	(0.000002)	(0.000002)	(0.000012)	(0.000014)
Black Share x Rural Ind.	-0.000597**	0.002609***	-0.000214	0.002794**
	(0.000280)	(0.000352)	(0.000692)	(0.001102)
Black Share^2 x Rural Ind.	0.000010**	-0.000022***	-0.000011	-0.000033
	(0.000004)	(0.000005)	(0.000014)	(0.000020)
Rural	-0.000713***	-0.002089***	-0.001654***	-0.004935***
	(0.000044)	(0.000067)	(0.000127)	(0.000245)
Midwest	0.061712***	0.006528**	0.239942***	0.330354***
	(0.002021)	(0.002693)	(0.004944)	(0.008265)
Northeast	0.066126***	0.027523***	0.062446***	0.155909***
	(0.002172)	(0.002729)	(0.004615)	(0.008087)
South	0.029814***	-0.030021***	0.064158***	0.067872***
	(0.002007)	(0.002720)	(0.004744)	(0.008232)
% ≥ Bachelor's	0.001330***	0.001509***	0.001382***	0.003945***
	(0.000072)	(0.000110)	(0.000149)	(0.000269)
Per Capita Income	-0.000001***	0.000002***	0.000001***	0.000002***
	(0.000000)	(0.000000)	(0.000000)	(0.000000)
Gini Coefficient	0.000529***	-0.000709***	0.001128***	0.002365***
	(0.000106)	(0.000147)	(0.000235)	(0.000419)
Unemployment Rate	-0.000461**	0.000890***	-0.002406***	-0.003213***
	(0.000182)	(0.000243)	(0.000403)	(0.000712)
N	31,314	31,314	31,314	31,314
Mean Outcome	0.126	0.203	0.35	0.678
Log Likelihood	51636	47682	33367	18038

Note: Table displays derivatives of coefficient estimates from the second stage of Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate. Actual coefficient estimates are not directly interpretable, and the partial derivatives must be used instead.

Table B12. 1st Stage of Cragg-Hurdle Regression for Mean Loan Amount per Employee – Traditional Lenders Only

Mean Loan Amount per Employee	Tranche 1	Tranche 2	Trance 3	All
White Share	0.017***	0.019***	0.032***	0.024**
	(0.004)	(0.005)	(0.007)	(0.009)
White Share^2	-0.000***	-0.000***	-0.000***	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
White Share x Rural Ind.	0.005	-0.001	-0.012*	0.004
	(0.005)	(0.005)	(0.007)	(0.010)
White Share^2 x Rural Ind.	0.000	0.000	0.000***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Black Share	-0.010*	-0.011*	-0.055***	-0.069***
	(0.006)	(0.007)	(0.018)	(0.022)
Black Share^2	0.000	0.000*	0.002***	0.002***
	(0.000)	(0.000)	(0.001)	(0.001)
Black Share x Rural Ind.	0.022***	0.026***	0.063***	0.064***
	(0.007)	(0.008)	(0.019)	(0.022)
Black Share^2 x Rural Ind.	-0.000**	-0.000***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.001)	(0.001)
Rural	-0.015***	-0.012***	-0.013***	-0.013***
	(0.001)	(0.001)	(0.001)	(0.002)
Midwest	0.659***	0.361***	0.660***	0.678***
	(0.040)	(0.050)	(0.058)	(0.088)
Northeast	0.390***	0.139***	0.150***	0.168**
	(0.044)	(0.053)	(0.058)	(0.082)
South	0.388***	0.124**	0.264***	0.350***
	(0.039)	(0.049)	(0.053)	(0.081)
% ≥ Bachelor's	0.014***	0.010***	0.009***	0.007*
	(0.002)	(0.002)	(0.003)	(0.004)
Per Capita Income	-0.000	0.000*	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Gini Coefficient	0.030***	0.028***	0.039***	0.033***
	(0.002)	(0.002)	(0.003)	(0.004)
Unemployment Rate	-0.015***	-0.009***	-0.013***	-0.016***
	(0.002)	(0.003)	(0.003)	(0.004)
Constant	0.217*	0.572***	0.138	0.907***
	(0.116)	(0.143)	(0.161)	(0.245)
N	29,787	29,787	29,787	29,787
Log Likelihood	-229637	-218700	-232716	-264604

Note: Table displays coefficient estimates from the first stage of a Cragg-hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate.

Table B13. 2nd Stage of Cragg-Hurdle Regression for Mean Loan Amount per Employee – Traditional Lenders Only

Mean Loan Amount per Employee	Tranche 1	Tranche 2	Trance 3	All
White Share	0.004***	-0.011***	-0.007***	-0.004***
	(0.002)	(0.001)	(0.001)	(0.001)
White Share^2	0.000	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
White Share x Rural Ind.	0.004**	0.004*	0.003	0.006***
	(0.002)	(0.002)	(0.002)	(0.002)
White Share^2 x Rural Ind.	-0.000***	-0.000	-0.000	-0.000*
	(0.000)	(0.000)	(0.000)	(0.000)
Black Share	-0.000	-0.005***	-0.008***	-0.006***
	(0.002)	(0.002)	(0.001)	(0.001)
Black Share^2	0.000	0.000**	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Black Share x Rural Ind.	-0.008***	0.003	-0.004	-0.001
	(0.003)	(0.003)	(0.003)	(0.002)
Black Share^2 x Rural Ind.	0.000*	-0.000	0.000**	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Rural	0.001	-0.002***	0.001**	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Midwest	0.394***	-0.415***	0.164***	0.150***
	(0.022)	(0.021)	(0.020)	(0.018)
Northeast	0.274***	-0.210***	0.135***	0.101***
	(0.022)	(0.021)	(0.021)	(0.018)
South	0.226***	-0.307***	0.066***	0.015
	(0.021)	(0.020)	(0.020)	(0.018)
% ≥ Bachelor's	0.004***	0.002*	0.003***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
Per Capita Income	0.000*	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Gini Coefficient	0.001	-0.004***	0.001	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
Unemployment Rate	-0.008***	0.004*	-0.001	-0.005***
	(0.002)	(0.002)	(0.002)	(0.002)
Constant	6.902***	7.427***	7.099***	8.086***
	(0.061)	(0.059)	(0.058)	(0.051)
N	29,787	29,787	29,787	29,787
Log Likelihood	-229637	-218700	-232716	-264604

Note: Table displays coefficient estimates from the second stage of Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate.

Table B14. Partial Derivatives of 2nd Stage of Cragg-Hurdle Regression for Mean Loan Amount per Employee – Traditional Lenders Only

Mean Loan Amount per Employee	Tranche 1	Tranche 2	Trance 3	All
White Share	20.283***	-17.310***	-15.161***	-28.862***
	(5.268)	(2.856)	(4.105)	(10.028)
White Share^2	-0.040	0.064**	0.090**	0.286***
	(0.051)	(0.027)	(0.039)	(0.094)
White Share x Rural Ind.	16.302**	6.765*	6.941	43.955***
	(6.808)	(3.870)	(5.544)	(13.683)
White Share^2 x Rural Ind.	-0.169**	0.010	0.031	-0.255*
	(0.070)	(0.039)	(0.057)	(0.138)
Black Share	-4.599	-11.854***	-32.046***	-57.823***
	(5.774)	(2.932)	(4.830)	(10.301)
Black Share^2	0.148*	0.104***	0.721***	1.098***
	(0.085)	(0.040)	(0.113)	(0.168)
Black Share x Rural Ind.	-17.090*	8.493	-2.169	5.381
	(9.774)	(5.491)	(8.137)	(18.985)
Black Share^2 x Rural Ind.	0.135	-0.139	-0.030	-0.138
	(0.157)	(0.089)	(0.156)	(0.321)
Rural	-4.532***	-5.246***	0.457	-4.661
	(1.435)	(0.846)	(1.231)	(3.115)
Midwest	1,536.493***	-717.345***	564.683***	1,284.495***
	(71.706)	(41.603)	(57.851)	(142.398)
Northeast	1,037.533***	-369.440***	402.247***	820.353***
	(73.833)	(41.092)	(58.546)	(145.422)
South	884.215***	-551.336***	227.456***	174.118
	(69.692)	(39.168)	(56.883)	(142.258)
% ≥ Bachelor's	19.582***	4.853***	11.287***	29.929***
	(2.447)	(1.850)	(2.293)	(5.779)
Per Capita Income	0.004	0.026***	0.023***	0.050***
	(0.003)	(0.003)	(0.003)	(0.007)
Gini Coefficient	16.578***	-2.872	8.429***	39.733***
	(3.631)	(2.314)	(3.156)	(8.050)
Unemployment Rate	-31.961***	5.320	-5.332	-40.362***
	(6.672)	(3.841)	(5.259)	(13.760)
N	29,787	29,787	29,787	29,787
Mean Outcome	2,983.82	1,722.136	2,723.671	7,429.627
Log Likelihood	-229637	-218700	-232716	-264604

Note: Table displays derivatives of coefficient estimates from the second stage of Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate. Actual coefficient estimates are not directly interpretable, and the partial derivatives must be used instead.

Table B15. 1st and 2nd Stages of Cragg-Hurdle Regression for Number of Loans Received – Before and After Feb. 24th, 2021

Loans per Employer Establishment	Before Stage 1	Before Stage 2	After Stage 1	After Stage 2
White Share	0.026210***	-0.006132***	0.039440***	-0.012360***
	(0.004389)	(0.000943)	(0.005842)	(0.001172)
White Share^2	-0.000294***	0.000023***	-0.000413***	0.000046***
	(0.000048)	(0.000008)	(0.000063)	(0.000010)
White Share x Rural Ind.	0.004978	0.002106	-0.012603**	0.000603
	(0.004693)	(0.001339)	(0.006259)	(0.001386)
White Share^2 x Rural Ind.	0.000052	0.000005	0.000219***	0.000057***
	(0.000051)	(0.000013)	(0.000067)	(0.000013)
Black Share	-0.005205	0.002672***	-0.031004*	0.030491***
	(0.005592)	(0.000894)	(0.016506)	(0.001183)
Black Share^2	0.000096	0.000036***	0.001460***	-0.000113***
	(0.000081)	(0.000013)	(0.000535)	(0.000016)
Black Share x Rural Ind.	0.004940	-0.015247***	0.041384**	-0.003144*
	(0.006375)	(0.001820)	(0.016951)	(0.001873)
Black Share^2 x Rural Ind.	-0.000057	0.000191***	-0.001415***	0.000036
	(0.000094)	(0.000028)	(0.000538)	(0.000029)
Rural	-0.015592***	-0.004116***	-0.011131***	-0.006021***
	(0.000835)	(0.000326)	(0.001045)	(0.000364)
Midwest	0.839352***	0.604682***	0.642346***	0.439745***
	(0.042315)	(0.013812)	(0.048381)	(0.012991)
Northeast	0.189358***	0.210314***	0.023068	0.063676***
	(0.042376)	(0.013123)	(0.047956)	(0.013177)
South	0.177623***	0.028869**	0.185563***	0.147405***
	(0.038048)	(0.013553)	(0.044622)	(0.013205)
% ≥ Bachelor's	0.014506***	0.006860***	0.008014***	-0.001004**
	(0.001845)	(0.000426)	(0.001944)	(0.000410)
Per Capita Income	0.000004*	0.000003***	0.000001	0.000003***
	(0.000002)	(0.000000)	(0.000003)	(0.000000)
Gini Coefficient	0.036692***	-0.002895***	0.040656***	-0.003170***
	(0.001855)	(0.000704)	(0.002085)	(0.000673)
Unemployment Rate	-0.015143***	-0.006427***	-0.015226***	-0.001520
	(0.002098)	(0.001365)	(0.002341)	(0.001139)
Constant	-0.175492	-1.907814***	-0.173626	-1.053884***
	(0.113839)	(0.037599)	(0.132018)	(0.040729)
N	31,314	31,314	31,314	31,314
Log Likelihood	48368	48368	39052	39052

Note: Table displays coefficient estimates from the first and second stages of a Cragg-hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate.

Table B16. Partial Derivatives of 2nd Stage of Cragg-Hurdle Regression for Number of Loans Received – Before and After Feb. 24th, 2021

Loans per Employer Establishment	Before	After
White Share	-0.000571***	-0.003046***
	(0.000174)	(0.000376)
White Share^2	-0.000001	0.000006*
	(0.000002)	(0.000003)
White Share x Rural Ind.	0.000437*	-0.000050
	(0.000237)	(0.000439)
White Share^2 x Rural Ind.	0.000002	0.000022***
	(0.000002)	(0.000004)
Black Share	0.000356**	0.008748***
	(0.000179)	(0.000482)
Black Share^2	0.000008***	-0.000007
	(0.000003)	(0.000011)
Black Share x Rural Ind.	-0.002457***	-0.000191
	(0.000324)	(0.000654)
Black Share^2 x Rural Ind.	0.000031***	-0.000015
	(0.000005)	(0.000013)
Rural	-0.000954***	-0.002049***
	(0.000055)	(0.000114)
Midwest	0.115230***	0.146447***
	(0.002521)	(0.004140)
Northeast	0.038314***	0.019904***
	(0.002307)	(0.004119)
South	0.007867***	0.048536***
	(0.002354)	(0.004126)
% ≥ Bachelor's	0.001393***	-0.000158
	(0.000078)	(0.000131)
Per Capita Income	0.000001***	0.000001***
	(0.000000)	(0.000000)
Gini Coefficient	0.000148	-0.000213
	(0.000122)	(0.000207)
Unemployment Rate	-0.001332***	-0.000748**
	(0.000237)	(0.000352)
N	31,314	31,314
Mean Outcome	0.159	0.303
Log Likelihood	48368	39052

Note: Table displays derivatives of coefficient estimates from the second stage of Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate. Actual coefficient estimates are not directly interpretable, and the partial derivatives must be used instead.

Table B17. 1st and 2nd Stages of Cragg-Hurdle Regression for Mean Loan Amount per Employee – Before and After Feb. 24th, 2021

Mean Loan Amount per Employee	Before Stage 1	Before Stage 2	After Stage 1	After Stage 2
White Share	0.026***	-0.005***	0.043***	-0.011***
	(0.004)	(0.001)	(0.006)	(0.002)
White Share^2	-0.000***	0.000***	-0.000***	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
White Share x Rural Ind.	-0.004	0.006***	-0.023***	-0.002
	(0.005)	(0.002)	(0.007)	(0.002)
White Share^2 x Rural Ind.	0.000***	-0.000**	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Black Share	-0.012**	-0.007***	-0.049***	0.005***
	(0.006)	(0.001)	(0.017)	(0.002)
Black Share^2	0.000**	0.000***	0.002***	0.000***
	(0.000)	(0.000)	(0.001)	(0.000)
Black Share x Rural Ind.	0.013**	-0.010***	0.065***	0.006**
	(0.006)	(0.003)	(0.017)	(0.003)
Black Share^2 x Rural Ind.	-0.000	0.000**	-0.002***	0.000
	(0.000)	(0.000)	(0.001)	(0.000)
Rural	-0.015***	-0.001	-0.011***	0.001**
	(0.001)	(0.000)	(0.001)	(0.000)
Midwest	0.599***	0.029	0.660***	0.091***
	(0.041)	(0.023)	(0.051)	(0.021)
Northeast	0.314***	0.167***	0.123**	-0.016
	(0.044)	(0.022)	(0.050)	(0.022)
South	0.230***	-0.041*	0.251***	0.082***
	(0.040)	(0.022)	(0.047)	(0.021)
% ≥ Bachelor's	0.014***	0.005***	0.008***	-0.001
	(0.002)	(0.001)	(0.002)	(0.001)
Per Capita Income	0.000**	0.000***	-0.000	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Gini Coefficient	0.033***	-0.003**	0.041***	-0.005***
	(0.002)	(0.001)	(0.002)	(0.001)
Unemployment Rate	-0.010***	0.002	-0.014***	0.001
	(0.002)	(0.002)	(0.003)	(0.002)
Constant	0.006	6.671***	-0.040	6.961***
	(0.120)	(0.065)	(0.143)	(0.061)
N	29,787	29,787	29,787	29,787
Log Likelihood	-209277	-209277	-213962	-213962

Note: Table displays coefficient estimates from the first stage and second of a Cragg-hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate.

Table B18. Partial Derivatives of 2nd Stage of Cragg-Hurdle Regression for Mean Loan Amount per Employee – Before and After Feb. 24th, 2021

Mean Loan Amount per Employee	Before	After
White Share	-2.657	-11.587***
	(2.541)	(2.584)
White Share^2	0.013	-0.009
	(0.024)	(0.025)
White Share x Rural Ind.	8.267**	-5.789*
	(3.591)	(3.397)
White Share^2 x Rural Ind.	-0.047	0.164***
	(0.037)	(0.034)
Black Share	-13.443***	2.324
	(2.641)	(3.293)
Black Share^2	0.200***	0.400***
	(0.036)	(0.081)
Black Share x Rural Ind.	-13.756***	18.459***
	(5.248)	(5.087)
Black Share^2 x Rural Ind.	0.167**	-0.236**
	(0.082)	(0.103)
Rural	-4.302***	0.127
	(0.752)	(0.764)
Midwest	174.774***	228.334***
	(36.765)	(34.286)
Northeast	330.872***	-10.282
	(36.784)	(35.305)
South	-15.403	161.779***
	(35.906)	(33.331)
% ≥ Bachelor's	10.941***	-0.299
	(1.427)	(1.456)
Per Capita Income	0.015***	0.015***
	(0.002)	(0.002)
Gini Coefficient	2.447	-3.283*
	(2.076)	(1.900)
Unemployment Rate	0.765	-0.573
	(3.798)	(2.996)
N	29,787	29,787
Mean Outcome	1,499.87	1,622.50
Log Likelihood	-209277	-213962

Note: Table displays derivatives of coefficient estimates from the second stage of Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate. Actual coefficient estimates are not directly interpretable, and the partial derivatives must be used instead.

Table B19. 1st Stage of Cragg-Hurdle Regression for Number of Loans Received – First Four Periods

Loans per Employer Establishment	Period -3	Period -2	Period -1	Period 0
White Share	0.024035***	0.028955***	0.026977***	0.030588***
	(0.003374)	(0.003538)	(0.003480)	(0.003357)
White Share^2	-0.000288***	-0.000326***	-0.000303***	-0.000346***
	(0.000036)	(0.000038)	(0.000037)	(0.000036)
White Share x Rural Ind.	-0.003390	-0.002368	-0.006432*	-0.014178***
	(0.003592)	(0.003827)	(0.003727)	(0.003611)
White Share^2 x Rural Ind.	0.000114***	0.000108***	0.000147***	0.000223***
	(0.000039)	(0.000041)	(0.000040)	(0.000039)
Black Share	0.003145	-0.004396	0.003351	0.002446
	(0.004535)	(0.004676)	(0.004861)	(0.004833)
Black Share^2	-0.000010	0.000113*	0.000024	0.000031
	(0.000064)	(0.000068)	(0.000069)	(0.000071)
Black Share x Rural Ind.	-0.010812**	-0.000000	0.005295	0.007665
	(0.005148)	(0.005380)	(0.005497)	(0.005471)
Black Share^2 x Rural Ind.	0.000037	-0.000050	-0.000091	-0.000124
	(0.000076)	(0.000080)	(0.000080)	(0.000082)
Rural	-0.015766***	-0.014650***	-0.015603***	-0.013948***
	(0.000685)	(0.000725)	(0.000703)	(0.000688)
Midwest	1.050265***	0.906979***	0.715828***	0.776567***
	(0.032892)	(0.035533)	(0.033736)	(0.032479)
Northeast	0.324439***	0.152182***	-0.032039	-0.013462
	(0.034097)	(0.036058)	(0.034478)	(0.033238)
South	0.265463***	0.224175***	0.082513***	0.227315***
	(0.030236)	(0.032562)	(0.031660)	(0.030798)
% ≥ Bachelor's	0.014412***	0.015878***	0.013808***	0.011236***
	(0.001252)	(0.001419)	(0.001291)	(0.001210)
Per Capita Income	0.000001	0.000001	-0.000002	-0.000000
	(0.000002)	(0.000002)	(0.000002)	(0.000001)
Gini Coefficient	0.033887***	0.035479***	0.033380***	0.034916***
	(0.001446)	(0.001584)	(0.001495)	(0.001473)
Unemployment Rate	-0.017128***	-0.016809***	-0.018534***	-0.017294***
	(0.001798)	(0.001870)	(0.001907)	(0.001935)
Constant	-0.452622***	-0.423535***	-0.152650*	-0.422696***
	(0.090847)	(0.096747)	(0.092018)	(0.090628)
N	31,314	31,314	31,314	31,314
Log Likelihood	59744	61206	66795	68782

Note: Table displays coefficient estimates from the first stage of a Cragg-hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate.

Table B20. 1st Stage of Cragg-Hurdle Regression for Number of Loans Received – Last Three Periods

Loans per Employer Establishment	Period 1	Period 2	Period 3
White Share	0.033884***	0.035786***	0.034694***
	(0.003566)	(0.003562)	(0.003348)
White Share^2	-0.000378***	-0.000398***	-0.000385***
	(0.000038)	(0.000038)	(0.000036)
White Share x Rural Ind.	-0.011831***	-0.014676***	-0.015778***
	(0.003837)	(0.003823)	(0.003587)
White Share^2 x Rural Ind.	0.000210***	0.000244***	0.000246***
	(0.000041)	(0.000041)	(0.000038)
Black Share	-0.005580	0.000105	0.007777
	(0.005099)	(0.005098)	(0.004975)
Black Share^2	0.000156*	0.000113	0.000009
	(0.000081)	(0.000078)	(0.000070)
Black Share x Rural Ind.	0.014536**	0.012728**	0.009626*
	(0.005781)	(0.005825)	(0.005623)
Black Share^2 x Rural Ind.	-0.000225**	-0.000187**	-0.000139*
	(0.000091)	(0.000090)	(0.000081)
Rural	-0.014050***	-0.013442***	-0.014035***
	(0.000727)	(0.000723)	(0.000681)
Midwest	0.835660***	0.775313***	0.760297***
	(0.034700)	(0.034270)	(0.031670)
Northeast	0.085098**	0.080094**	0.027592
	(0.035229)	(0.034921)	(0.032901)
South	0.290588***	0.277971***	0.362073***
	(0.032605)	(0.032467)	(0.030619)
% ≥ Bachelor's	0.011602***	0.010594***	0.008000***
	(0.001327)	(0.001277)	(0.001134)
Per Capita Income	-0.000001	-0.000002*	-0.000002
	(0.000002)	(0.000001)	(0.000001)
Gini Coefficient	0.035573***	0.037186***	0.036036***
	(0.001556)	(0.001567)	(0.001432)
Unemployment Rate	-0.016261***	-0.016426***	-0.015533***
	(0.001916)	(0.001988)	(0.001801)
Constant	-0.364132***	-0.435273***	-0.533324***
	(0.096834)	(0.094884)	(0.089488)
N	31,314	31,314	31,314
Log Likelihood	66689	64772	11355

Note: Table displays coefficient estimates from the first stage of a Cragg-hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate.

Table B21. 2nd Stage of Cragg-Hurdle Regression for Number of Loans Received – First Four Periods

Loans per Employer Establishment	Period -3	Period -2	Period -1	Period 0
White Share	-0.002010*	-0.007232***	-0.011450***	-0.012730***
	(0.001102)	(0.000959)	(0.001021)	(0.001062)
White Share^2	0.000017	0.000024***	0.000056***	0.000057***
	(0.000010)	(0.000009)	(0.000009)	(0.000010)
White Share x Rural Ind.	0.002254	-0.000476	-0.002466*	-0.004535***
	(0.001795)	(0.001434)	(0.001468)	(0.001532)
White Share^2 x Rural Ind.	-0.000023	0.000030**	0.000058***	0.000081***
	(0.000018)	(0.000014)	(0.000015)	(0.000015)
Black Share	-0.000141	0.002281**	0.008984***	0.008479***
	(0.001108)	(0.000946)	(0.001042)	(0.001124)
Black Share^2	0.000025*	0.000031**	-0.000008	0.000005
	(0.000014)	(0.000013)	(0.000015)	(0.000016)
Black Share x Rural Ind.	-0.027419***	-0.017508***	-0.005686***	-0.001351
	(0.002660)	(0.001995)	(0.002061)	(0.002102)
Black Share^2 x Rural Ind.	0.000392***	0.000230***	0.000072**	0.000007
	(0.000045)	(0.000031)	(0.000032)	(0.000032)
Rural	-0.000363	-0.002316***	-0.002910***	-0.000821**
	(0.000405)	(0.000339)	(0.000349)	(0.000352)
Midwest	0.685658***	0.465805***	0.227445***	0.272750***
	(0.016911)	(0.014749)	(0.014861)	(0.015165)
Northeast	0.396190***	0.134546***	0.056705***	0.045774***
	(0.016274)	(0.014172)	(0.014638)	(0.015151)
South	0.097446***	0.013807	-0.137890***	0.004995
	(0.016922)	(0.014111)	(0.014255)	(0.014556)
% ≥ Bachelor's	0.007316***	0.005911***	0.004562***	0.001944***
	(0.000516)	(0.000484)	(0.000559)	(0.000626)
Per Capita Income	0.000001**	0.000004***	0.000006***	0.000006***
	(0.000001)	(0.000001)	(0.000001)	(0.000001)
Gini Coefficient	-0.006387***	-0.005840***	-0.010100***	-0.009489***
	(0.000915)	(0.000779)	(0.000827)	(0.000880)
Unemployment Rate	-0.004836**	-0.004105***	0.001011	-0.000418
	(0.002005)	(0.001559)	(0.001721)	(0.001624)
Constant	-3.353131***	-2.558446***	-2.557411***	-2.799289***
	(0.046469)	(0.039866)	(0.042310)	(0.043520)
N	31,314	31,314	31,314	31,314
Log Likelihood	59744	61206	66795	68782

Note: Table displays coefficient estimates from the second stage of Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate.

Table B22. 2nd Stage of Cragg-Hurdle Regression for Number of Loans Received – Last Three Periods

Loans per Employer Establishment	Period 1	Period 2	Period 3
White Share	-0.015553***	-0.017816***	-0.020716***
	(0.001032)	(0.001159)	(0.001262)
White Share^2	0.000087***	0.000104***	0.000106***
	(0.000010)	(0.000011)	(0.000012)
White Share x Rural Ind.	-0.003422**	-0.001859	-0.002553
	(0.001432)	(0.001511)	(0.001678)
White Share^2 x Rural Ind.	0.000070***	0.000059***	0.000075***
	(0.000014)	(0.000015)	(0.000017)
Black Share	0.011080***	0.026295***	0.037176***
	(0.001088)	(0.001267)	(0.001371)
Black Share^2	-0.000009	-0.000098***	-0.000196***
	(0.000015)	(0.000018)	(0.000019)
Black Share x Rural Ind.	0.000225	-0.010238***	-0.013619***
	(0.001940)	(0.002071)	(0.002256)
Black Share^2 x Rural Ind.	-0.000019	0.000089***	0.000131***
	(0.000029)	(0.000031)	(0.000033)
Rural	-0.001653***	-0.001475***	-0.001897***
	(0.000340)	(0.000357)	(0.000390)
Midwest	0.304879***	0.316870***	0.304832***
	(0.014386)	(0.015022)	(0.016601)
Northeast	0.086141***	0.039444***	0.047428***
	(0.014470)	(0.015145)	(0.016919)
South	0.075711***	0.095126***	0.155632***
	(0.013955)	(0.014652)	(0.016258)
% ≥ Bachelor's	0.001570***	-0.000990**	-0.004373***
	(0.000509)	(0.000493)	(0.000604)
Per Capita Income	0.000004***	0.000002***	0.000004***
	(0.000001)	(0.000001)	(0.000001)
Gini Coefficient	-0.009325***	-0.009257***	-0.013509***
	(0.000781)	(0.000816)	(0.000935)
Unemployment Rate	-0.000854	0.000421	0.007129***
	(0.001592)	(0.001492)	(0.001658)
Constant	-2.342284***	-2.276563***	-2.358798***
	(0.041150)	(0.044836)	(0.050580)
N	31,314	31,314	31,314
Log Likelihood	66689	64772	11355

Note: Table displays coefficient estimates from the second stage of Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate.

Table B23. Partial Derivatives of 2nd Stage of Cragg-Hurdle Regression for Number of Loans Received – First Four Periods

Loans per Employer Establishment	Period -3	Period -2	Period -1	Period 0
White Share	0.000191***	-0.000128	-0.000249***	-0.000176***
	(0.000066)	(0.000080)	(0.000059)	(0.000052)
White Share^2	-0.000003***	-0.000003***	-0.000001	-0.000001**
	(0.000001)	(0.000001)	(0.000001)	(0.000001)
White Share x Rural Ind.	0.000066	-0.000063	-0.000181**	-0.000309***
	(0.000094)	(0.000110)	(0.000078)	(0.000067)
White Share^2 x Rural Ind.	0.000000	0.000003***	0.000004***	0.000005***
	(0.000001)	(0.000001)	(0.000001)	(0.000001)
Black Share	0.000031	0.000101	0.000450***	0.000341***
	(0.000075)	(0.000090)	(0.000070)	(0.000063)
Black Share^2	0.000001	0.000004***	-0.000000	0.000001
	(0.000001)	(0.000001)	(0.000001)	(0.000001)
Black Share x Rural Ind.	-0.001425***	-0.001213***	-0.000208*	0.000025
	(0.000142)	(0.000156)	(0.000111)	(0.000095)
Black Share^2 x Rural Ind.	0.000019***	0.000015***	0.000002	-0.000001
	(0.000002)	(0.000002)	(0.000002)	(0.000001)
Rural	-0.000205***	-0.000349***	-0.000297***	-0.000168***
	(0.000020)	(0.000024)	(0.000017)	(0.000014)
Midwest	0.044904***	0.043940***	0.017969***	0.017836***
	(0.000947)	(0.001146)	(0.000776)	(0.000654)
Northeast	0.022590***	0.011279***	0.002289***	0.001581**
	(0.000891)	(0.001083)	(0.000766)	(0.000655)
South	0.007763***	0.003841***	-0.005517***	0.002420***
	(0.000890)	(0.001063)	(0.000741)	(0.000626)
% ≥ Bachelor's	0.000517***	0.000614***	0.000355***	0.000183***
	(0.000029)	(0.000038)	(0.000029)	(0.000026)
Per Capita Income	0.000000**	0.000000***	0.000000***	0.000000***
	(0.000000)	(0.000000)	(0.000000)	(0.000000)
Gini Coefficient	0.000101**	0.000052	-0.000120***	-0.000012
	(0.000048)	(0.000059)	(0.000043)	(0.000037)
Unemployment Rate	-0.000432***	-0.000501***	-0.000146*	-0.000186***
	(0.000103)	(0.000116)	(0.000088)	(0.000068)
N	31,314	31,314	31,314	31,314
Mean Outcome	0.046	0.067	0.045	0.037
Log Likelihood	59744	61206	66795	68782

Note: Table displays derivatives of coefficient estimates from the second stage of Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate. Actual coefficient estimates are not directly interpretable, and the partial derivatives must be used instead.

Table B24. Partial Derivatives of 2nd Stage of Cragg-Hurdle Regression for Number of Loans Received – Last Three Periods

Loans per Employer Establishment	Period 1	Period 2	Period 3
White Share	-0.000486***	-0.000673***	-0.000561***
	(0.000072)	(0.000085)	(0.000067)
White Share^2	0.000001	0.000002*	0.000001
	(0.000001)	(0.000001)	(0.000001)
White Share x Rural Ind.	-0.000332***	-0.000297***	-0.000281***
	(0.000092)	(0.000105)	(0.000083)
White Share^2 x Rural Ind.	0.000006***	0.000007***	0.000006***
	(0.000001)	(0.000001)	(0.000001)
Black Share	0.000563***	0.001645***	0.001746***
	(0.000086)	(0.000102)	(0.000082)
Black Share^2	0.000001	-0.000005***	-0.000009***
	(0.000001)	(0.000001)	(0.000001)
Black Share x Rural Ind.	0.000182	-0.000483***	-0.000508***
	(0.000130)	(0.000149)	(0.000118)
Black Share^2 x Rural Ind.	-0.000004*	0.000003	0.000004**
	(0.000002)	(0.000002)	(0.000002)
Rural	-0.000257***	-0.000258***	-0.000233***
	(0.000020)	(0.000023)	(0.000018)
Midwest	0.027003***	0.029349***	0.021670***
	(0.000902)	(0.001027)	(0.000820)
Northeast	0.005870***	0.003451***	0.002414***
	(0.000914)	(0.001040)	(0.000837)
South	0.007673***	0.009367***	0.010788***
	(0.000874)	(0.001001)	(0.000803)
% ≥ Bachelor's	0.000224***	0.000068*	-0.000111***
	(0.000033)	(0.000035)	(0.000030)
Per Capita Income	0.000000***	0.000000***	0.000000***
	(0.000000)	(0.000000)	(0.000000)
Gini Coefficient	-0.000114**	-0.000121**	-0.000224***
	(0.000049)	(0.000055)	(0.000045)
Unemployment Rate	-0.000238**	-0.000176*	0.000155*
	(0.000098)	(0.000099)	(0.000080)
N	31,314	31,314	31,314
Mean Outcome	0.056	0.063	0.045
Log Likelihood	66689	64772	11355

Note: Table displays derivatives of coefficient estimates from the second stage of Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate. Actual coefficient estimates are not directly interpretable, and the partial derivatives must be used instead.

Table B25. 1st Stage of Cragg-Hurdle Regression for Mean Loan Amount per Employee – First Four Periods

Mean Loan Amount per Employee	Period -3	Period -2	Period -1	Period 0
White Share	0.021***	0.027***	0.023***	0.027***
	(0.003)	(0.004)	(0.004)	(0.003)
White Share^2	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
White Share x Rural Ind.	-0.004	-0.007*	-0.009**	-0.014***
	(0.004)	(0.004)	(0.004)	(0.004)
White Share^2 x Rural Ind.	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Black Share	0.003	-0.010**	0.001	-0.002
	(0.004)	(0.005)	(0.005)	(0.005)
Black Share^2	-0.000	0.000***	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Black Share x Rural Ind.	-0.006	0.008	0.012**	0.012**
	(0.005)	(0.005)	(0.006)	(0.005)
Black Share^2 x Rural Ind.	-0.000	-0.000*	-0.000**	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Rural	-0.017***	-0.015***	-0.017***	-0.016***
	(0.001)	(0.001)	(0.001)	(0.001)
Midwest	0.585***	0.567***	0.360***	0.521***
	(0.032)	(0.034)	(0.033)	(0.032)
Northeast	0.372***	0.304***	0.109***	0.165***
	(0.035)	(0.037)	(0.036)	(0.034)
South	0.258***	0.255***	0.097***	0.272***
	(0.031)	(0.034)	(0.033)	(0.032)
% ≥ Bachelor's	0.014***	0.015***	0.014***	0.012***
	(0.001)	(0.001)	(0.001)	(0.001)
Per Capita Income	0.000	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Gini Coefficient	0.029***	0.031***	0.030***	0.031***
	(0.002)	(0.002)	(0.002)	(0.002)
Unemployment Rate	-0.011***	-0.011***	-0.013***	-0.014***
	(0.002)	(0.002)	(0.002)	(0.002)
Constant	-0.223**	-0.203**	0.028	-0.196**
	(0.094)	(0.099)	(0.096)	(0.093)
N	29,787	29,787	29,787	29,787
Log Likelihood	-157966	-172278	-152206	-139513

Note: Table displays coefficient estimates from the first stage of a Cragg-hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate.

Table B26. 1st Stage of Cragg-Hurdle Regression for Mean Loan Amount per Employee – Last Three Periods

Mean Loan Amount per Employee	Period 1	Period 2	Period 3
White Share	0.034***	0.033***	0.032***
	(0.004)	(0.004)	(0.003)
White Share^2	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)
White Share x Rural Ind.	-0.018***	-0.017***	-0.018***
	(0.004)	(0.004)	(0.004)
White Share^2 x Rural Ind.	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
Black Share	-0.013**	-0.004	0.004
	(0.005)	(0.005)	(0.005)
Black Share^2	0.000***	0.000*	0.000
	(0.000)	(0.000)	(0.000)
Black Share x Rural Ind.	0.022***	0.017***	0.016***
	(0.006)	(0.006)	(0.006)
Black Share^2 x Rural Ind.	-0.000***	-0.000**	-0.000**
	(0.000)	(0.000)	(0.000)
Rural	-0.014***	-0.014***	-0.015***
	(0.001)	(0.001)	(0.001)
Midwest	0.732***	0.612***	0.508***
	(0.035)	(0.034)	(0.032)
Northeast	0.199***	0.144***	0.085**
	(0.036)	(0.036)	(0.034)
South	0.384***	0.327***	0.391***
	(0.034)	(0.034)	(0.032)
% ≥ Bachelor's	0.012***	0.012***	0.008***
	(0.001)	(0.001)	(0.001)
Per Capita Income	-0.000*	-0.000**	-0.000***
	(0.000)	(0.000)	(0.000)
Gini Coefficient	0.032***	0.033***	0.034***
	(0.002)	(0.002)	(0.002)
Unemployment Rate	-0.013***	-0.012***	-0.013***
	(0.002)	(0.002)	(0.002)
Constant	-0.189*	-0.210**	-0.328***
	(0.101)	(0.100)	(0.093)
N	29,787	29,787	29,787
Log Likelihood	-161732	-157120	-134753

Note: Table displays coefficient estimates from the first stage of a Cragg-hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate.

Table B27. 2nd Stage of Cragg-Hurdle Regression for Mean Loan Amount per Employee – First Four Periods

Mean Loan Amount per Employee	Period -3	Period -2	Period -1	Period 0
White Share	0.004**	-0.005***	-0.010***	-0.012***
	(0.002)	(0.002)	(0.002)	(0.002)
White Share^2	0.000	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
White Share x Rural Ind.	0.008**	0.006**	-0.001	-0.005*
	(0.003)	(0.003)	(0.003)	(0.003)
White Share^2 x Rural Ind.	-0.000**	-0.000	0.000	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Black Share	-0.007***	-0.004**	-0.003	-0.005**
	(0.002)	(0.002)	(0.002)	(0.002)
Black Share^2	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Black Share x Rural Ind.	-0.028***	-0.013***	-0.004	-0.000
	(0.005)	(0.004)	(0.004)	(0.004)
Black Share^2 x Rural Ind.	0.000***	0.000***	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Rural	0.001*	-0.001	-0.001	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)
Midwest	0.238***	-0.165***	-0.299***	-0.149***
	(0.029)	(0.026)	(0.028)	(0.028)
Northeast	0.278***	0.009	-0.010	-0.032
	(0.028)	(0.026)	(0.028)	(0.028)
South	0.034	-0.111***	-0.232***	-0.079***
	(0.028)	(0.024)	(0.026)	(0.026)
% ≥ Bachelor's	0.004***	0.005***	0.005***	0.002*
	(0.001)	(0.001)	(0.001)	(0.001)
Per Capita Income	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Gini Coefficient	-0.011***	-0.006***	-0.010***	-0.012***
	(0.002)	(0.002)	(0.002)	(0.002)
Unemployment Rate	0.003	0.006*	0.007**	0.002
	(0.004)	(0.003)	(0.003)	(0.003)
Constant	5.388***	5.953***	5.773***	5.466***
	(0.084)	(0.076)	(0.079)	(0.080)
N	29,787	29,787	29,787	29,787
Log Likelihood	-157966	-172278	-152206	-139513

Note: Table displays coefficient estimates from the second stage of Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate.

Table B28. 2nd Stage of Cragg-Hurdle Regression for Mean Loan Amount per Employee – Last Three Periods

Mean Loan Amount per Employee	Period 1	Period 2	Period 3
White Share	-0.013***	-0.013***	-0.015***
	(0.002)	(0.002)	(0.002)
White Share^2	0.000**	0.000***	0.000**
	(0.000)	(0.000)	(0.000)
White Share x Rural Ind.	-0.007***	-0.009***	-0.010***
	(0.003)	(0.003)	(0.003)
White Share^2 x Rural Ind.	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
Black Share	-0.004**	0.007***	0.017***
	(0.002)	(0.002)	(0.002)
Black Share^2	0.000***	0.000***	0.000
	(0.000)	(0.000)	(0.000)
Black Share x Rural Ind.	-0.001	-0.000	0.004
	(0.004)	(0.004)	(0.004)
Black Share^2 x Rural Ind.	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Rural	0.002***	0.005***	0.005***
	(0.001)	(0.001)	(0.001)
Midwest	0.026	-0.000	-0.007
	(0.027)	(0.027)	(0.029)
Northeast	0.013	-0.108***	-0.095***
	(0.027)	(0.027)	(0.030)
South	0.045*	0.000	0.071***
	(0.025)	(0.025)	(0.028)
% ≥ Bachelor's	0.001	-0.002	-0.006***
	(0.001)	(0.001)	(0.001)
Per Capita Income	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
Gini Coefficient	-0.011***	-0.012***	-0.017***
	(0.002)	(0.002)	(0.002)
Unemployment Rate	-0.003	0.005**	0.008**
	(0.003)	(0.003)	(0.003)
Constant	5.823***	5.590***	5.311***
	(0.075)	(0.076)	(0.083)
N	29,787	29,787	29,787
Log Likelihood	-161732	-157120	-134753

Note: Table displays coefficient estimates from the second stage of Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate.

Table B29. Partial Derivatives of 2nd Stage of Cragg-Hurdle Regression for Mean Loan Amount per Employee – First Four Periods

Mean Loan Amount per Employee	Period -3	Period -2	Period -1	Period 0
White Share	5.795***	0.838	-1.264	-0.638
	(1.181)	(1.190)	(0.769)	(0.520)
White Share^2	-0.040***	-0.022*	-0.008	-0.014***
	(0.011)	(0.012)	(0.008)	(0.005)
White Share x Rural Ind.	3.288*	2.594	-1.293	-2.286***
	(1.725)	(1.701)	(1.120)	(0.725)
White Share^2 x Rural Ind.	-0.021	-0.006	0.032***	0.037***
	(0.018)	(0.017)	(0.012)	(0.008)
Black Share	-3.001**	-4.149***	-0.933	-1.200**
	(1.297)	(1.272)	(0.853)	(0.593)
Black Share^2	0.044**	0.067***	0.032***	0.028***
	(0.017)	(0.018)	(0.012)	(0.008)
Black Share x Rural Ind.	-15.758***	-6.738***	-0.215	1.016
	(2.699)	(2.497)	(1.651)	(1.038)
Black Share^2 x Rural Ind.	0.201***	0.082**	0.010	-0.012
	(0.044)	(0.039)	(0.026)	(0.016)
Rural	-2.364***	-2.764***	-2.050***	-0.697***
	(0.357)	(0.355)	(0.229)	(0.150)
Midwest	230.961***	-15.950	-71.017***	8.766
	(16.461)	(16.838)	(11.041)	(6.966)
Northeast	212.814***	52.220***	7.978	6.397
	(16.490)	(16.912)	(10.873)	(7.082)
South	64.831***	-30.416*	-74.913***	4.417
	(15.988)	(16.007)	(10.416)	(6.623)
% ≥ Bachelor's	4.845***	5.641***	3.346***	1.522***
	(0.570)	(0.709)	(0.456)	(0.317)
Per Capita Income	0.003***	0.006***	0.004***	0.003***
	(0.001)	(0.001)	(0.001)	(0.000)
Gini Coefficient	-0.353	0.778	-0.379	-0.231
	(0.916)	(1.003)	(0.643)	(0.429)
Unemployment Rate	-0.232	1.731	1.007	-0.761
	(1.987)	(1.842)	(1.240)	(0.758)
N	29,787	29,787	29,787	29,787
Mean Outcome	524.39	607.85	367.63	253.48
Log Likelihood	-157966	-172278	-152206	-139513

Note: Table displays derivatives of coefficient estimates from the second stage of Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate. Actual coefficient estimates are not directly interpretable, and the partial derivatives must be used instead.

Table B30. Partial Derivatives of 2nd Stage of Cragg-Hurdle Regression for Mean Loan Amount per Employee – Last Three Periods

Mean Loan Amount per Employee	Period 1	Period 2	Period 3
White Share	-1.380*	-1.278*	-0.678
	(0.771)	(0.672)	(0.436)
White Share^2	-0.023***	-0.018***	-0.016***
	(0.008)	(0.007)	(0.004)
White Share x Rural Ind.	-4.456***	-4.388***	-3.127***
	(1.075)	(0.938)	(0.602)
White Share^2 x Rural Ind.	0.077***	0.069***	0.050***
	(0.011)	(0.010)	(0.006)
Black Share	-2.980***	1.840**	3.518***
	(0.866)	(0.764)	(0.516)
Black Share^2	0.064***	0.037***	0.003
	(0.013)	(0.011)	(0.007)
Black Share x Rural Ind.	1.788	1.460	1.737**
	(1.477)	(1.288)	(0.839)
Black Share^2 x Rural Ind.	-0.010	-0.004	-0.009
	(0.023)	(0.020)	(0.012)
Rural	-0.793***	0.217	-0.087
	(0.233)	(0.198)	(0.125)
Midwest	83.578***	55.023***	32.774***
	(10.582)	(9.130)	(5.987)
Northeast	25.067**	-22.054**	-12.402**
	(10.871)	(9.436)	(6.125)
South	55.626***	29.571***	39.764***
	(10.210)	(8.803)	(5.706)
% ≥ Bachelor's	1.481***	0.533	-0.682**
	(0.481)	(0.370)	(0.271)
Per Capita Income	0.004***	0.003***	0.002***
	(0.001)	(0.000)	(0.000)
Gini Coefficient	-0.850	-0.962*	-1.012***
	(0.611)	(0.517)	(0.343)
Unemployment Rate	-2.444**	0.620	0.600
	(1.022)	(0.853)	(0.621)
N	29,787	29,787	29,787
Mean Outcome	408.04	354.57	205.29
Log Likelihood	-161732	-157120	-134753

Note: Table displays derivatives of coefficient estimates from the second stage of Cragg-Hurdle regression with * denoting p<0.1, ** denoting p<0.05, and *** denoting p<0.01. Robust standard errors are shown in parentheses below each coefficient estimate. Actual coefficient estimates are not directly interpretable, and the partial derivatives must be used instead.