

Uncollectible Versus Unproductive: Compliance Impact of Working Collection Cases That Are Ultimately Not Fully Collectible

*Erik Miller, Stacy Orlett, and Alex Turk,
Small Business/Self-Employed Division, Internal Revenue Service**

Background and Introduction

Each year a fraction of voluntary and enforcement tax assessments are not paid timely. Many taxpayers resolve these tax debts during the balance due notice process. The remaining (delinquent) accounts make up the potential workload for the Internal Revenue Service's (IRS's) collection call sites or field collection offices. As of the end of FY 2012, nearly 11.5 million taxpayer delinquent accounts owed over \$124 billion dollars in tax, penalties and interest.¹ There is little benefit from using the IRS's scarce resources to attempt to collect from taxpayers who cannot pay and who are not at risk for future noncompliance. Therefore, some accounts are moved out of the collection work streams and identified as Currently Not Collectible (CNC) when the taxpayers are unable to pay anything further due to significant hardship or when the IRS is unable to locate them.

The IRS and various stakeholders closely monitor the rate of cases identified as CNC. A common misconception is that a case identified as CNC is not a productive case. Furthermore, the CNC determination is sometimes used as evidence that the IRS should not have worked the case at all. However, this is not necessarily true. There are specific guidelines for determining if a case is CNC. Thus, a CNC determination is a tax administration policy decision based on the case's situation—not a payment compliance outcome. Many cases identified as CNC are associated with significant enforcement revenue and the IRS intervention may have curtailed future noncompliance. Unfortunately, there has been little research to quantify the direct revenue impacts and the future compliance impacts of IRS treatments.

In this paper, we estimate the impact of IRS collection treatments on taxpayers' payment of delinquent taxes and their payment of future tax liabilities. We analyze individual and business accounts having unpaid assessments for Calendar Years 2008–2010 that do not fully resolve during the notice process. For cases identified as CNC, we estimate the impact of various collection treatments on resolving the unpaid amounts and on the taxpayer's subsequent payment compliance.

We find positive impacts of IRS treatments on the amount of delinquent taxes collected and the taxpayer's future payment compliance for cases that are ultimately CNC. Thus, working cases that close as CNC can be beneficial for tax administration. This implies that attempts to evaluate the efficacy of IRS's collection treatments and allocation of collection resources based on CNC determinations, without considering the benefits and costs of working CNC cases, are likely incomplete.

Summary of the IRS Collection Process

The collection process is illustrated in Figure 1. Unpaid taxes generally come from two situations: voluntarily filed returns, and IRS enforcement assessments from audits and delinquent returns. A taxpayer that has unpaid taxes will enter the collection balance due notice process and receive one or more notices. Any taxpayer that does not resolve a balance due during the notice process becomes available collection inventory to work. Cases in available inventory may be routed to collection treatments such as the call site or a field office to help the taxpayer pay the balance due.

* The views and opinions presented in this paper reflect those of the authors. They do not necessarily reflect the views or the official position of the Internal Revenue Service.

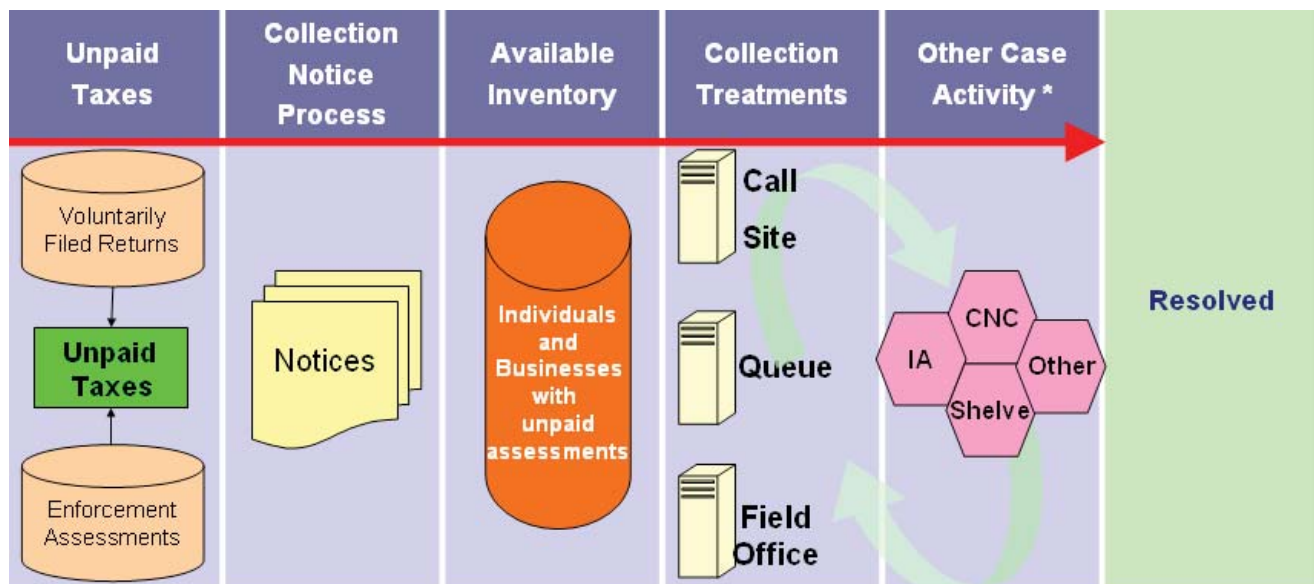
¹ Publication 55B (Rev. 3-2013). Catalog Number 215671. Department of the Treasury. *Internal Revenue Service Data Book, 2012*. <http://www.irs.gov/pub/irs-soi/12databk.pdf> (accessed November 2013).

In addition, the taxpayer's account may go into certain statuses such as CNC,² depending on collection treatments or other circumstances. Treatments and statuses may change over time depending on the characteristics of the case.

Currently Not Collectible Determination

The criteria for a CNC determination are not observable using available tax administration data at the time the case is selected for treatment. A call site or field collection office employee makes the CNC determination after investigating the case and gathering all the relevant case characteristics, facts and circumstances. Thus, we model those characteristics as exogenous and existing at the time of selection, but not being observable with the tax administration data available at that point in time. If in fact the call site and field collection treatments influence characteristics associated with the CNC determination, then we would need to treat CNC determination as an endogenous outcome. We develop the models under the assumption it is not influenced by the treatments and can be used as an explanatory factor without controlling for possible endogeneity.

FIGURE 1. Basic Overview of the IRS Collection Process



* A case may have other activity or statuses based on certain conditions and characteristics of the case. For example, the Service may determine after reviewing the case that it is Currently Not Collectible (CNC). Another example is an Installment Agreement (IA) where the taxpayer requests and enters into a payment plan to make payments over time to resolve the deficiency. Alternatively, a case may be shelved (i.e., set aside) based on case characteristics and having insufficient resources available to work the case.

Theoretical Model

Assume taxpayers must decide: (1) how much of a composite good, C , to consume; (2) how much to pay toward unpaid tax liabilities, P_p ; and (3) how much to pay toward the next tax liability, P_f , which is reported on a future tax return.

Assume the price of the composite good has been normalized to one.

Furthermore, let I be the taxpayer's income, A_p be the amount of unpaid past tax assessment, and A_f be the taxpayer's tax assessment as reported on future tax returns.

Also let T be a vector of treatments that could be applied by the taxing authority, i be the interest rate on unpaid taxes, and r be the penalty rate on unpaid taxes.

² A case may have other activity or statuses based on certain conditions and characteristics of the case. For example, the Service may determine after reviewing the case that it is Currently Not Collectible (CNC). Another example is an Installment Agreement (IA) where the taxpayer requests and enters into a payment plan to make payments over time to resolve the deficiency. Alternatively, a case may be shelved (i.e., set aside) based on case characteristics and having insufficient resources available to work the case.

Assume that taxpayers make choices based on the following utility maximization problem:³

$$\text{Max } U = U(C, (A_p - P_p), (A_f - P_f), T, i, r)$$

$$\text{Subject to: } I \geq C + P_p + P_f$$

Assuming that delinquent and future tax debts have a negative impact on utility, $\partial U / \partial (A_p - P_p)$ and $\partial U / \partial (A_f - P_f)$ would both be less than zero. Solving the optimization above would yield the following optimal payment functions:

$$P_p^* = V_p(I, A_p, A_f, T, i, r)$$

$$P_f^* = V_f(I, A_p, A_f, T, i, r)$$

The optimal payment functions provide the basis for developing separate empirical models of taxpayers' payments of delinquent tax liabilities and their payments toward their current tax liabilities that they will report on their next return.

Empirical Model

We estimate models of payments to current and future tax liabilities as a function of observable case characteristics and IRS policy and treatments. Let X be a vector of case characteristics and T be a vector of indicators for various IRS treatments. Treatments include automated call site contact, field Revenue Officer contact, and the decision to close the case as not collectible. This specification assumes that each treatment stream is uniformly applying CNC guidelines as defined in the IRS Internal Revenue Manual, and that those guidelines do not vary over time.

Payment on current unpaid tax liabilities is modeled as

$$\begin{aligned} \ln(P_p) &= X_t \beta + T \beta_T + \varepsilon_p & \text{if } P_p^* > 0 \text{ and} \\ \ln(P_p) &= 0 & \text{otherwise.} \end{aligned}$$

We estimate β and β_T using a Tobit regression censored at zero. We censored at zero since payments are always greater than or equal to zero.⁴ The parameters β and β_T reflect the marginal impacts of each variable on the latent variable, P_p^* . Some elements of the treatment parameters, β_T , correspond to treating a case and ultimately having a CNC determination, and treating cases without a CNC determination. Therefore, the elements of β_T provide estimates of the marginal impact on payment resulting from treating the case with or without a CNC determination. The marginal impact on log of observed payments is

$$\frac{\partial \ln(P_p)}{\partial x_i} = \beta_i \Phi\left(\frac{(X_t \beta + T \beta_T)}{\sigma_p}\right)$$

where $\Phi(\cdot)$ is the Normal distribution function and σ_p is the scale parameter.

Next, we model the value of taxpayers' future additional unpaid tax liabilities, $A^* - P_f^*$ or U_L , as

$$\begin{aligned} \ln(U_L) &= X_{t+2} \alpha + T \alpha_T + \varepsilon_u & \text{if } A^* - P_f^* > 0 \text{ and} \\ \ln(U_L) &= 0 & \text{otherwise.} \end{aligned}$$

We estimate α and α_T using a Tobit regression censored at zero. We censored at zero since future additional unpaid tax liabilities are always greater than or equal to zero.⁵ The elements of α_T that relate to working a case and closing as CNC provide estimates to the marginal impacts of each variable on the latent variable, P_f^* . The marginal impact on log of observed additional unpaid tax liabilities is given by

$$\frac{\partial \ln(U_L)}{\partial x_i} = \alpha_i \Phi\left(\frac{(X_t \alpha + T \alpha_T)}{\sigma_u}\right)$$

where $\Phi(\cdot)$ is the Normal distribution function and σ_u is the scale parameter.

³ The model could be extended to include accumulated wealth in the budget constraint.

⁴ We did not censor from above because of the potential for the taxpayer to accrue additional unpaid tax liabilities, interest and/or penalties.

⁵ We did not censor from above because of the potential for the taxpayer to accrue additional unpaid tax liabilities, interest and/or penalties.

Research Design

Available Inventory

We identified the available inventory of taxpayers with unpaid assessments from IRS databases.⁶ The study includes individual and business taxpayers that had at least one unpaid assessment during calendar years 2008–2010 and the taxpayer did not resolve the delinquent amounts in the IRS balance due notice process. While we included all unpaid assessments for individual accounts, we limited business accounts to sole proprietorships and corporations and their related unpaid assessments on specific tax returns: Form 941 (Employer's Quarterly Federal Tax Return), Form 1120 (U.S. Corporation Income Tax Return), and Form 940 (Employer's Annual Federal Unemployment (FUTA) Tax Return).⁷

Collection Treatments

After identifying the available inventory of taxpayers with unpaid assessments, we determined if the taxpayers received various collection treatments following the notice process. The treatment categories defined for this study were based on where the case was first routed following the balance due notice process. Cases were routed to an automated collection or call site (ACS) or a field collection office (FC). Cases going to ACS could be subsequently transferred to FC as part of that treatment stream, but we did not estimate separate treatment effects for this routing. This was done to avoid the potential situation where the treatment applied to the case is endogenous to the taxpayer's response to previous treatments. For example, the case could have been transferred from ACS to FC as a result of the taxpayer calling in response to an ACS contact. Also, a taxpayer was considered treated if it was assigned to ACS and/or FC within two years of the notice process. We chose two years because this allows a sufficient amount of time in most instances for the IRS to have selected to treat the case and make a determination such as CNC.

We divided the taxpayers into five different groups based on where the taxpayer was assigned following the notice process and if there was a subsequent CNC determination. The five treatment groups are:

1. Routed to ACS with subsequent CNC determination,
2. Routed to ACS without subsequent CNC determination,
3. Routed to FC (no ACS assignment) with subsequent CNC determination,
4. Routed to FC (no ACS assignment) without subsequent CNC determination, and
5. No collection treatment.

Taxpayers were included in the no collection treatment category if they had at least one module⁸ in an available inventory status during the two years following notice.⁹ Taxpayers not in available inventory were removed from the study.¹⁰

Dependent Variable

We studied compliance behavior over a three-year period after the final balance due notice. We analyzed collection treatments during the first two years after the notice process. We modeled two outcomes.

1. The **total payments** made by the taxpayer in these first two years became the dependent variable for the model of payments toward delinquent assessments (unpaid assessment payments).
2. **New unpaid tax assessments** occurring in the third year after the notice process became the dependent variable for the subsequent compliance model.

Figure 2 illustrates the research design and compliance behavior studied over the three-year period.

⁶ Data is from the Accounts Receivable Dollar Inventory database stored in the IRS Compliance Data Warehouse.

⁷ This study related to businesses with unpaid taxes focusing on sole proprietors and corporations. This excludes businesses such as partnerships, estate and gift related taxes, government and other unpaid taxes.

⁸ A "module" is a tax year with outstanding issues for a specific taxpayer.

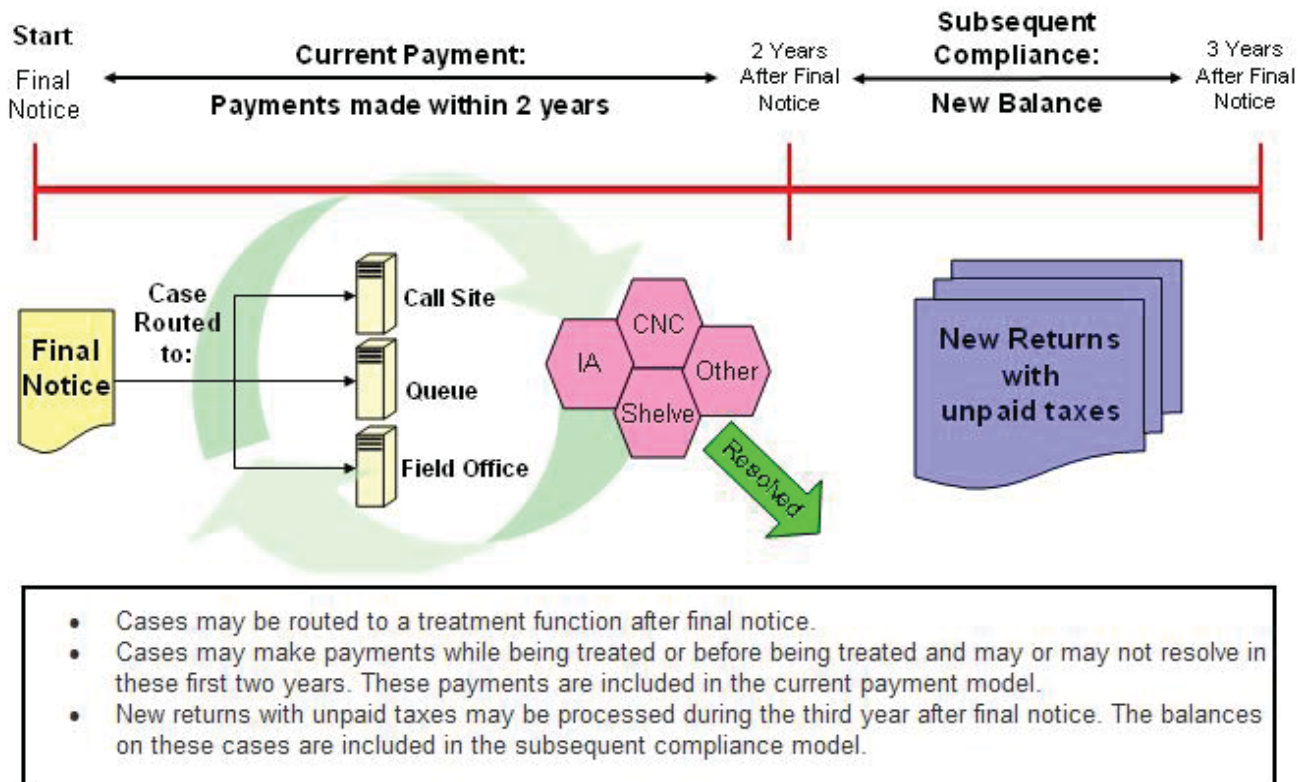
⁹ Cases in the Field Collection Queue or in a shelved status. Cases remain in the Queue until requested by a Collection Field function. If the case meets certain guidelines, then the IRS may shelve individual and business accounts removing the case from active inventory.

¹⁰ For example, some entities defined as unavailable to work for this study resolved their unpaid assessments during the notice process. Since the balance was resolved they would have never made it to the Queue, ACS and/or FC.

Independent Variables

Dummy variables for each treatment were included in the model allowing us to compare the impact of treating a case to not treating a case. Other explanatory variables of current payments and subsequent compliance included case characteristics such as the source of assessment (voluntarily reported balance due, examination assessment, nonfiler assessments, etc.), taxpayer type (corporation, sole proprietor, etc.), prior payments, previous treatments, age in accounts receivable, etc.. We also included the expected payments made on unpaid assessments resulting from the payment model as an independent variable for the subsequent compliance model. Appendices A and B provide a complete list of the variables.

FIGURE 2. Summary of Research Design



Overview of the Collection Inventory

Routing Assignments

The IRS uses several criteria to identify which cases should be worked and which treatment streams they should enter. At any point in time, there are more cases available than can actively be worked with the available ACS and FC resources. Table 1 shows where available inventory was routed by type of liability for the three calendar years in our study.

TABLE 1. Percent of Cases in Available Inventory by Type of Liability and Treatment Type, Calendar Years 2008–2010

Type of Liability [^]	Treatment Type [*]	Calendar Year of Final Notice		
		2008	2009	2010
Individual	ACS	84%	89%	91%
	FC (no ACS assignment)	2%	1%	1%
	No Treatment	14%	9%	8%
Business—Sole Proprietorship	ACS	56%	71%	71%
	FC (no ACS assignment)	29%	18%	17%
	None	16%	12%	12%
Business—Corporation	ACS	54%	70%	72%
	FC (no ACS assignment)	29%	18%	15%
	None	17%	13%	13%

[^] Individual liabilities are associated with taxpayers identified in the Individual Masterfile. Business liabilities (sole proprietorships and corporations) are associated with entities identified in the Business Masterfile.

^{*} Available Collection Inventory following final notice routed within two years of final notice.

NOTE: Totals may not add to 100 percent due to rounding. ACS stands for automated collection site. FC stands for field collection office.

Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Individuals and Businesses. Data extracted March 2014.

The IRS tends to use ACS and FC resources to work the more difficult and complicated cases, as well as the cases that are at more of a risk for future noncompliance. Thus, simple comparisons across treatment groups do not reveal the impact of treatment on taxpayer behavior. We must therefore control for other characteristics of a case (like balance due amount or prior behavior) to accurately estimate the impact of the treatment.

During our study period there were changes to how cases were routed to the treatment stream and variations in the number of cases coming into the collection work streams. The data in Table 1 highlight the effects of these changes. Variation in the percentage and type of cases that go to each stream helps identify the impact of each treatment stream in the regressions for unpaid assessment payments and subsequent compliance.

During Calendar Years 2008–2010, we identified approximately 6.8 million individuals and 1.4 million business taxpayers (sole proprietorships and corporations) that entered the post-notice treatment stream and were available to be worked by ACS and FC. All results in this paper are based on a 5 percent random sample of these taxpayers.¹¹

Unpaid Assessments Payments

Table 2 and Table 3 provide an overview of the payments on individual and business tax liabilities during the first two years following the notice process, respectively. The percentage of payments received were higher when the IRS treated the case compared to no treatment. Cases with a CNC determination in each treatment stream have a lower average payment than those not CNC.

Of the available individual inventory, 90 percent of the cases were treated within two years of the notice process, with most taxpayers (88 percent) routed to ACS following the notice process and just 2 percent routed directly to FC. Cases treated within two years had a higher rate of payments and higher median payments compared to those not treated. Cases treated with a CNC determination consisted of 9 percent of the available individual inventory. Even with the subsequent CNC determination, 56 percent of the cases routed to ACS and 67 percent routed to FC made a payment during the first two years following final notice.

¹¹ A 5-percent sample was selected for computational ease. The sample resulted in 339,974 individuals and 70,758 businesses.

TABLE 2. Payments on Unpaid Individual Income Tax Assessments in Available Collection Inventory, Calendar Years 2008–2010

During First Two Years After Final Notice, Cases Routed to	CNC Determination	Percent of Available Inventory	Percent With Payments in 2 Years Following Balance Due Notice Process	Median Payments	Average Payments
ACS	Yes	8%	56%	\$243	\$1,671
ACS	No	80%	72%	\$1,223	\$4,504
FC, but no ACS	Yes	1%	67%	\$805	\$5,696
FC, but no ACS	No	1%	79%	\$3,706	\$39,123
No Treatment	No	10%	52%	\$155	\$3,427
Available Individual Inventory		100%	69%	\$1,028	\$4,499

NOTE: ACS stands for automated collection site. FC stands for field collection office. CNC stands for currently not collectible.
Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Individuals. Data extracted March 2014.

Of the available business inventory, 86 percent of the cases were treated within two years of the notice process. Most of the cases treated were routed to ACS. Cases that were treated within two years had a higher rate of payments and higher median payments compared to those not treated. CNC determinations consisted of 9 percent of the available business inventory. Even with the subsequent CNC determination, 55 percent of the cases routed to either ACS or FC made a payment during the first two years following final notice. However, the average payment amount was larger with no treatment than it was for CNC dispositions.

TABLE 3. Payments on Unpaid Business Assessments in Available Collection Inventory, Calendar Years 2008–2010

During First Two Years After Final Notice, Cases Routed to	CNC Determination	Percent of Available Inventory	Percent With Payments in 2 Years Following Balance Due Notice Process	Median Payments	Average Payments
ACS	Yes	4%	55%	\$97	\$4,987
ACS	No	61%	78%	\$2,252	\$14,376
FC, but no ACS	Yes	5%	55%	\$105	\$7,186
FC, but no ACS	No	16%	85%	\$7,388	\$39,219
No Treatment	No	14%	44%	\$0	\$7,360
Available Business Inventory		100%	72%	\$1,835	\$16,458

NOTE: ACS stands for automated collection site. FC stands for field collection office. CNC stands for currently not collectible.
Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Businesses. Data extracted March 2014.

Subsequent Compliance

Table 4 and Table 5 provide an overview of subsequent compliance for the individuals and businesses in our study, respectively. Taxpayers are defined as noncompliant if they accrued new modules with unpaid assessments during the third year after final notice.

Overall, 12 percent of the individual taxpayers in our study acquired an additional module with an average unpaid assessment of \$804. Cases routed to ACS with a subsequent CNC determination had the lowest percentage of subsequent modules at 8 percent.¹²

¹² We did not explicitly control for taxpayers who didn't file a tax return, but should have. Taxpayers may have had circumstances removing their filing requirement, such as going out of business or bankruptcy, or were not identified as a nonfiler.

TABLE 4. Subsequent Compliance for Individuals' Unpaid Assessments in Available Collection Inventory, Calendar Years 2008–2010

Cases Routed to	CNC Determination	Percent of Available Inventory	Percent With Subsequent Module in Third Year	Median Subsequent Balance	Average Subsequent Balance
ACS	Yes	8%	8%	\$0	\$226
ACS	No	80%	13%	\$0	\$814
FC, but no ACS	Yes	1%	11%	\$0	\$873
FC, but no ACS	No	1%	21%	\$0	\$7,342
No Treatment	No	10%	10%	\$0	\$572
Available Inventory		100%	12%	\$0	\$804

NOTE: ACS stands for automated collection site. FC stands for field collection office. CNC stands for currently not collectible.
Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Individuals. Data extracted March 2014.

In addition, 24 percent of the businesses in our study acquired an additional module with an average unpaid assessment of \$2,286. Cases treated by either ACS or FC with a subsequent CNC determination had a lower percentage of subsequent modules at 5 percent compared to cases with no treatment at 14 percent.

TABLE 5. Subsequent Compliance for Business' Unpaid Assessments in Available Collection Inventory, Calendar Years 2008–2010

Cases Routed to	CNC Determination	Percent of Available Inventory	Percent With Subsequent Module in Third Year	Median Subsequent Balance	Average Subsequent Balance
ACS	Yes	4%	5%	\$0	\$266
ACS	No	61%	27%	\$0	\$2,378
FC, but no ACS	Yes	5%	5%	\$0	\$318
FC, but no ACS	No	16%	32%	\$0	\$3,852
No Treatment	No	14%	14%	\$0	\$1,517
Available Inventory		100%	24%	\$0	\$2,286

NOTE: ACS stands for automated collection site. FC stands for field collection office. CNC stands for currently not collectible.
Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Business. Data extracted March 2014.

Unpaid Assessment Payments—Model Estimates

We estimated separate Tobit models for businesses and individuals to estimate their net payments made within the first two years of the notice process.¹³ Table 7 provides the parameter estimates for the various treatment groups for both the business and individual taxpayers. Appendices A and B provide a full set of parameter estimates.

For both businesses and individuals, we find positive and significant effects of ACS and FC treatments on payments (Table 6). Treating a case leads to higher payments towards unpaid assessments compared to cases not treated. The impact of FC was somewhat larger than the ACS impact, all else equal. This is expected, since FC employees work fewer cases but work them more intensely, and have more authority to take certain actions compared to ACS employees. When a case is routed to ACS, there is a 2.45 and 1.72 expected change in log payments for businesses and individuals, respectively. When a case is routed to FC, there is a 2.67 and 2.39 expected change in log payments for businesses and individuals, respectively.

¹³ More specifically, we modeled the log of net payments.

TABLE 6. ACS and FC Consolidated Treatment Effects on Payments of Unpaid Assessments, Individual and Business Collection Inventory

Key Explanatory Variables <i>Dependent Variable: Log of Payments</i>	Business Liabilities		Individual Liabilities	
	Coefficient	Marginal Effect	Coefficient	Marginal Effect
Cases Routed to ACS	2.770 (0.069)***	2.45	2.107 (0.043)***	1.72
Cases Routed to FC	3.018 (0.075)***	2.67	2.921 (0.092)***	2.39
Constant	-3.463 (0.144)***		1.777 (0.083)***	
Sigma	4.281 (0.017)***		4.759 (0.009)***	
Log-likelihood value	-114,469		-556,429	
n	70,758		339,974	

NOTES: Not all explanatory variables shown; see Appendices A and B. Marginal Effects are calculated at the sample means.

*p<0.1; **p<0.05; ***p<0.01

Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Individuals and Businesses. Data extracted March 2014.

When we estimate separate treatment effects for CNC and non-CNC case determinations we still find a positive and significant effect on payments (see Table 7). For business taxpayers, given we treat the case and make a CNC determination, there is approximately a 0.4 marginal effect in the log of payments compared to no treatment, all else equal. For individual taxpayers with the same treatment and CNC determination, there is a 1.26 to 1.59 increase in the log payments compared to taxpayers not treated, all else equal. The results indicate that there is a larger treatment effect for the cases not identified as CNC, but the treatment effect is positive in both types of cases.

TABLE 7. ACS and FC CNC/Non-CNC Treatment Effects on Payments of Unpaid Assessments, Individual and Business Collection Inventory

Key Explanatory Variables <i>Dependent Variable: Log of Payments</i>	Businesses		Individuals	
	Coefficients	Marginal Effects	Coefficients	Marginal Effects
Group 1: ACS with CNC	0.452 (0.120)***	0.40	1.535 (0.062)***	1.26
Group 2: ACS no CNC	2.978 (0.068)***	2.65	2.146 (0.043)***	1.76
Group 3: FC, but no ACS, with CNC	0.440 (0.107)***	0.39	1.943 (0.144)***	1.59
Group 4: FC, but no ACS, no CNC	3.792 (0.078)***	3.37	3.427 (0.111)***	2.80
Constant	-3.690 (0.142)***		1.763 (0.083)***	
Sigma	4.195 (0.017)***		4.755 (0.009)***	
Log-likelihood value	-113,648		-556,281	
n	70,758		339,974	

NOTES: Not all explanatory variables shown; see Appendices A and B. Marginal Effects are calculated at the sample means.

*p<0.1; **p<0.05; ***p<0.01

Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Individuals and Businesses. Data extracted March 2014.

Subsequent Compliance—Model Estimates

We estimated separate Tobit models for businesses and individuals to estimate their subsequent compliance defined as the log of the dollar amount of new unpaid tax assessments during the third year after the notice process. Table 8 provides the parameter estimates for the various treatment groups from both models. Appendices A and B provide a full set of parameter estimates.

For both businesses and individuals, we find a negative and significant effect on subsequent underpayment, given the IRS treated the case using ACS and/or FC resources. In other words, treating a case leads to lower amounts of unpaid assessments on new modules. The effect was greater for cases routed to FC compared to ACS. When a case is routed to ACS, there is a -0.2 and -0.1 marginal effect on the log of new assessments for businesses and individuals, respectively. When a case is routed to FC, there is a -0.4 and -0.3 marginal effect on the log of new assessments for businesses and individuals, respectively.

TABLE 8. ACS and FC Consolidated Effects on Subsequent Compliance, Individual and Business Collection Inventory

Key Explanatory Variables <i>Dependent Variable: Log of New Assessments</i>	Business Liabilities		Individual Liabilities	
	Coefficients	Marginal Effects	Coefficients	Marginal Effects
Cases Routed to ACS	-1.132 (0.152)***	-0.20	-0.887 (0.159)***	-0.09
Cases Routed to FC	-2.300 (0.172)***	-0.40	-2.636 (0.327)***	-0.27
Constant	-6.055 (0.296)***		-26.961 (0.332)***	
Sigma	7.534 (0.048)***		10.918 (0.056)***	
Log-likelihood value	-75,465		-161,274	
n	70,758		339,974	

NOTES: Not all explanatory variables shown; see Appendices A and B. Marginal Effects are calculated at the sample means.

*p<0.1; **p<0.05; ***p<0.01

Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Individuals and Businesses. Data extracted March 2014.

When the treatment groups are broken out by whether a case was identified as CNC, we still find a negative and significant effect on subsequent compliance in terms of new unpaid assessments (see Table 9). For business taxpayers, given we treat and determine the case as CNC, there is approximately a -1.1 to -1.2 marginal effect in the log of new assessments, compared to no treatment, all else equal. For individual taxpayers with the same treatment and CNC determination, there is a -0.3 to -0.4 marginal effect in the log of new assessments compared to taxpayers not treated, all else equal. Thus, the estimated subsequent compliance treatment effects for cases identified as CNC are larger than those not identified as CNC.

Conclusions and Direction for Further Research

We find positive impacts in terms of both revenue and subsequent compliance from using ACS and FC resources to collect unpaid taxes, even if it is known, a priori, that the case will meet the guidelines for being identified as CNC.¹⁴ The model estimates do suggest that the FC and ACS treatments will have a smaller impact on payments for cases with a CNC determination versus other cases. It seems fairly intuitive that working a CNC case would not produce as much additional revenue as a more collectible case. However, the estimated subsequent compliance impact of working CNC cases is relatively large compared to cases without a CNC determination. One should keep in mind, however, that the models do not explicitly control for circumstances as to why the taxpayer may have not filed or not had a filing requirement, such as a bankruptcy or going out of business.

¹⁴ It is not possible to determine if a case will be identified CNC with certainty until the case is worked by an ACS or FC employee.

TABLE 9. ACS and FC CNC/Non-CNC Treatment Effects on Subsequent Compliance, Individual and Business Collection Inventory

Key Explanatory Variables Dependent Variable: Log of New Assessments	Business Liabilities		Individual Liabilities	
	Coefficients	Marginal Effects	Coefficients	Marginal Effects
Group 1: ACS with CNC	-6.446 (0.338)***	-1.10	-3.191 (0.237)***	-0.33
Group 2: ACS no CNC	-0.326 (0.152)***	-0.06	-0.685 (0.237)***	-0.07
Group 3: FC, but no ACS, with CNC	-6.848 (0.315)***	-1.17	-4.291 (0.546)***	-0.44
Group 4: FC, but no ACS, no CNC	-0.947 (0.179)***	-0.16	-2.042 (0.375)***	-0.21
Constant	-6.347 (0.295)***		-27.107 (0.332)***	
Sigma	7.458 (0.047)***		10.902 (0.056)***	
Log-likelihood value	-75,052		-161,172	
n	70,758		339,974	

NOTES: Not all explanatory variables shown; see Appendices A and B. Marginal Effects are calculated at the sample means.

*p<0.1; **p<0.05; ***p<0.01

Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Individuals and Businesses. Data extracted March 2014.

These results suggest that any optimal approach to collecting unpaid taxes that considers the treatment impacts on both enforcement revenue and ensuring future payment compliance should include cases that are CNC, even if those cases could be identified prior to treatment. Thus, it may not be appropriate to evaluate the success or failure of any treatment strategy based on a CNC determination. It is well beyond the scope of this paper to determine what the appropriate mix of cases is and how to balance the importance of revenue collection and subsequent compliance. However, it does appear that a CNC determination is not a good proxy for the productivity of a case. Rather, focusing on the treatment impact on payments and subsequent compliance is a more direct, and arguably more appropriate, strategy. However, the cost of the treatments should be taken into account; even if CNC cases tend to produce benefits, these should be compared with the associated costs to determine if CNC cases are more or less cost-effective than non-CNC cases.

This research could be extended by further exploration into the assumptions of CNC conditions being exogenous to the taxpayer's response to the treatment. If CNC conditions are endogenous to treatment then an Instrumental Variable approach may be appropriate to estimate the impacts of treating each type of case. It might also prove useful to expand the time period for studying subsequent payment compliance.

Another extension of this research could include modeling payments of current unpaid assessments and future noncompliance simultaneously. When a taxpayer is considering whether to make payments on past unpaid assessments, they are also likely considering making payments on current or future tax liabilities (e.g. withholding, estimated payments, or payments with the next tax return filed). One way to capture this decision-making process is to model both of these forms of compliance simultaneously, most likely using a method such as Seemingly Unrelated Regression (SUR) or a dynamic structure using Vector Autoregression (VAR). In our research, we did account for expected payments made on current unpaid assessments as a part of explaining future noncompliance, but we did not account for payments necessary for future compliance toward current unpaid assessments. Using SUR or VAR could help rectify this issue.

References

- Greene, William. 2003. *Econometric Analysis*. New Jersey: Prentice Hall.
- IRS, Small Business/Self-Employed Research, St. Paul. 2002. "Estimating the Impact of Federal Tax Lien Filing on Accounts Receivable Resolution." Project 13.14 Study Report (Project 07.13.003.01).
- IRS, Small Business/Self-Employed Research, St. Paul. 2006. "Impact of the Federal Tax Lien on Cases Shelved by the Currently Not Collectible Filter." Project STP0001.
- IRS, Small Business/Self-Employed Research, Denver. 2012. "Utility of the Notice of Federal Tax Lien on Currently Not Collectible Hardship Taxpayers." Project DEN0194.
- IRS, Small Business/Self-Employed Research, Denver. 2012. "Estimating the Impact of Federal Tax Lien Filing on BMF and IMF Cases Assigned to the Queue." Project DEN0113.
- National Taxpayer Advocate 2013 Annual Report to Congress. Volume Two: *A Comparison of Revenue Officers and the Automated Collection System in Addressing Similar Employment Tax Delinquencies*.
- SAS Institute Inc. 2008. *SAS/ETS User's Guide*, Version 9.2, Cary, NC: SAS Institute Inc.
- Turk, Alex and Terry Ashley. 2002. "Accounts Receivable Resolution and The Impact of Lien Filing Policy on Sole Proprietor Businesses," Federal Forecasters Conference 2002—Papers and Proceedings, pp 323–331.

Appendix A

Complete Model Results for Businesses

TABLE A1. Past Assessment Payment Model for Businesses, Consolidated Treatment Effects

Explanatory Variables	Coefficient	Standard Error	P-value	Marginal Effect
Cases routed to ACS	2.770	0.069	<.0001	2.45
Cases routed to FC	3.018	0.075	<.0001	2.67
Total abatements over the one year prior to final notice as a percent of the balance due	-1.550	0.142	<.0001	-1.37
Log of the balance due at final notice.	-0.245	0.020	<.0001	-0.22
Taxpayer has a lien at final notice.	-0.542	0.084	<.0001	-0.48
Taxpayer has a balance due source of assessment.	0.689	0.047	<.0001	0.61
Taxpayer has a nonfiler source of assessment.	-0.452	0.053	<.0001	-0.40
Age of the most recent module.	-0.983	0.024	<.0001	-0.87
Taxpayer had new modules within one year prior to final notice.	0.413	0.018	<.0001	0.37
Age of the taxpayer's oldest module in accounts receivable.	0.065	0.015	<.0001	0.06
Change in payments over the year prior to final notice.	0.057	0.006	<.0001	0.05
Change in the frequency of payments two years prior compared to one year prior of final notice.	-0.113	0.011	<.0001	-0.10
Taxpayer resolved modules in the one year prior to final notice.	1.819	0.058	<.0001	1.61
Taxpayer is a corporation.	-0.440	0.050	<.0001	-0.39
Log of the taxpayer's TPI at final notice.	0.876	0.018	<.0001	0.77
Taxpayer has a module assigned to the Queue during notice process.	-0.112	0.072	0.1209	-0.10
Taxpayer has a module CNC or shelved during notice process.	-1.976	0.106	<.0001	-1.75
Taxpayer was treated and made payments during the one year prior to notice.	0.118	0.022	<.0001	0.10
Total Payments over the one year prior to final notice as a percent of the balance due	1.302	0.098	<.0001	1.15
Constant	-3.463	0.144	<.0001	
Sigma	4.281	0.017	<.0001	
Log-likelihood value	-114,469			
n	70,758			

NOTES: ACS stands for automated collection site. FC stands for field collection office.
Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Businesses. Data extracted March 2014.
Marginal Effects are calculated at the sample means.

TABLE A2. Past Assessment Payment Model for Businesses, CNC/Non-CNC Treatment Effects

Explanatory Variables	Coefficient	Standard Error	P-value	Marginal Effect
Group 1: ACS with CNC	0.452	0.120	0.0002	0.40
Group 2: ACS no CNC	2.978	0.068	<.0001	2.65
Group 3: FC, but no ACS, with CNC	0.440	0.107	<.0001	0.39
Group 4: FC, but no ACS, no CNC	3.792	0.078	<.0001	3.37
Total abatements over the one year prior to final notice as a percent of the balance due	-1.494	0.140	<.0001	-1.33
Log of the balance due at final notice.	-0.192	0.019	<.0001	-0.17
Taxpayer has a lien at final notice.	-0.325	0.082	<.0001	-0.29
Taxpayer has a balance due source of assessment.	0.754	0.046	<.0001	0.67
Taxpayer has a nonfiler source of assessment.	-0.403	0.052	<.0001	-0.36
Age of the most recent module.	-0.958	0.023	<.0001	-0.85
Taxpayer had new modules within one year prior to final notice.	0.411	0.018	<.0001	0.37
Age of the taxpayer's oldest module in accounts receivable.	0.053	0.015	0.0003	0.05
Change in payments over the year prior to final notice.	0.063	0.006	<.0001	0.06
Change in the frequency of payments two years prior compared to one year prior of final notice.	-0.119	0.011	<.0001	-0.11
Taxpayer resolved modules in the one year prior to final notice.	1.704	0.057	<.0001	1.52
Taxpayer is a corporation.	-0.355	0.049	<.0001	-0.32
Log of the taxpayer's TPI at final notice.	0.842	0.018	<.0001	0.75
Taxpayer has a module assigned to the Queue during notice process.	-0.144	0.071	0.0423	-0.13
Taxpayer has a module CNC or shelved during notice process.	-1.862	0.104	<.0001	-1.66
Taxpayer was treated and made payments during the one year prior to notice.	0.108	0.022	<.0001	0.10
Total Payments over the one year prior to final notice as a percent of the balance due	1.247	0.096	<.0001	1.11
Constant	-3.690	0.142	<.0001	
Sigma	4.195	0.017	<.0001	
Log-likelihood value	-113,648			
n	70,758			

NOTES: ACS stands for automated collection site. CNC stands or currently not collectible. FC stands for field collection office. Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Businesses. Data extracted March 2014. Marginal Effects are calculated at the sample means.

TABLE A3. Subsequent Compliance Model for Businesses, Consolidated Treatment Effects

Explanatory Variables	Coefficient	Standard Error	P-value	Marginal Effect
Cases routed to ACS	-1.132	0.152	<.0001	-0.20
Cases routed to FC	-2.300	0.172	<.0001	-0.40
Taxpayer had both a TDI and TDA module active two years following notice process.	-0.746	0.116	<.0001	-0.13
Taxpayer had unpaid nonfiler source of assessments.	-2.495	0.098	<.0001	-0.44
Taxpayer had balance due unpaid source of assessments.	-0.807	0.091	<.0001	-0.14
Number of cycles since the most recent module with an unpaid assessment.	-0.082	0.002	<.0001	-0.01
Age of the newest module with an unpaid assessment	-1.524	0.047	<.0001	-0.27
Log of Taxpayer's TPI two years after final notice.	-0.027	0.030	0.364	0.00
Log of Taxpayer's balance due at two years following final notice.	0.624	0.017	<.0001	0.11
Estimate of log payments amount over 2 years after final notice.	0.929	0.024	<.0001	0.16
Constant	-6.055	0.296	<.0001	
Sigma	7.534	0.048	<.0001	
Log-likelihood Value	-75,465			
n	70,758			

NOTES: ACS stands for automated collection site. FC stands for field collection office.
Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Businesses. Data extracted March 2014.
Marginal Effects are calculated at the sample means.

TABLE A4. Subsequent Compliance Model for Businesses, CNC/Non-CNC Treatment Effects

Explanatory Variables	Coefficient	Standard Error	P-value	Marginal Effect
Group 1: ACS with CNC	-6.446	0.338	<.0001	-1.10
Group 2: ACS no CNC	-0.326	0.152	0.0323	-0.06
Group 3: FC, but no ACS, with CNC	-6.848	0.309	<.0001	-1.17
Group 4: FC, but no ACS, no CNC	-0.947	0.179	<.0001	-0.16
Taxpayer had both a TDI and TDA module active two years following notice process.	-1.009	0.115	<.0001	-0.17
Taxpayer had unpaid nonfiler source of assessments.	-2.455	0.098	<.0001	-0.42
Taxpayer had balance due unpaid source of assessments.	-0.564	0.090	<.0001	-0.10
Number of cycles since the most recent module with an unpaid assessment.	-0.077	0.002	<.0001	-0.01
Age of the newest module with an unpaid assessment	-1.577	0.046	<.0001	-0.27
Log of Taxpayer's TPI two years after final notice.	0.082	0.029	0.0052	0.01
Log of Taxpayer's balance due at two years following final notice.	0.661	0.017	<.0001	0.11
Estimate of log payments amount over 2 years after final notice.	0.705	0.025	<.0001	0.12
Constant	-6.347	0.295	<.0001	
Sigma	7.458	0.047	<.0001	
Log-likelihood Value	-75,052			
n	70,758			

NOTES: ACS stands for automated collection site. CNC stands or currently not collectible. FC stands for field collection office.
Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Businesses. Data extracted March 2014.
Marginal Effects are calculated at the sample means.

Appendix B

Complete Model Results for Individuals

TABLE B1. Past Assessment Payment Model for Individuals, Consolidated Treatment Effects

Explanatory Variables	Coefficient	Standard Error	P-value	Marginal Effect
Cases routed to ACS	2.107	0.043	<.0001	1.723
Cases routed to FC	2.921	0.092	<.0001	2.389
CNC: unable to Contact Indicator	-3.609	0.062	<.0001	-2.951
Frequency of accruing new modules in the 2 years prior to final notice	0.291	0.014	<.0001	0.238
Age of the newest module with balance due	-0.171	0.008	<.0001	-0.140
Log of payments made in the 2 years prior to final notice	0.256	0.004	<.0001	0.210
Indicator of wages only taxpayer 2 years prior to final notice	-0.666	0.036	<.0001	-0.545
Indicator of "other" type of taxpayer at time of final notice.	-0.759	0.037	<.0001	-0.620
Log of TPI at time of final notice	0.135	0.003	<.0001	0.111
Log of payments made while in final notice status over past 2 years prior to final notice	0.261	0.006	<.0001	0.213
Time spent in Field status 1 year prior to final notice	-0.119	0.005	<.0001	-0.097
Time spent in ACS status 2 years prior to final notice	-0.086	0.004	<.0001	-0.070
Log of payments made while in queue status over past 2 years prior to final notice	0.195	0.008	<.0001	0.160
Treated by ASFR but marked as treated by field in CDW	1.830	0.071	<.0001	1.497
Time since last payment made in a "worked" status (Field or ACS).	-0.013	0.000	<.0001	-0.011
Constant	1.777	0.083	<.0001	
Sigma	4.759	0.009	<.0001	
Log-likelihood Value	-556,429			
n	339,974			

NOTES: ACS stands for automated collection site. CNC stands or currently not collectible. FC stands for field collection office
Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Individuals. Data extracted March 2014.
Marginal Effects are calculated at the sample means.

TABLE B2. Past Assessment Payment Model for Individuals, CNC/Non-CNC Treatment Effects

Explanatory Variables	Coefficient	Standard Error	P-value	Marginal Effect
Group 1: ACS with CNC	1.535	0.062	<.0001	1.26
Group 2: ACS no CNC	2.146	0.043	<.0001	1.76
Group 3: FC, but no ACS, with CNC	1.943	0.144	<.0001	1.59
Group 4: FC, but no ACS, no CNC	3.427	0.111	<.0001	2.80
CNC: unable to Contact Indicator	-3.079	0.075	<.0001	-2.52
Frequency of accruing new modules in the 2 years prior to final notice	0.295	0.014	<.0001	0.24
Age of the newest module with balance due	-0.168	0.008	<.0001	-0.14
Log of payments made in the 2 years prior to final notice	0.256	0.004	<.0001	0.21
Indicator of wages only taxpayer 2 years prior to final notice	-0.661	0.036	<.0001	-0.54
Indicator of "other" type of taxpayer at time of final notice.	-0.753	0.037	<.0001	-0.62
Log of TPI at time of final notice	0.134	0.003	<.0001	0.11
Log of payments made while in final notice status over past 2 years prior to final notice	0.259	0.006	<.0001	0.21
Time spent in Field status 1 year prior to final notice	-0.119	0.005	<.0001	-0.10
Time spent in ACS status 2 years prior to final notice	-0.085	0.004	<.0001	-0.07
Log of payments made while in queue status over past 2 years prior to final notice	0.195	0.008	<.0001	0.16
Treated by ASFR but marked as treated by field in CDW	1.649	0.074	<.0001	1.35
Treated by ASFR but marked as treated by field in CDW, then closed as CNC	2.776	0.154	<.0001	2.27
Time since last payment made in a "worked" status (Field or ACS).	-0.013	0.000	<.0001	-0.01
Constant	1.763	0.083	<.0001	
Sigma	4.755	0.009	<.0001	
Log-likelihood value	-556,281			
n	339,974			

NOTES: ACS stands for automated collection site. CNC stands or currently not collectible. FC stands for field collection office
Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Individuals. Data extracted March 2014.
Marginal Effects are calculated at the sample means.

TABLE B3. Subsequent Compliance Model for Individuals, Consolidated Treatment Effects

Explanatory Variables	Coefficient	Standard Error	P-value	Marginal Effect
Cases routed to ACS	-0.887	0.159	<.0001	-0.09
Cases routed to FC	-2.636	0.327	<.0001	-0.27
Log of entity balance 2 years after final notice	0.492	0.022	<.0001	0.05
CNC: unable to Contact Indicator	-0.133	0.265	0.6165	-0.01
Estimate of log payments amount over 2 years after final notice.	1.370	0.039	<.0001	0.14
Indicator of Balance Due module assessed after final notice	8.871	0.086	<.0001	0.92
Indicator of module assessed 2 years prior to final notice	1.296	0.086	<.0001	0.13
Payments made over two years prior to final notice as a percent of total balance.	1.256	0.197	<.0001	0.13
Treated by ASFR but marked as treated by field in CDW	-1.627	0.266	<.0001	-0.17
W&I indicator 2 years after final notice	-2.072	0.076	<.0001	-0.21
Constant	-26.961	0.332	<.0001	
Sigma	10.918	0.056	<.0001	
Log-likelihood value	-161,274			
n	339,974			

NOTES: ACS stands for automated collection site. CNC stands or currently not collectible. FC stands for field collection office
Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Individuals. Data extracted March 2014.
Marginal Effects are calculated at the sample means.

TABLE B4. Subsequent Compliance Model for Individuals, CNC/Non-CNC Treatment Effects Internal

Explanatory Variables	Coefficient	Standard Error	P-value	Marginal Effect
Group 1: ACS with CNC	-0.685	0.159	<.0001	-0.07
Group 2: ACS no CNC	-3.191	0.237	<.0001	-0.33
Group 3: FC, but no ACS, with CNC	-2.042	0.375	<.0001	-0.21
Group 4: FC, but no ACS, no CNC	-4.291	0.546	<.0001	-0.44
Log of entity balance 2 years after final notice	0.527	0.022	<.0001	0.05
CNC: unable to Contact Indicator	2.136	0.312	<.0001	0.22
Estimate of log payments amount over 2 years after final notice.	1.333	0.039	<.0001	0.14
Indicator of Balance Due module assessed after final notice	8.872	0.086	<.0001	0.91
Indicator of module assessed 2 years prior to final notice	1.331	0.086	<.0001	0.14
Payments made over two years prior to final notice as a percent of total balance.	1.245	0.197	<.0001	0.13
Treated by ASFR but marked as treated by field in CDW	-1.332	0.279	<.0001	-0.14
Treated by ASFR but marked as treated by field in CDW, then closed as CNC	-3.926	0.625	<.0001	-0.40
W&I indicator 2 years after final notice	-2.038	0.076	<.0001	-0.21
Constant	-27.107	0.332	<.0001	
Sigma	10.902	0.056	<.0001	
Log-likelihood value	-161,172			
n	339,974			

NOTES: ACS stands for automated collection site. CNC stands or currently not collectible. FC stands for field collection office
Source: Internal Revenue Service Accounts Receivable Dollar Inventory for Individuals. Data extracted March 2014.
Marginal Effects are calculated at the sample means.