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Evaluating the Economic Impact of Tax Refunds: Evidence from UNC Asheville's IRS VITA Program

Quinn Jacquez

Department of Economics
The University of North Carolina Asheville
One University Heights
Asheville, North Carolina 28804 USA

Faculty Mentor: Dr. Muhammad Nawaz

Abstract

This paper estimates the local economic impact of tax refunds distributed through an IRS VITA (Volunteer Income Tax Assistance) site, a federal program that enables mostly low-income taxpayers to have their yearly tax filing done for free. Accordingly, tax refunds soured from VITA are expected to behave as positive income shocks, while the program's eligibility requirements suggest participants will have a high marginal propensity to consume. As a result, transfer payments given to program participants may generate a strong multiplier effect, where increased spending stimulates and recirculates through the local economy. This study uses data from an IRS VITA site in Asheville, NC, covering tax refunds, tax credit claims, the claimed number of dependents, and taxpayer adjusted gross income (n = 573). This study then draws from existing economic literature to assign marginal propensity to consume metrics corresponding to the adjusted gross income of the individuals who received refunds. Conjoining the two data sets together, I employ a classic Keynesian multiplier model to create an estimate of the VITA program's local economic impact. Additionally, this paper incorporates a regression analysis to examine

the relationship between income, refundable tax credits, dependents, and refund amounts. The results estimate VITA-generated refunds produce a local multiplier of 2.71 in Buncombe County, with robustness checks by utilizing yielding a range of 1.58 to 5.86. This finding suggests that increasing VITA participation by eligible taxpayers may be a cost-effective mechanism to stimulate a local economy.

Introduction

The Internal Revenue Service (IRS) first established the VITA (Volunteer Income Tax Assistance) program in 1969, under the Tax Reform Act (IRS, 2021). The law intended to facilitate an increase in citizen tax knowledge by providing free, convenient tax services to underserved communities (IRS, 2025). Once implemented, the program was left untouched for an extended period before being revitalized in 2007 through the VITA Grant Program, which helped further the mission to assist underserved communities (IRS, 2025). In 2019, the VITA Permanence Act cemented the grant's continuation to serve communities in need (VITA Grant Program, 2021). To volunteer at a VITA site as a tax preparer, individuals must pass the IRS's certification exam at either the advanced or beginner level to verify their ability to accurately file tax returns. Although volunteering is not exclusive to students, universities often extend this program as a real-world learning experience for students to give back to the local community in exchange for college credits (Gleim Productions, 2025). Under this structure, VITA is a mutually beneficial program; taxpayers avoid costly filing fees while volunteers acquire real tax experience. In the program's first year, VITA totaled seventy-five hundred volunteers who used paper and pencil to prepare over one hundred thousand returns nationwide (IRS, 2021). Modernly, there are more than eighty thousand IRS-certified tax preparers and eleven thousand sites, preparing a total of three and a half million returns each year electronically through tax software (IRS, 2021). Despite the program's nationwide reach, very few projects have conducted an economic analysis of a VITA site, while none have estimated its economic impact on the community it serves. This paper seeks to fill this gap by being the first to quantify the multiplier effect stemming from free tax refunds provided by a VITA site. By doing so, this project will solve currently unknown questions, such as: (i) To what extent can an IRS VITA site stimulate the local economy? (ii) What is the local impact of transfer payments received through fiscal intervention?

To qualify for the VITA program's services, individuals must be disabled, of middle to lowincome, have low English proficiency, or be elderly (IRS, 2021). From an accountant's perspective, this means there will be many eligible clients, and the VITA site may be a busy program. To an economist, this means theoretically many of the community participants will have a high marginal propensity to consume (Parker et al., 2011). For this reason, the

ripple effect of the tax refunds, or in economic language, one-time transfer payments, sourced from VITA sites, may be significantly larger than the lump sum amount received. All taxpayers who utilize the program incur zero filing fees and often receive refund checks through fully or partially refundable tax credits such as the earned income credit (EIC) , child tax credit (CTC) , and American opportunity tax credit (AOTC) . Keeping in mind program participants will have a theoretically high marginal propensity to consume (MPC), this project hypothesizes that the refunds received may have a significant impact on the local economy. This hypothesis implies the program's value may extend beyond a mere tax service to a mechanism of economic stimulation. Using VITA site data provided by the UNC Asheville Department of Business, for the city of Asheville, North Carolina, for the years 2023 - 2025, this project's approach first assesses the total refunds sourced from the Asheville site to then be plugged into a Keynesian multiplier (Keynes, 1936). For the multiplier, MPC value is implemented for each taxpayer according to their income based on medians from existing economic literature (Parker et al., 2008; Kaplan et al., 2014; and Kueng, 2018). This model then generates a baseline numeric value for the program's stimulus on local economic activity.

Next, a robustness check is executed by implementing the lowest and highest end of the MPC ranges pulled from prior literature. The low-end of the MPC ranges is called the conservative MPC, while the highest end of the ranges is labeled the generous MPC. This approach forms a range of the program’s impact rather than one single estimate to ensure a thorough analysis. This methodology is repeated for each year of available site data, creating a by-year and total estimate for the VITA site’s economic benefit to the local community, rooted in a classic Keynesian multiplier analysis (Keynes, 1936).

Lastly, this paper employs regression analysis on the tax data provided by the VITA site to illustrate the relationship between tax refunds and key taxpayer characteristics and tax credits. Specifically, refunds are regressed on adjusted gross income, the additional child tax credit, the earned income tax credit, education tax credits, and the number of dependents. A second regression is used where adjusted gross income is split by income brackets, with the rest of the variables remaining the same. This specification is implemented to isolate how income levels and taxpayer household structure impact tax credit usage and shape tax refund outcomes.

This study yields benefits to taxpayers and policy makers alike by using real tax data to evaluate the economic implications of a VITA site and refundable tax credits as they pertain to a local economy. By connecting real refund data with an economic multiplier, this study may help policy makers, nonprofits, and taxpayers understand the broader economic return of fiscal policy intended to uplift low and moderate-income taxpayers. The findings uncovered by this project may also guide a more efficient tax policy, allocation of public resources, and inform outreach efforts aimed at increasing tax credit uptake.

Overall, this project contributes to a clearer understanding of the real-world effect that tax policy, and more broadly, fiscal policy, can have on household spending and economic growth at the local level.

Although the economic and tax fields have substantial theoretical overlaps, the two are often treated as independent fields of study. Economic theory informs the design of tax policy, while the practice of tax accounting provides direct evidence for how policy influences consumer behavior. It follows that insights gathered from these two fields can be mutually enriching, forming a deeper analysis. This paper's main objective is to be the first to quantify a range of economic impacts stemming from tax returns provided by Asheville's VITA site. However, beyond this main objective, this paper has implications for many sectors within both economic and tax literature. This project aims to contribute to both literatures in three keyways.

First, by assessing the Asheville site, this study provides similar-sized communities that participate in the VITA program with a framework to estimate the economic impact of a site in their community. Second, these insights may incentivize volunteer efforts and taxpayer participation, which further increases the impact VITA has on local economies across the nation. Third, findings produced from this paper may serve as a useful case study for refining future tax policy or law making.

This paper is unique in the fact that its tax refund observations, credit usage, and taxpayer income observations are real and not imputed. Meaning the findings from this study are not purely theoretical but backed by real-world impact. With greater evidence of fiscal policy's interworking within an economy, future policymakers may gain insights that support policy expansion or adjustment, thereby improving tax efficiency. For example, the insights from this project may support expanding the criteria to qualify for the earned income credit or increasing the refundable portion of the child tax credit, helping future policymakers design more efficient policies towards combating poverty and improving economic well-being.

This study consists of five sections, where the second section explores existing literature on the topic, while the third dives into the data, variables, and methodology used in this project. The fourth section analyzes the results, with the fifth holding the concluding remarks and policy interpretations.

Literature Review

Some researchers have begun conducting similar tax-related research through the VITA program. Most relevantly, Abed and Robison-Foster (2024) led a case study on taxpayer satisfaction from an IRS Vita Site. The pair found that 92.4% of taxpayers utilizing the University of the District of Columbia site were satisfied with their tax filing based on a

twenty-two-paragraph survey. These results indicate a program of high quality, reflecting the effectiveness of the VITA certification process in developing well-abled tax preparers. A second VITA-centered study by Collins and Porto (2017) used two VITA sites to determine how middle to low-income taxpayers' refund expectations influenced the likelihood they would save in middle to low-income taxpayers. The project first sought to establish if taxpayers have an expectation towards their refund, and if so, how the expectation correlated with saving behavior. The study found most taxpayers did not have an estimate of their refund before the filing process; however, those small few with an estimation tended to be fairly accurate in their best guesses. Additionally, those with an estimate displayed a higher tendency to save part of their refund, suggesting the planning behind the filing process may be associated with saving behavior. Similar to Abed and Robinson-Foster (2024), this study uses the VITA site to collect and analyze economic information and not assess the value of a VITA program itself.

On the tax side of the literature, Goodman-Bacon and McGranahan (2008) investigated how recipients of the earned income tax credit allocate the tax refund they received. The paper used the Consumer Expenditure Survey, over the years 1997 to 2006, to examine the size and timing of refunds to identify changes between EITC-eligible and EITC-ineligible households. The pair found that the lump sum amount received from the EITC was often immediately spent, with the largest response for non-everyday goods such as vehicle purchases and transportation spending. Their insights are crucial to this paper, as they underscore the high marginal propensity to consume observed in EITC recipients. Building off this work, Parker et al. (2008) reviewed how the one-time tax rebate of 2008 impacted consumer spending. They employed special questions added to the Consumer Expenditure Survey and variation in receipt timing to uncover a potential causal relationship between the stimulus payments and the change in consumption. The group found that on average, 50-90% of the stimulus was spent on non-everyday goods, with the primary composition being vehicles and vehicle-related services, like Goodman-Bacon and McGranahan (2008). This spending effect was found to be larger for groups that were older, low-income, or homeowners compared to other groups. This conclusion is particularly important, as the demographic with the largest spending response to additional cash is the same group that qualifies for VITA services.

Jones and Michelmore (2018) continued research on the earned income credit, with particular emphasis on how the credit impacts debt repayment, savings, and short-term financial wellbeing. The authors use data from the Panel Study of Income Dynamics to investigate changes to household financial outcomes after receiving the EIC payment. They found that the EIC increased short-term financial stability, savings, and liquidity. They also found that money from the EIC is primarily spent on debt repayment and essential consumption rather than nonmandatory spending, with the strongest increases being

observed in single-parent households. These findings again underscore the high MPC displayed in EITC-eligible taxpayers, an insight that is central to this project.

More recently, Schild et al. (2023) examined how the 2021 child tax credit expansion in response to the COVID-19 pandemic impacted consumer spending on child-related goods and basic needs. The expansion's impact was analyzed by cross-referencing the Bureau of Labor Statistics' Consumer Expenditure Survey with imputed CTC payments to eligible families. The group found that for an additional $100 received from the CTC, the consumers' spending increased by $75 with 88% of the increased consumption put towards categories such as housing, food, and clothing. Their findings displayed that the largest response in spending was from low-income households. The expanded consumption illustrated by Schild et al. (2023) highlights the large-scale impact fiscal policy can have on consumer behavior, a conclusion this paper aims to build upon. Similarly, Hammond and Orr (2021) examined specifically the community impact of the child tax credit as a result of the 2021 expansion. The pair aimed to analyze how the child tax credit can have impacts beyond spending uptakes and serve as an economic stimulus, especially to low-income and rural communities. They estimate that in the twelve-month period following the expansion, consumer spending increased by roughly $29 billion, highlighting the potential material benefits to the economy. Overall, both these studies emphasize value to the community at large through generous tax policy towards those with high consumption.

This project seeks to build upon those previously mentioned by combining tax theory with economic techniques to quantify the impact of a combination of free filing fees and tax refunds. The child tax credit and earned income credit are the two main credits within the tax system specifically designed to accommodate low-income individuals and alleviate poverty nationwide. The articles mentioned above illustrate the potential value a VITA can provide to a community due to the high marginal propensity to consume associated with the average taxpayer that qualifies for the program. This paper seeks to further extend the noted author's findings as evidence for how the IRS VITA sites can have a significant impact on the communities they serve.

To address the main underlying research questions within this paper, the author utilizes the following hypotheses.

Hypothesis # 1: Tax refunds sourced from a VITA Site are associated with significant impacts on local economic activity.

Tax refunds, often produced through refundable tax credits such as the earned income tax credit and child tax credit, can serve as a direct payment transfer to eligible households. This occurs when a taxpayer's credit transfers exceed their tax liability,

creating a positive shock to their household income. Based on the parameters to qualify for a VITA program's services, refunds from the site often find themselves in the hands of households with a high MPC and may tend to be spent on immediate needs such as rent, vehicles, food, and clothing (Schild et al., 2023). Theoretically, most of the dollars spent will be done locally, increasing the number of times it recirculates within the local economy. For this reason, tax refunds are expected to generate a significant stimulus throughout the local economy.

Hypothesis #2: Tax Refunds are likely to display a positive relationship with tax credits, the number of dependents, and income

While any household can, in theory, earn a tax refund, economic theory predicts that the returns tend to be larger as income decreases, the number of dependents increases, and tax credit usage increases. The tax system often phases out credit availability as income rises, suggesting that lower income individuals are more likely to qualify for refundable tax credits and earn refunds. Similarly, as the number of dependents increases, the taxpayer will be able to claim a greater portion of refundable credits such as the child tax credit, earned income credit, and if the dependent is pursuing higher education, refundable tax credits. Lastly, due to the refundable nature of the child tax credit, earned income tax credit, and education tax credits, taxpayers who utilize the programs are likely to produce more refunds. These are the most distinct variables included in the VITA data set that are expected to play a significant role in determining tax refund amounts.

Data, Variables, and Methodology

Data Source and Variables

This study utilizes archived tax data collected from the University of North Carolina at Asheville (UNCA) VITA site, spanning the tax years 2023 to 2025. This data set contains information such as filing status, number of dependents, adjusted gross income, refund amounts, and credit usage. The key variables this paper utilizes from the data set include the amount refunded to the taxpayer and their corresponding adjusted gross income. The refund amount is treated as a transfer payment expected to be recirculated through the economy (Goodman-Bacon & McGranahan, 2008 and Parker et al., 2011), which is quantified by the multiplier model. While the adjusted gross income of taxpayers who received refunds is the metric used to determine the imputed marginal propensity to consume metrics. The taxpayers' AGI directly determines their MPC by illustrating the

constraints associated with their income and the likelihood of having immediate monetary needs to be met. It follows that observations with lower AGI are paired with higher MPC rates, while those with higher AGI are linked to a lower MPC (Johnson et al., 2006; Parker et al., 2013; Kaplan et al., 2014; Kueng, 2018).

Each taxpayer's marginal propensity to consume is assigned by their adjusted gross income, following from empirical estimates drawn from tax rebate and consumption literature of Parker et al. (2008), Kaplan et al. (2014), and Kueng (2018). This literature establishes the second data set, which includes varying ranges of spending responses, which are used to complete a robust analysis. These MPC metrics are assumed within the model, rather than directly observed within the sample. The multiplier model employs the minimum, median, and maximum of the imputed MPC range to establish different MPC types called the (i) conservative, (ii) baseline, and (iii) generous range. Within the conservative, baseline, and generous estimates, MPC is computed by the taxpayer's AGI. For example, a taxpayer with an AGI of less than $30,000 has imputed MPCs of 0.5 (conservative), 0.75 (baseline), and 0.9 (generous). These metrics are consistent with the findings of Parker et al. (2008), who identified a 0.5 - 0.9 spending response to an initial tax rebate in low-income households.

To protect taxpayers' identities, the archived VITA data set holds no descriptive information, including names, age, race, or gender. For this reason, demographic variables and analysis are not included in this paper. Included below in Table 1 are the definitions and qualifying parameters for the refundable tax credits observed in this study, as well as the summary statistics for the variables of interest in the VITA site data set. While Table 2 is a visual representation of the MPC rates imputed from existing economic literature by taxpayer AGI.

Table 1 covers a unique set of statistical information gathered from the UNC Asheville VITA site. First, it is shown that the average refund from the program is $1,580, not including those whose tax returns owed money. This amount is well below the national average for refunds from the same tax year, which amounted to $3,176 (IRS, 2025). The most common filing status of the taxpayers was single, accounting for 68% of filers in the VITA data set. This contradicts nationwide data, which suggests that the most common filing status is married filing jointly at a 50.7% majority (IRS, 2022). On the national scale, single filers only account for 37.6% of tax returns, a number that has grown 6.7% from the prior year (IRS, 2022). Married filed jointly was the second most common filing status in the VITA data, accounting for 30% of the taxpayers, which again displays a discrepancy from the national average. The VITA data shows 98% of the observations are of those who are filing single or married filing jointly, while on the national scale, the two only account for 88.3% of tax returns (IRS, 2022).

Table 1. VITA Data Summary Statistics of Observations (2023-2025)

Variable	Description	Mean	Max.	Min.	Obs.
Refund Amount	Total tax refund received by the filer (Only those who received a refund)	$1,580	$11,807	$1	574
Filing Status	Tax filer classification determining deductions and credits	Single (68%)	N/A	N/A	N/A
Child Tax Credit	Partially refundable tax credit for having qualifying children	$1450	$4321	$5	105
Additional Child Tax Credit	Refundable portion of Child Tax Credit	$2328.91	$8503	$5	91
Earned Income Credit	Fully refundable credit for low- to moderate- income workers	$2098.76	$7830	$5	187
American Opportunity Credit	Partially refundable credit to offset college expenses	$1222.9	$2500	$86	42
Number of Dependents	Amount of dependents claimed on tax return	0.37	8	0	170
Adjusted Gross Income	Taxpayer income after deductions	$35700	$236306	($631)	574

Note: All figures represented in the data table above were collected from the Asheville IRS VITA Site

The refundable portion of the child tax credit, known as the additional child tax credit, shows an average of $2,328.91, with the largest observation at $8,503, an amount nearly three and a half times larger. The national average for the additional child tax credit was most recently estimated to be $2520, an amount slightly larger than what is exhibited by the VITA site (Tax Policy Center, 2025). Both amounts are above the maximum amount claimable because the figures include those with more than one child (Tax Policy Center, 2025). This maximum for the additional child tax credit is also the highest claimed credit observation from the entire data set. Next, the earned income credit average holds a slightly lower value than the additional child tax credit, with a value of $2,098.76. Surprisingly, this figure is less than the national average of $2984 (IRS, 2025). Similar to the

additional child tax credit, the maximum observed credit refund is around three and a half times the average amount of $7,830.

The American opportunity tax credit is much more straightforward, revealing the average amount claimed is $1,222.9, around half of the maximum amount the credit can be claimed for of $2,500. The maximum observed claim reached the highest the credit can offer at $2,500, while the smallest observation of $86 is substantially below both the average and the maximum credit amount. The average displayed by the VITA site data is larger compared to the national average of $1,036, suggesting that the VITA participants are incurring more qualifying education expenses than what we see nationally (Department of the Treasury, 2023). This suggests that despite outperforming the national average, the VITA observations are not incurring enough education related expenses to absorb the full benefit of the credit. This credit is also the least utilized among taxpayers, as denoted by its small number of observations relative to both the child tax credit and the earned income tax credit.

Additionally, the VITA data set also exhibits the average number of children claimed on the tax returns to be 0.38, suggesting that most of the taxpayers at the VITA site have no children. The largest overall refund observed in the data set is $11,807, a highly significant amount relative to the average AGI of $35,700 and the median of $29,108. These AGI figures are significantly below the national average of $76,539 (IRS, 2023), suggesting that the taxpayers at the VITA Site will have a much higher marginal propensity to consume than the national average due to their constrained income (Johnson et al., 2006).

Table 2. Imputed MPC/Robustness Check: MPC Estimates by Type and Income Level

MPC Type	AGI < $30k	$30k < AGI < $100k	AGI > $100k
Conservative	0.5	0.20	0.1
Baseline	0.75	0.4	0.225
Generous	0.9	0.6	0.35

Data Source: The author imputed this MPC calibrations above the drawing from the existing literature of Parker *et al.*, 2008; Kaplan *et al.*, 2014; as well as Kueng, 2018.

Table 2 holds marginal propensity to consume metrics that have been imputed from the existing literature of Parker et al. (2008), Kaplan et al. (2014), and Kueng (2018). The metrics themselves are assumed rather than directly observed by the VITA Site dataset. This literature reflects broader spending and includes durable goods as a component of consumption to better illustrate cumulative responses. For the income groups below $30,000, the MPC values are imputed from the findings of Parker et al. (2008). This group finds the spending response of financially constrained individuals to be 0.5 to 0.9 of the initial rebates, which is reflected in the second column of Table 3. The middle-income

group, between $30,000 and $100,000, holds MPC metrics derived from the findings of Parker et al. (2008) and Kaplan (2014), who found that higher income groups can produce spending responses of 0.4 to 0.6 in generous circumstances, with averages closer to 0.2 to 0.4. Lastly, the highest income group, characterized by an amount above $100,000, has MPC values that originate from Kueng (2018). This paper found that wealthier households with a median income north of $100,000, exhibit low MPC averages, specifically when their liquidity is high. This paper establishes a spending response between 0.1 and 0.4 of an initial transfer payment. With MPC by AGI and transfer payments accounted for, this paper adopts a classic Keynesian multiplier model to estimate the impact of the IRS VITA site in Asheville, North Carolina (Keynes, 1936).

Constructing the Multiplier

With MPC by AGI and transfer payments accounted for, this paper adopts a classic Keynesian multiplier model to estimate the impact of the IRS VITA site in Asheville, North Carolina (Keynes, 1936). The use of a classic Keynesian multiplier necessarily simplifies local economic behavior.

The goal of the economic multiplier is to estimate the economic stimulus spurred by the VITA program. The taxpayers' refunds serve as the stimulus variable to multiply against a classic Keynesian multiplier model. Those who received refunds are then sorted by their AGI to the corresponding MPC metrics as identified by existing economic literature. This gauges a baseline estimates for the estimated economic stimulus spurred by the IRS VITA site. The use of a classic Keynesian multiplier necessarily simplifies local economic behavior to approximate economic stimulus. To account for this limitation within the model, the analysis incorporates a robustness check, using conservative and generous MPC metrics to produce a range of outcomes. Using the Asheville IRS VITA Site as a case study, this study illustrates how volunteer work can stimulate significant financial activity to a local economy, capturing the direct and indirect effect of fiscal policy.

Multiplier = 1 / 1 - (MPC) (1)

Econometric Model

To analyze the relationship between tax refunds, income, refundable tax credits, and the number of dependents, this study incorporates two regression equations and apply least square analysis. The equations are given as:

$$Refundi = \beta 0 + \beta 1 AGIi + \beta 2 ADDCTCi + \beta 3 EICi + \beta 4 EDUTCi + \beta 5 Dependentsi + ui \quad (2)$$

$$Refundi = \gamma 0 + \gamma 1 Incomebelow2550ki + \gamma 2 Income5075ki + \gamma 3 Income\ Above75ki + \gamma 4 ADDCTCi + \gamma 5 EICi + \gamma 6 EDUTCi + \gamma 7 Dependentsi + ui \quad (3)$$

The first model (equation 2) specifies tax refunds as a function of adjusted gross income (AGI), the additional child tax credit (ADDCTC), the earned income tax credit (EIC), the education tax credits (EDUTC), and the number of dependents (Dependents). This equation treats adjusted gross income as a continuous variable, which allows the model to capture marginal effects. The second econometric model (equation 3) differs only in its replacement of continuous adjusted gross income with categorical income group brackets to display income threshold effects on tax refunds where under $25,000 is taken as base category. In both models, tax credits and the number of dependents is expected to exhibit a positive relationship to refund amounts, while adjusted gross income is anticipated to have a negative relationship. Additionally, both models utilize an ordinary least squares framework to capture unobserved taxpayer characteristics within the error term.

Results and Discussions

Preliminary Analysis

The preliminary analysis of this paper further dissects the relationship between VITA participants' AGI and tax credit claims. The figures included below focus on the three tax credits noted throughout the study: The additional child credit, the earned income credit, and the American opportunity credit.

Figure 1 provides the correlation between taxpayer uptake for the refundable portion of the child tax credit and the additional child tax credit by the taxpayer's AGI for the years 2023 to 2025. This graph illustrates the near linear relationship between the additional child tax credit and low-income taxpayers, as seen by the bottom most diagonal line of the graph. Under this income group, the amount refunded through the credit often constitutes a large relative proportion of the taxpayer's AGI. This suggests that those who are most financially constrained hold a strong relationship with the credit and are able to reap its benefits. This figure also suggests that the highest concentration of credit claims is found in households with low-to-moderate AGI, an important takeaway in drawing conclusions towards the effectiveness of the credits' intended purpose to serve middle and lower-class taxpayers.

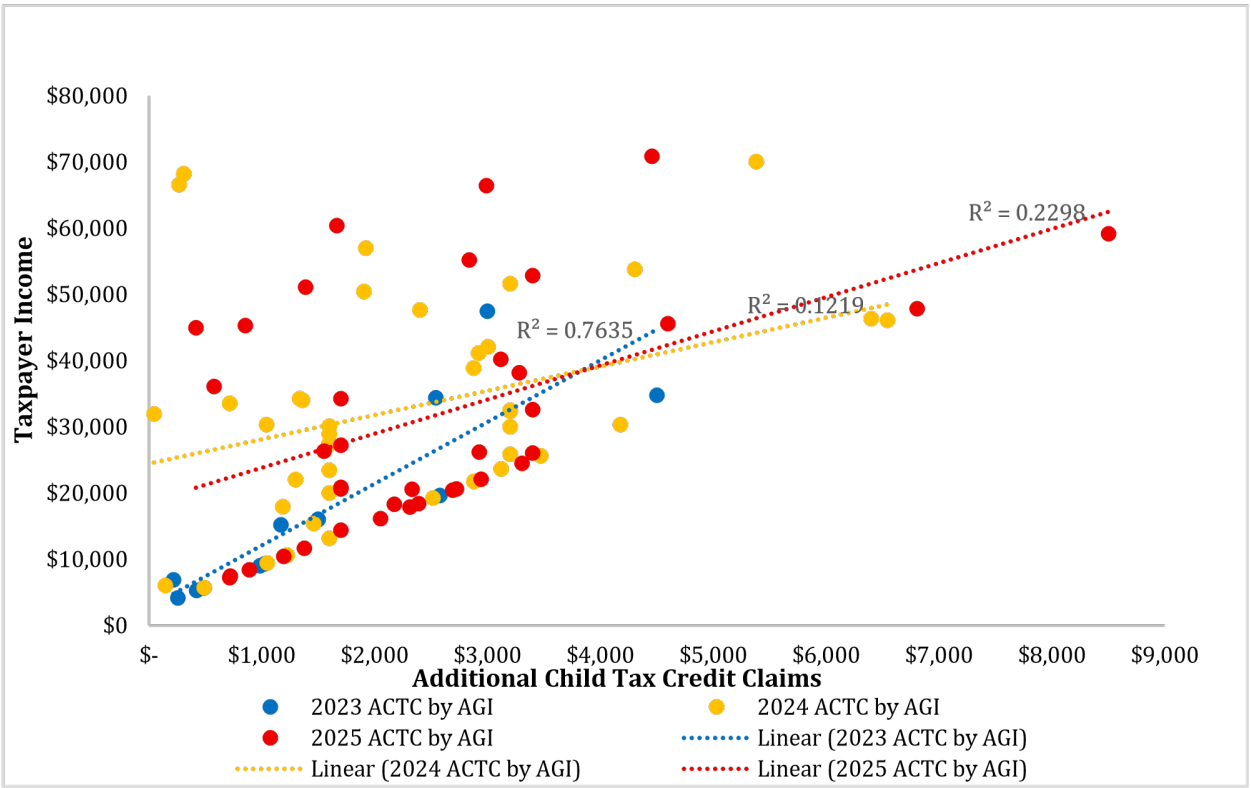

Figure 1. Additional Child Tax Credit's Correlation to Income

Figure 2 illustrates a weak connection between taxpayer AGI and EITC usage as seen by the array of scattered data points. Although this finding may be puzzling at first glance, intuitively, this makes sense due to the influence other eligibility requirements for the tax credit, namely filing status and number of children, have on the amount of the credit taxpayers can claim.

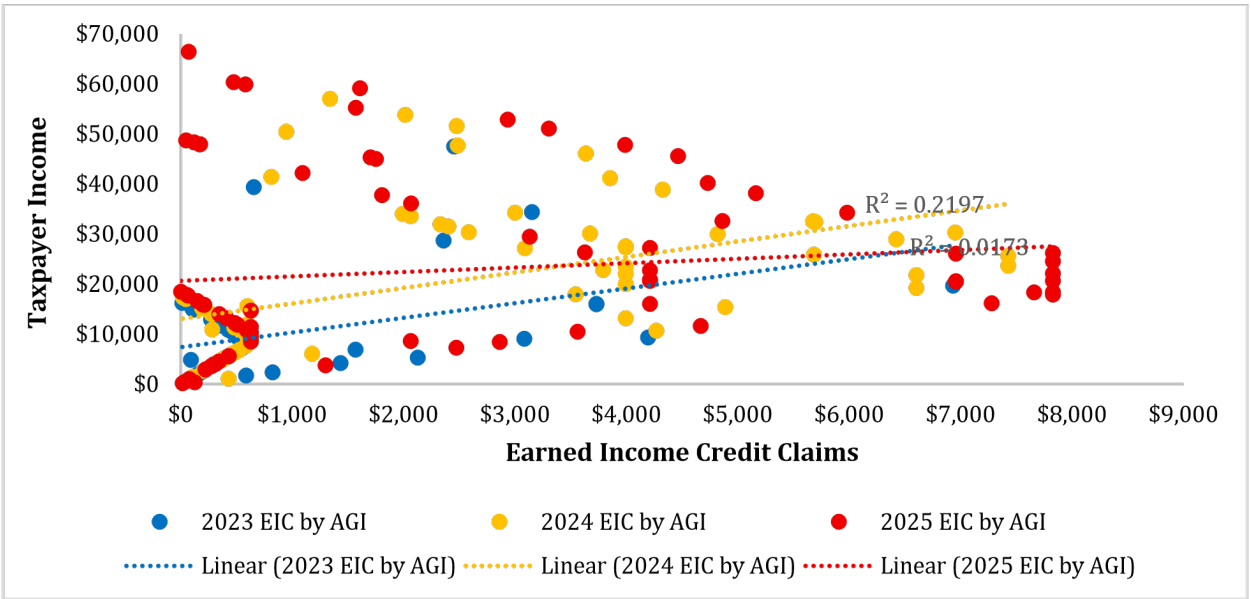

Figure 2. Earned Income Tax Credit's Correlation to Adjusted Gross Income

Figure 2 focuses solely on the taxpayers' AGI, while in practice, the combination of AGI, filing status, and the number of children are the factors that determine the credit amounts. This conclusion is further supported by the vastly different credit amounts claimed by taxpayers of similar income, illustrating that income is not the sole factor in determining the credit amount. Additionally, Figure 2 does demonstrate evidence of the credits' effectiveness driven by the high concentration of observations in the low-to-middle AGI range, suggesting the observations of taxpayers utilizing the program correspond with the demographic fiscal policy intended to target.

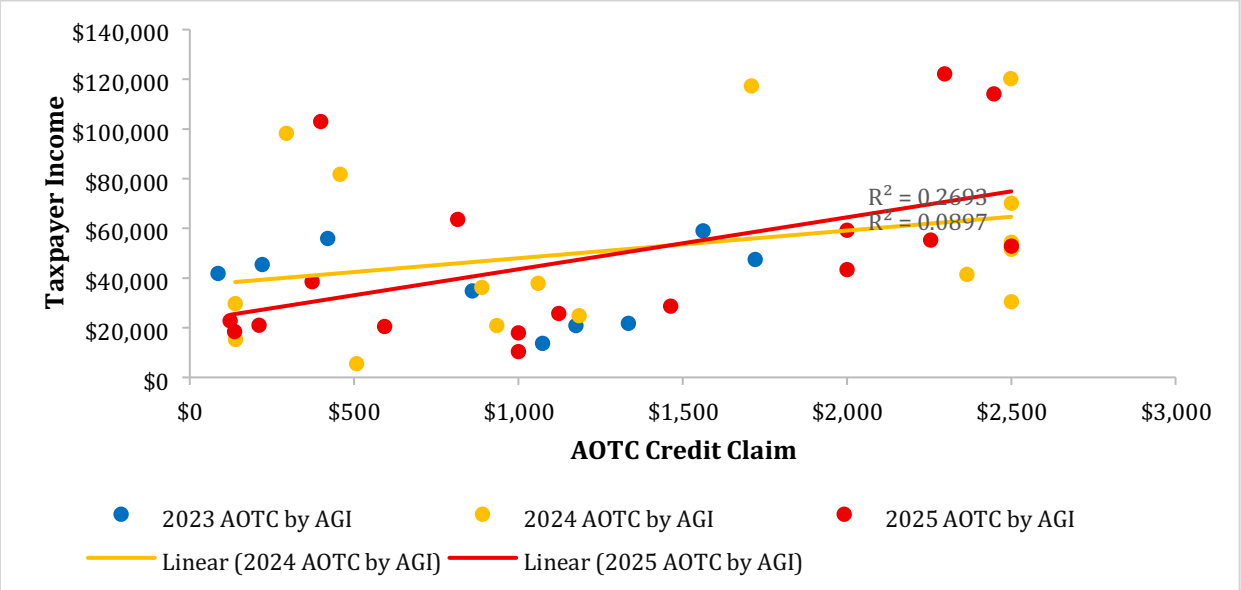

Figure 3. American Opportunity Tax Credit's Correlation to Adjusted Gross Income

In Figure 3, a weak correlation between the amount claimed through the American Opportunity Tax Credit and the taxpayer's adjusted gross income exhibits a different economic story. The largest credit claims are concentrated in middle-to-upper income households, which may reflect that the middle class often absorb the cost of education out-of-pocket, qualifying them for the tax credit; while low-income households may often qualify for tuition assistance, limiting the amount of AOTC qualifying expenses they incur. This emphasizes the importance of the tax credit as an additional means to provide relief to taxpayers pursuing higher education outside of the standard student loan and institutional scholarship programs. Similar to Figure 2, Figure 3 emphasizes a weak connection purely between taxpayer AGI and AOTC claims, suggesting there may be a larger economic story at play than simply taxpayer income and credit usage.

Multiplier Results

This paper estimates the local economic impact of tax refunds sourced from an IRS VITA site through a multiplier model. The multiplier estimates are calculated by multiplying real tax refund observations against a baseline, conservative, and generous MPC metrics imputed from existing economic literature. For the years 2023 - 2025, the baseline analysis reveals that for every dollar refunded to taxpayers through the VITA program, the estimated economic impact is 2.71 times larger. This implies that the average refund ($1580) from the program is associated with an average increase of $4,281.8 in economic activity. Applying this metric to the total amount refunded from the years 2023 -2025 ($906,677) suggests a total stimulus of $2.45 million to the local Asheville economy through the baseline estimate. Under the conservative portion of the analysis, it is estimated that the local impact is 1.58 times larger than the initial amount refunded, suggesting a total impact of $1.43 million for the three years observed in this study. Lastly, under the generous estimate, the average per dollar impact is 5.86 times larger than the initial refunds, implying the total impact is estimated to be $5.3 million under the generous assumption. The vast difference between the estimates is largely due to the wide range of MPC metrics pulled from existing literature. These figures are represented visually in Figure 4 below.

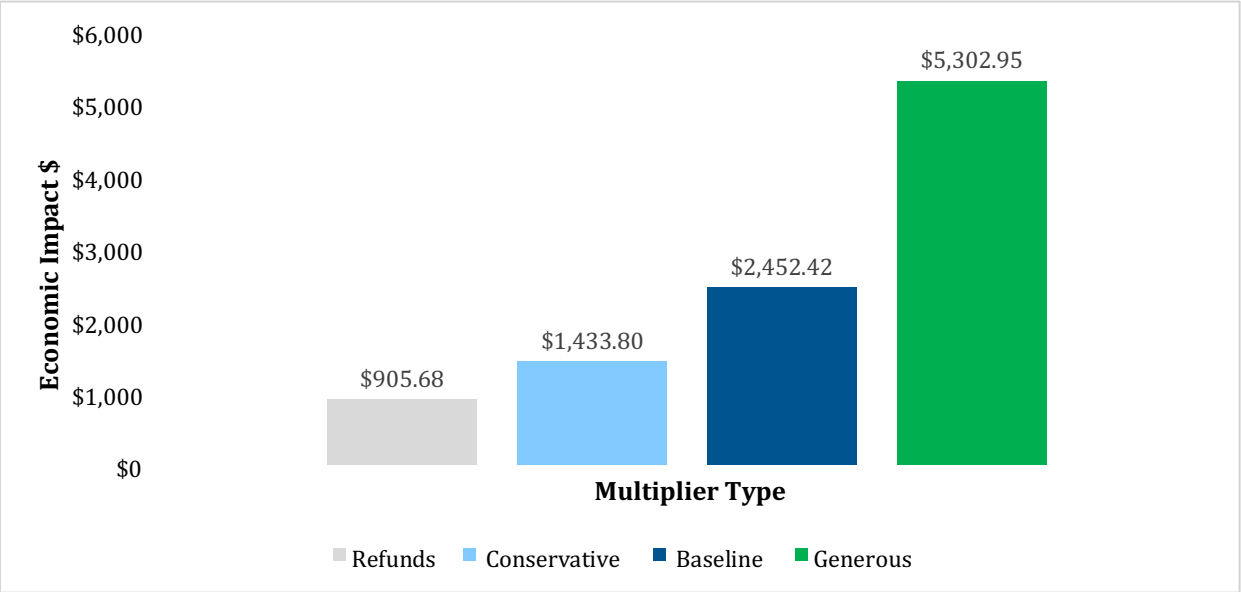

Figure 4. Total Economic Impact 2023-2025. Sourced from own calculations.

Further dissecting the analysis, the paper has estimated the multiplier effect for each individual year of observations. In 2023, the program's refunds totaled $130,537, the lowest of all three years, likely due to the COVID-19 pandemic. Even so, the baseline impact for 2023 is estimated to be $371,067.75, an amount 2.84 times larger than the

initial refund transfers. Under the conservative and generous assumption, the economic impact is predicted to be $212,221.97 and $823,777.5, respectively. These estimates imply a range of impact 1.62 to 6.31 times larger than the initial amount refunded to taxpayers.

For the year 2024, the program saw an increase in taxpayer utilization, and as a result, an increase in refunds given out. The original sum of refunds totaled $358,972, which under the baseline multiplier corresponds to an estimated economic impact of $927,755.33, an amount 2.58 times larger than the initial sum of transfer payments. For the conservative section of the analysis, the total impact is 1.54 times larger than the initial refunds for a total of $554,352.00. Lastly, the generous multiplier is 5.45 times larger than the total refunds, creating a massive estimate of $1,957,348 in local economic impact.

2024 was the largest observation of taxpayer participation and local impact, totaling $416,168 worth of issued tax refunds. When run through the baseline multiplier, the program's local impact is gauged to be $1,153,596, an amount 2.77 times greater than the total refunds. The conservative segment of the analysis estimates the multiplier effect to be 1.6 times larger than the primary refunds, for a total of $667,225.67 in local stimulus. Under the generous assumption, the generated multiplier is 6.08 times greater than the initial refunds, accounting for a $2,521,829.23 impact on Asheville's economy. The estimates by year are visualized below in Figure 5.

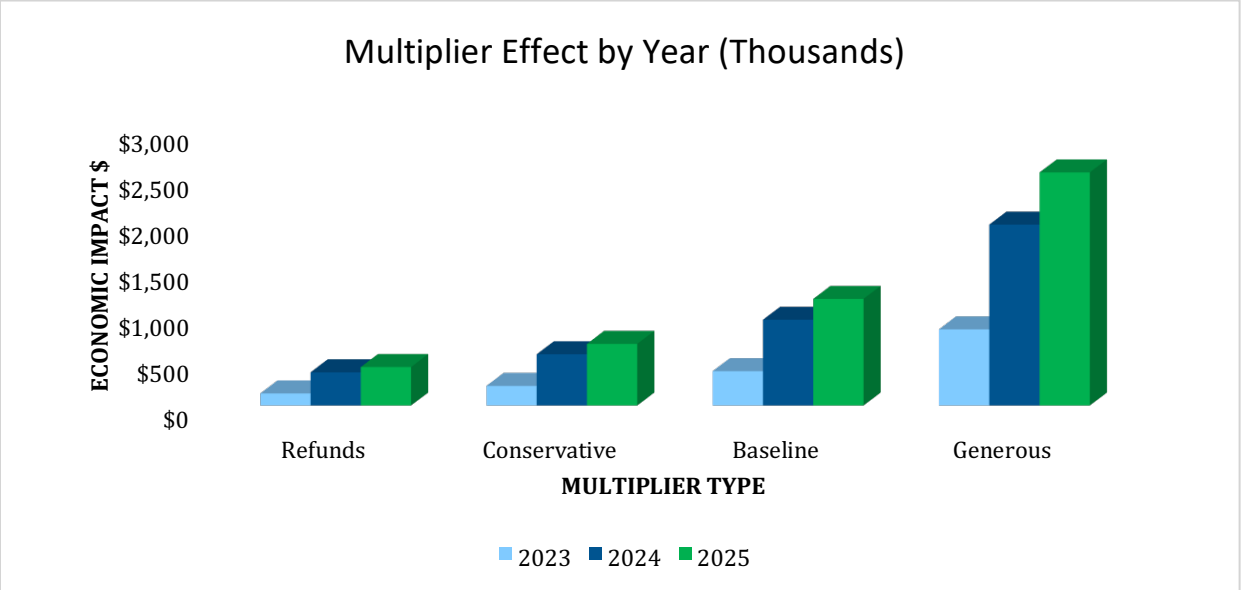

Figure 5. Multiplier Effect by Year (in thousands)

Regression Results

The first of the two regressions is encapsulated in Table 3, which treats adjusted gross income (AGI) as continuous rather than by income brackets. Across all specifications, the

variables included in the regression: adjusted gross income, the additional child tax credit, the earned income tax credit, and the number of dependents, all demonstrate consistent explanatory capabilities. The majority of the coefficients are statistically significant, indicating a sturdy relationship between refund amounts, income, and tax credits made possible through fiscal policy. The regression results indicate that tax refunds from the Asheville VITA site are jointly determined by income and the utilization of refundable tax credits.

The estimated coefficients represent the bullish role of income and tax credits in producing tax refunds. Notably, the additional child tax credit displays a strong relationship, with coefficients ranging from 0.71 to 1.34. This suggests that a $1 increase to the additional child tax credit is associated with a median increase of $1.02 increase to the tax refund amount. Similarly, the earned income tax credit shows a considerable and statistically significant relationship to determining a tax refund. The coefficients range from 0.59 to 0.7, illustrating their consistent role in determining tax refund outcomes. The education tax credits also display a strong statistical significance to tax refunds; however, with a greater variability than the other refundable credits observed. The number of dependents is associated with substantial increases in tax refunds, likely due to its direct role in determining tax credit eligibility and interaction with credit programs. Adjusted gross income displays a much smaller impact relative to the other variables but still remains statistically significant.

To complete a robust analysis of the estimated relationships, alternative specifications are estimated by sequentially dropping an explanatory variable while leaving the others intact. Across these alternate regressions, the results remain largely consistent in coefficients and significance for AGI and the tax credit variables. However, some variation exists in the results, specifically in the coefficient magnitude and significance of the number of dependents. This is likely due to the eligibility requirements of the additional child tax credit and earned income credit requiring specific household characteristics, meaning when one variable is dropped, explanatory power may be shifted to another. Regardless, the overall positive relationship consistency displayed by the explanatory variables suggests an effective model in proving the interplay between refundable tax credits and tax refunds.

Overall, these findings suggest that tax refunds are primarily driven by policy-supported transfer payments rather than by income alone. This conclusion is reflected in the relatively small coefficients seen by adjusted gross income and highlights the complex nature of the tax code in supporting taxpayers through multiple different angles. The strong, consistent connection between refundable tax credits and refunds underscores the ability of the tax code to provide benefits for low to middle income taxpayers.

Table 3. Regression – Determinants of Tax Refunds (Continuous AGI)

	Model 1	Model 2	Model 3	Model 4	Model 5
Adjusted Gross Income	0.022**		0.022**	0.016**	0.023**
	(0.002)		(0.002)	(0.002)	(0.002)
Additional Child Tax Credit	0.707**	0.756**		1.338**	0.744**
	(0.100)	(0.109)		(0.106)	(0.101)
Earned Income Tax Credit	0.684**	0.593**	0.829**		0.668**
	(0.047)	(0.051)	(0.044)		(0.048)
Education Tax Credits	0.578**	0.767**	0.686**	0.368*	
	(0.155)	(0.168)	(0.161)	(0.181)	
Dependents	190.40*	269.7**	573.0**	365.1**	200.5*
	(83.495)	(90.498)	(66.022)	(96.601)	(84.390)
Intercept	35.263	724.9**	-40.157	382.0**	43.054
	(91.185)	(67.347)	(94.343)	(102.873)	(92.187)
Number of observations	573	573	573	573	573

Note: ** p <0.01, * p <0.05. Standard errors are represented in parentheses.

Table 4. Regression – Determinants of Tax Refunds (AGI Categores)

	Model 1	Model 2	Model 3	Model 4	Model 5
Adjusted Gross Income (omitted: under 25k)					
25- 50k	299.157*	405.8**	157.773	312.5*	296.04*
	(125.827)	(131.032)	(144.393)	(127.289)	(126.335)
50 - 75k	636.2**	718.3**	25.975	699.22**	704.4**
	(176.932)	(185.076)	(197.090)	(178.280)	(175.292)
Over 75k	2436.3**	2397.8**	2119.8**	2527.2**	2466.14
	(249.220)	(261.135)	(285.720)	(251.065)	(249.921)
Additional Child Tax Credit	0.76**		1.360**	0.806**	0.92
	(0.102)		(0.106)	(0.103)	(0.078)
Earned Income Tax Credit	0.659**	0.81**		0.643**	0.67**
	(0.048)	(0.046)		(0.049)	(0.048)
Education Tax Credits	0.599**	0.719**	0.415*		0.60**
	(0.156)	(0.163)	(0.179)		(0.157)
Dependents	201.95**	612.7**	394.7**	210.149*	
	(85.064)	(68.395)	(96.584)	(86.058)	
Intercept	400.21*	300.2**	697.40**	421.01**	425.4**
	(85.483)	(88.500)	(95.170)	(86.335)	(85.167)
Number of observations	573	573	573	573	573

The second regression model presents an alternative approach where adjusted gross income is separated into categorical variables as opposed to a continuous metric. Specifically, AGI brackets are introduced with ranges under $25,000, $25,000 to $50,000, $50,000 to $75,000, and over $75,000. The sweeping majority of observations all fall under $75,000, reflecting the nature of VITA in assisting low-to-moderate income taxpayers. This specification to AGI allows for a more versatile representation of the relationship between income and refund outcomes and can capture potential non-linear relationships. Additionally, this methodology reveals how different income levels behave individually, rather than an assumed uniform effect. This model unveils that income categories have less explanatory power, suggesting that the relationship between AGI and refunds may be more complex than initially hypothesized due to variation in tax withholdings, filing status, and deductions.

The coefficients of each income category mostly suggest statistical significance when controlling for refundable tax credits and dependents. This implies that belonging to a particular income bracket exhibits a statistically meaningful relationship with refund amounts when categorized. Taxpayers in the higher income bins are associated with larger refunds relative to the lower income groups, suggesting that income is a critical component in determining tax refund amounts. The corresponding coefficients to the tax credits remain statistically significant and display a strong positive relationship. Similar to Table 3, the additional child tax credit shows a near proportional relationship to refunds, while the earned income tax credit and education tax credits show a slightly weaker impact but remain statistically significant. The number of dependents claimed on the tax return also continues to express a substantial and significant impact to determining a tax refund.

A similar robust analysis was conducted for Table 4 by estimating models where each explanatory variable other than AGI is sequential removed. The results indicate that coefficients by income bracket remain positive but vary in magnitude and statistical significance. As with the continuous AGI model in Table 3, these occasional shifts likely reflect the overlap between household characteristics and refundable tax credits in determining tax refund outcomes. When the refundable tax credit variables are omitted, the income bracket variables may absorb some of the explanatory power, leading to altered coefficients. Despite these fluctuations, the consistency across coefficient signs and significance highlights the commanding role of refundable tax credits in determining tax refunds, while the improved performance of AGI in this model suggest a thorough analysis.

Overall, the comparison from Table 3 to Table 4 suggests that when AGI is modeled by income bins, there is both statistical significance and much larger coefficients, likely driven by the broad grouping embedded in a continuous AGI. In both tables, the consistent explanatory power of refundable tax credits is emphasized through a stable, statistically

significant relationship in predicting refund outcomes. These regressions underscore the tax system's ability to target specific demographics with refundable tax credits rather than through a blanket income specification. These findings have strong implications towards the multiplier analysis, as it can inform how taxpayers can better qualify and utilize refundable tax credits to produce better refund results, which provides an economic stimulation and benefit to the collective community.

Conclusion and Policy Implication

The IRS VITA program was intended to aid underserved communities by providing free and convenient access to tax services. During tax season, volunteers serve communities by filing tax returns and providing tax counsel to those in need. In this paper, I have estimated the economic impact beyond the initial tax refunds provided by a VITA site. Due to the lack of filing fees, tax refunds sourced from VITA sites resemble positive income, which, when paired with MPC metrics by corresponding AGI, can be used to construct an economic multiplier that approximates the potential impact spurred by the VITA site. The model yields an implied multiplier to be 2.71 times the dollar amount refunded to taxpayers through refunds, with a robustness check generating a range of 1.58 to 5.86 times the initial refunds to address potential model limitations.

These results illustrate a strong economic stimulus from the tax refunds observed. I estimate that the potential baseline impact from the program over the past three years is $2,452,419.09, underscoring the potential communal value a VITA site holds on to the communities it serves. I additionally use a range of MPC values, on both the generous and conservative ends, to complete a robustness check and ease model limitations. This estimates the range of impact stemming from the Asheville VITA site to be $1,433,799.92 to $5,302,954.81, a sizeable range relative to the scale of the program's volunteer-based operations.

Additionally, I incorporate regression analysis to better understand the relationship between tax refunds, adjusted gross income, refundable tax credits, and dependents. The interpretations of the regressions suggest that income is an important predictor of tax refund outcomes, with more precise relationships displayed when income is sorted into categories. The models also display a strong, consistent statistical significance between refundable tax credits and tax refund outcomes, consistent with the role of fiscal policy in generating tax refunds for specific demographic groups. Lastly, both regression models suggest the number of dependents claimed on a tax return is positive and significantly associated with higher refund amounts, likely due to its role in determining refundable credit eligibility and amounts. Overall, these conclusions are consistent with the idea that

refundable tax credits may serve as an effective mechanism for economic stimulus, particularly among individuals with a high propensity to consume.

These findings suggest VITA may be a cost-effective way to stimulate a local economy. Policies aimed at increasing VITA participation, from both volunteers and taxpayers, may increase the financial stimulus sourced from VITA sites. This could take the form of increasing who is eligible for VITA's services or providing a milestone-based awards system to incentivize volunteer work. To increase participation, the IRS or the VITA site coordinators could also better promote the program through newsletters, signs, online campaigns, or by allowing for further research to be conducted at the sites.

Additionally, the findings of this study support the use of tax credit programs to uplift certain demographic groups, implying targeted tax credits may represent a relatively efficient fiscal policy tool rather than broad tax changes. For example, increasing the credit amounts or simply matching inflation for the earned income tax credit or child tax credit may produce a strong multiplier effect on the broader economy while simultaneously reducing poverty in vulnerable groups. This conclusion is supported by the large coefficients displayed by the child tax credit, earned income tax credit, and number of dependents, which suggest improvements in these fiscal policy programs could improve broader impact. Overall, this study provides evidence of the valuable role refundable tax credits serve in producing tax refunds, improving economic well-being, and stimulating an economy.

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