Session 2. Realizing the Potential of Tax Enforcement

Moderator:	***Ron Hodge*** *IRS, RAAS*
How Do IRS Resources Affect the Tax Enforcement Process?	***Erin Towery*** *University of Georgia*
Tax Audits and Tax Compliance – Evidence from Italy	***Alessandro Modica****- Ministero dell'Economia e delle Finanze, Government of Italy*
Valuing Unpaid Tax Assessments – Estimating Long-Run Collectability Using an Econometric Approach	***Alex Turk*** *IRS, RAAS*
Discussant:	***Michael Udell*** *District Economics Group*

How do IRS resources affect the tax enforcement process?

Erin Towery, University of Georgia

(with Michelle Nessa, Casey Schwab & Bridget Stomberg)

2017 IRS-TPC Research Conference

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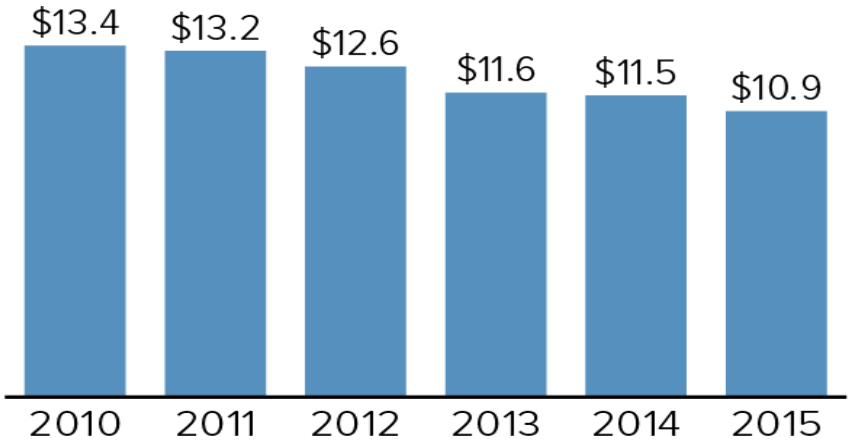
Disclaimer

The views expressed in this presentation do not reflect the positions of the Internal Revenue Service.

IRS Funding Has Fallen Sharply

IRS appropriated funding in 2015 dollars, billions

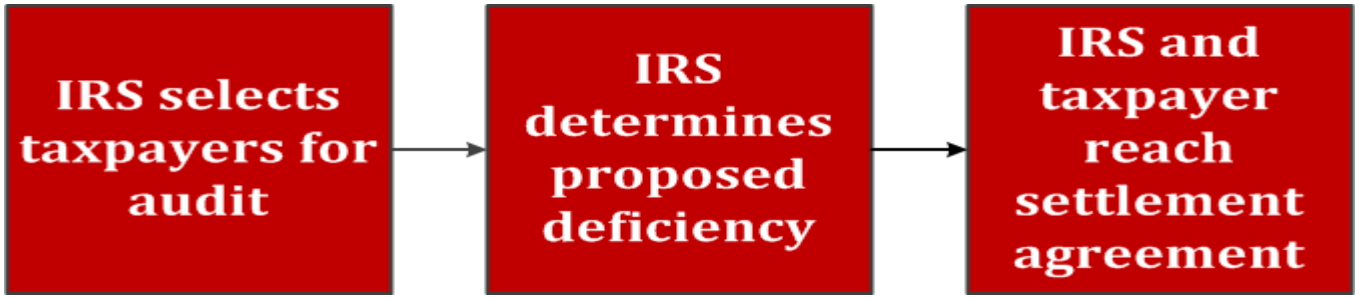


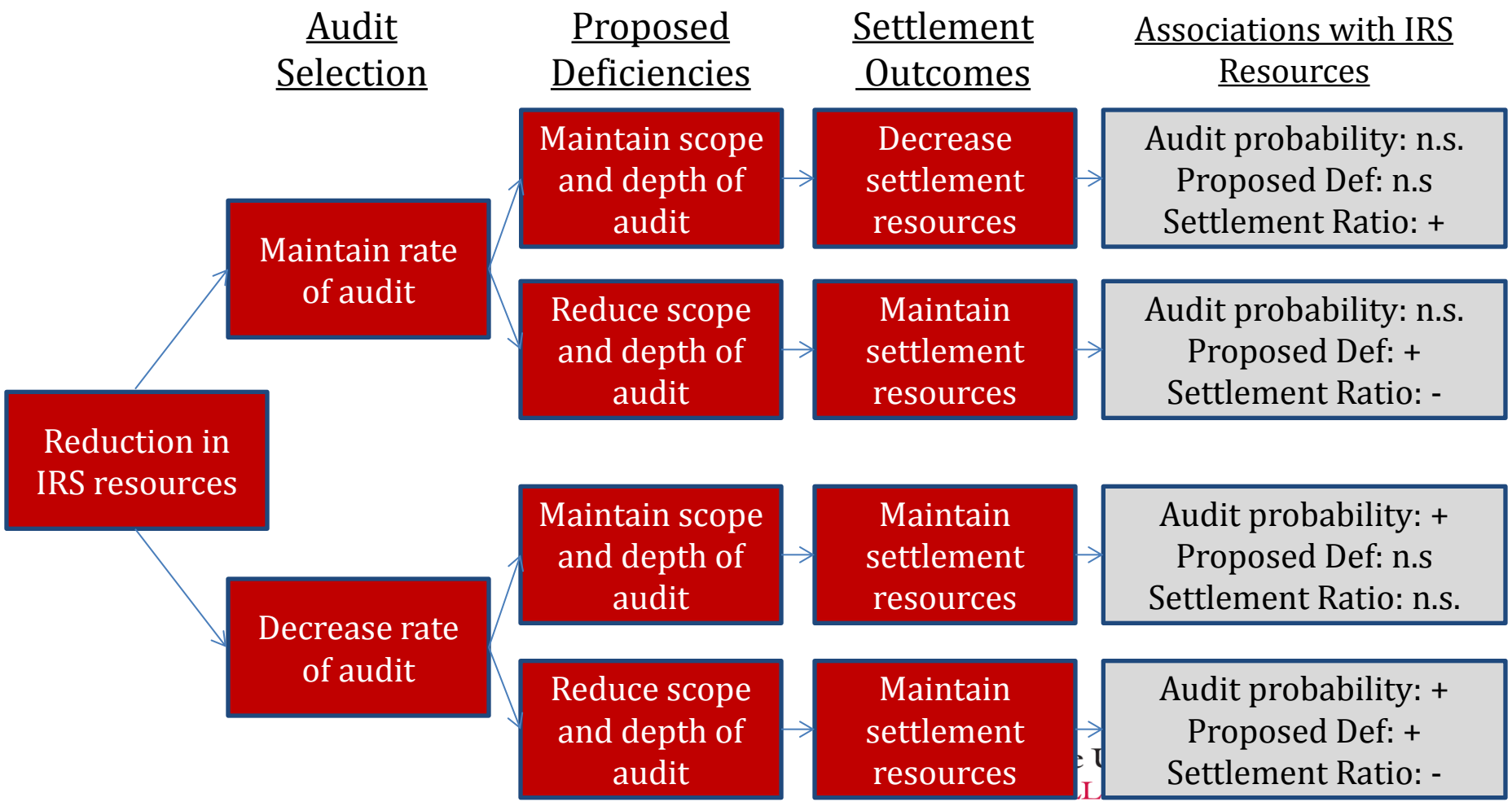
Source: CBPP calculations based on Congressional Budget Office, Office of Management and Budget, and Bureau of Labor Statistics data

IRS Enforcement Process

Research Question: How do IRS resources affect the corporate tax enforcement process?

IRS Enforcement Process




Audit Selection
Proposed Deficiencies
Settlement Outcomes
Associations with IRS Resources
Reduction in IRS resources
Maintain rate of audit
Decrease rate of audit
Maintain scope and depth of audit
Reduce scope and depth of audit
Maintain scope and depth of audit
Reduce scope and depth of audit
Decrease settlement resources
Maintain settlement resources
Maintain settlement resources
Maintain settlement resources
Audit probability: n.s.
Proposed Def: n.s
Settlement Ratio: +
Audit probability: n.s.
Proposed Def: +
Settlement Ratio: -
Audit probability: +
Proposed Def: n.s
Settlement Ratio: n.s.
Audit probability: +
Proposed Def: +
Settlement Ratio: -

Hypotheses

IRS resources are not associated with the:

H1a: probability of audit.

H1b: incidence of proposed deficiencies.

H1c: magnitude of proposed deficiencies.

H1d: proportion of deficiencies collected.

Research Design (H1a)

$$IRSAudit_{i,t} = \alpha_0 + \alpha_1 IRSResources_{t+k} + \sum Controls_{i,t} + \varepsilon$$

- *IRSAudit* = Indicator equal to 1 if IRS audits return year (H1a)
  - Linear probability model (LPM)
- IRS Resources: (measured in year after return is filed)
  - Enforcement expenditures
  - Number of revenue agents
  - Both scaled by total number of returns filed
- Control variables:
  - Based on Mills (1998), Wilson (2009), and Lisowsky (2010)

Research Design (H1b/c)

$$Deficiency_{i,t} = \alpha_0 + \alpha_1 IRSResources_{t+k} + \sum Controls_{i,t} + \varepsilon$$

- *Deficiency*:
  - Indicator equal to 1 if IRS proposes a deficiency (H1b) - LPM
  - Proposed deficiency scaled by Tax Savings (H1c) – OLS
- IRS Resources measured in year audit begins
  - Scaled by total number of returns examined
- Sample: All audited returns

Research Design (H1d)

$$Settlement_{i,t} = \alpha_0 + \alpha_1 IRSResources_{t+k} + \sum Controls_{i,t} + \varepsilon$$

- *Settlement* = Total settlements scaled by the proposed deficiency (H1d) – OLS
  - Higher (lower) values more favorable to the IRS (taxpayer)
- IRS Resources measured in year audit begins
  - Scaled by total number of returns examined
- Control for level of proposed deficiency
- Sample: Returns with *PropDef* > 0

Sample

- Merged Compustat with IRS tax return, audit and settlement data using EINs
- Includes tax-return years from 2000 to 2010
  - To allow for sufficient time for returns to be selected for audit and move through the audit and appeals process
- Includes IRS audits conducted from 2002 to

Probability of audit (H1a)

IRSResources =		*Enforce_Filed*	*RevAgents_Filed*
		Coef.	Coef.
Variable		*t-statistic*	*t-statistic*
IRSResources	H1a	4.9839 ***	2.7185 ***
		2.63	*3.05*
Controls		Included	Included
Adjusted R^2		0.1402	0.1403
N		31,549	31,549

One standard deviation decrease is associated with a 2.3 percentage point decrease in audit probability relative to the base probability.

Incidence of proposed deficiencies (H1b)

IRSResources =		*Enforce_Audited*	*RevAgents_Audited*
		Coef.	Coef.
Variable		*t-statistic*	*t-statistic*
IRSResources	H1b	0.0201 ***	0.0088 ***
		3.00	*2.99*
Controls		Included	Included
Adjusted R^2		0.1170	0.1170
N		11,899	11,899

One standard deviation decrease is associated with a 3.2 percentage point decrease in the probability of a proposed deficiency relative to the base probability.

Magnitude of proposed deficiencies (H1c)

IRSResources =		*Enforce_Audited*	*RevAgents_Audited*
		Coef.	Coef.
Variable		*t-statistic*	*t-statistic*
IRSResources	H1c	0.0098 ***	0.0042 ***
		3.13	*3.07*
Controls		Included	Included
Adjusted R^2		0.1170	0.1170
N		11,899	11,899

One standard deviation decrease is associated with a $497,000 decrease in proposed deficiencies per audited return.

Proportion of Deficiencies Collected (H1d)

IRSResources =		*Enforce_Audited*	*RevAgents_Audited*
		Coef.	Coef.
Variable		*t-statistic*	*t-statistic*
IRSResources	H1d	-0.0218 **	-0.0087 **
		-2.32	*-2.13*
Controls		Included	Included
Adjusted R^2		0.0638	0.0635
N		5,840	5,840

One standard deviation decrease is associated with a $179,000 increase in settlements per return with a deficiency.

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Aggregate effect

- One standard deviation ↓ in the enforcement budget = **$14.2 billion** from 2002-2014
- Net effect: A one standard deviation ↓ in IRS resources associated with a loss in collections of **$3.3 billion** *for our sample returns* from 2002-2014
- Extrapolating estimates to *all* large corporations, a one standard deviation ↓ in IRS resources associated with a loss in collections of **$28.7 billion**
- Estimates do not include small corporations or individual taxpayers

Conclusion

- Resource reductions compel the IRS to be strategic during the corporate tax enforcement process
  - IRS decreases the rate of audit
  - IRS proposes fewer and smaller deficiencies
  - IRS collects more of the deficiencies proposed
- Taxpayer and tax authority interaction
  - Identify level of IRS resources as an important determinant of audit probability and proposed deficiencies
  - Examine the negotiation process that follows the completion of an IRS exam

TAX AUDITS AND TAX COMPLIANCE – EVIDENCE FROM ITALY

Elena D'Agosto
Alessandro Modica
Marco Manzo
Stefano Pisani

IRS – TPS Research conference
June 21, 2017

Outline

- Motivation and related literature
- The dataset
- The empirical model
  - The indirect effect of tax audits
  - Tax audit effect by type of tax audit
  - The general deterrence effect
- Conclusions

Motivation and Related Literature

- Tax audits:
  - directly detect tax evasion;
  - promote voluntary compliance (indirect effect).

- Gemmell and Ratto (2012): Indirect effect implies a behavioral response of audited taxpayers (“corrective effect”) and non-audited taxpayers (“deterrent effect”).

Motivation and Related Literature

- Many studies using **aggregate data** find that the effect on tax compliance is positive and that the indirect effect prevails over the direct effect (e.g. Plumley, 1996 and Dubin, 2007).
- Others, using **individual data, find contrasting results:**
  - DeBacker et al. on U.S. tax data find that compliance of corporations **decreases** after an audit.
  - Advani et al. (2015) on UK data find that compliance of self-employed **increases** after an audit.

Motivation and Related Literature

- Innovating on a companion paper (D'Agosto et al, 2017), we use a panel of Italian firms to estimate the impact of tax audits on tax compliance.
- We consider different types of taxes and different categories of audit programs.
- We extend the analysis to estimate the effect of tax audits on non-audited taxpayers (general deterrence effect).
- Particularly relevant in Italy, where tax evasion has been estimated in about the 7% of the GDP.

The dataset

- Balanced panel with micro level data on small business over the period 2006-2011.

- Among small businesses, the propensity to underreport income is higher than the national average.

Table- Audits by category and year

	Desk Audit		Field Audit		Audited Taxpayers	% audited	Taxpayers
	full	partial	deep	soft			
2006	1,339	5,425	844	6,919	11,392	9.0%	126,401
2007	1,424	6,078	977	6,036	11,253	8.9%	126,401
2008	1,938	6,456	1,103	4,732	10,950	8.7%	126,401
2009	2,826	5,083	1,054	4,385	10,127	8.0%	126,401
2010	2,679	4,671	996	4,162	9,503	7.5%	126,401
2011	2,339	4,135	1,079	4,175	8,846	7.0%	126,401

The dataset

Table- SDS program

	Audited	Non-Audited	Total
% of SDS coherent	47%	58%	57%
% of SDS congruent	56%	67%	62%

- SdS is an audit program for small and medium sized firms, introduced in Italy in 1998.
- “non-congruent” = sales below the estimated level.
- “non-coherent” = value of some indicators different from the computed benchmark.
- If non-congruent and/or non-coherent, probability of being audited increases.

The empirical model

- Using a fixed effect estimator that accounts for individual time-invariant heterogeneity, we estimate the following equation:

$$y_{it} = a_i + d_t + \beta A_{it} + X'_{it}\gamma + \varepsilon_{it}$$

- a_i is a time-invariant fixed effect;
- A_{it} is a the audit dummy;
- X'_{it} is a vector of control variables.

Results– indirect effect

	Regional Business Tax	VAT	PIT
Audit	0.018	0.053	0.052
	(0.009)**	(0.016)***	(0.013)***
$Audit_{t-1}$	0.031	0.011	0.035
	(0.009)***	(0.016)	(0.012)***
SDS congruence	0.304	0.281	0.433
	(0.007)***	(0.012)***	(0.009)***
SDS coherence	0.390	0.132	0.768
	(0.007)***	(0.011)***	(0.009)***
Number of Observation	633,745	650,780	644,555

Time dummies and controls (sales, total revenue, total costs, labor costs) included. Robust standard errors in parenthesis.

- Following a tax audit, taxpayers increase the regional business tax paid by 1.8% and by 3.1% in the subsequent year.
- The effect of the audit looks stronger for the personal income tax paid and the VAT.
- The effect of the audit is less persistent on VAT compliance.

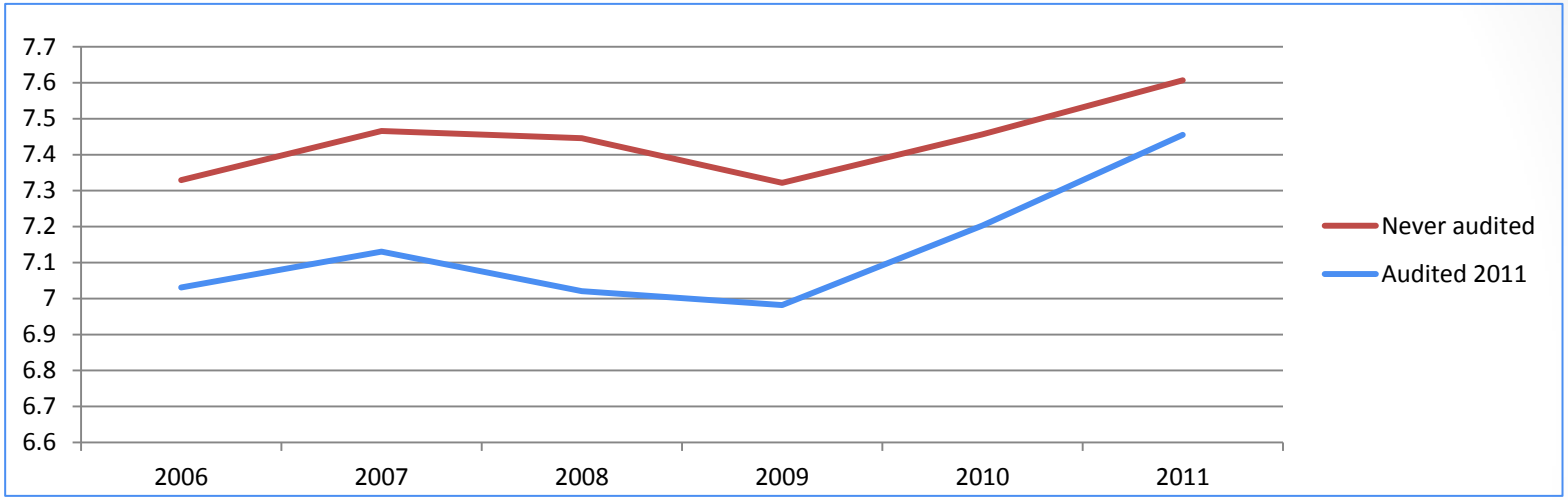
Results– robustness

	Regional Business Tax	VAT	PIT	Regional Business Tax	VAT	PIT
Audit	0.030	0.053	0.061	0.044	0.068	0.096
	(0.011)***	(0.019)***	(0.015)***	(0.027)	(0.051)	(0.037)***
$Audit_{t-1}$	0.043	0.009	0.046	0.080	0.035	0.086
	(0.011)***	(0.019)	(0.014)***	(0.025)***	(0.048)	(0.034)**
$Audit_{t-2}$				0.035	-0.005	0.006
				(0.020)*	(0.039)	(0.027)
$Audit_{t+1}$	0.006	-0.003	0.023	0.017	-0.042	0.068
	(0.011)	(0.020)	(0.015)	(0.027)	(0.050)	(0.036)*
$Audit_{t+2}$				0.001	-0.042	0.070
				(0.022)	(0.043)	(0.031)**
SDS congruence	0.280	0.286	0.412	0.222	0.264	0.354
	(0.008)***	(0.014)***	(0.011)***	(0.014)***	(0.026)***	(0.019)***
SDS coherence	0.447	0.118	0.775	0.529	0.178	0.918
	(0.008)***	(0.013)***	(0.010)***	(0.013)***	(0.025)***	(0.018)***
Number of Observation	505,604	520,624	515,644	252,802	260,312	257,822

Time dummies and controls (sales, total revenue, total costs, labor costs) included. Robust standard errors in parenthesis.

- Future audits do not have any statistically significant explanatory power on the tax paid;
- Using two leads and two lags of the audit variable, the consistency of the estimates is confirmed for the Regional Business Tax and for the VAT model but not for the PIT model.

Results– parallel trend



- The pre-treatment trend of the PIT (in logs) is similar across the two groups.
- The same analysis, considering shorter pre-treatment periods, leads to similar result.

Results– by type of Audit

	Regional Business Tax (1)	Regional Business Tax (2)	VAT	PIT
Full Desk Audit $_t$	0.190	0.189	0.181	0.147
	(0.019)***	(0.019)***	(0.032)***	(0.026)***
Partial Desk Audits $_t$	-0.009	-0.007	-0.019	0.013
	(0.014)	(0.014)	(0.024)	(0.018)
Field Audit Deep $_t$	0.008	0.008	0.022	0.037
	(0.025)	(0.025)	(0.047)	(0.039)
Field Audit Soft $_t$	-0.032	-0.079	0.046	0.013
	(0.014)**	(0.022)***	(0.025)*	(0.020)
Full Desk Audit $_{t-1}$	0.176	0.175	0.109	0.119
	(0.019)***	(0.019)***	(0.034)***	(0.027)***
Partial Desk Audits $_{t-1}$	0.023	0.024	0.011	0.029
	(0.013)*	(0.013)*	(0.023)	(0.018)*
Field Audit Deep $_{t-1}$	0.047	0.047	-0.020	-0.026
	(0.025)*	(0.025)*	(0.047)	(0.040)
Field Audit Soft $_{t-1}$	-0.048	-0.098	-0.029	0.017
	(0.013)***	(0.019)***	(0.024)	(0.018)
SDS congruence	0.302	0.299	0.280	0.433
	(0.007)***	(0.007)***	(0.012)***	(0.009)***
SDS coherence	0.389	0.388	0.132	0.768
	(0.007)***	(0.007)***	(0.011)***	(0.009)***
Field Audit Soft and SDS congruence $_t$		0.081		
		(0.025)***		
Field Audit Soft and SDS congruence $_{t-1}$		0.091		
		(0.022)***		
Number of Observation	632,005	632,005	650,780	644,555

Time dummies and controls (sales, total revenue, total costs, labor costs) included. Robust standard errors in parenthesis.

- Full desk audits are the most effective in increasing tax compliance.
- The effect of soft field audit is positive on the sample of congruent taxpayers.

Results– spillovers

	Regional Business Tax	Regional Business Tax	Regional Business Tax
Full Desk Audit $_t$	0.135	0.138	0.135
	(0.023)***	(0.023)***	(0.023)***
Partial Desk Audits $_t$	-0.012	-0.011	-0.011
	(0.018)	(0.018)	(0.018)
Field Audit Deep $_t$	-0.007	-0.007	-0.007
	(0.032)	(0.032)	(0.032)
Field Audit Soft $_t$	-0.022	-0.022	-0.022
	(0.018)	(0.018)	(0.018)
Full Desk Audit $_{t-1}$	0.130	0.129	0.129
	(0.023)***	(0.023)***	(0.023)***
Partial Desk Audits $_{t-1}$	-0.005	-0.004	-0.004
	(0.016)	(0.016)	(0.016)
Field Audit Deep $_{t-1}$	0.026	0.026	0.026
	(0.031)	(0.031)	(0.031)
Field Audit Soft $_{t-1}$	-0.013	-0.012	-0.012
	(0.016)	(0.016)	(0.016)
% additional Reg. Bus. tax evaded and detected by province		0.033	0.032
		(0.004)***	(0.004)***
Audit rate by province	0.017		0.011
	(0.005)***		(0.005)**
SDS congruence	0.275	0.274	0.274
	(0.009)***	(0.009)***	(0.009)***
SDS coherence	0.479	0.479	0.479
	(0.009)***	(0.009)***	(0.009)***
Number of Observations	419,072	419,072	419,072

Time dummies and controls (sales, total revenue, total costs, labor costs) included. Robust standard errors in parenthesis.

- Increasing the regional audit rate by 1%, tax compliance increases by a percentage between 1.1% and 1.7%.
- The percentage of tax evasion detected has a positive effect on compliance.

Conclusions

- Tax audits exert a significant and positive effect on tax compliance.
- The magnitude and the persistence of the effect are different across taxes.
- The full desk audits turn out to be the most effective in increasing tax compliance.
- The analysis provides preliminary evidence of the existence of a general deterrent effect of tax audits on non-audited taxpayers.

Valuing Unpaid Tax Assessments: Estimating Long Run Collectability Using an Econometric Approach

Alex Turk, Eric Henry, Dan Howar, Maryamm Muzikir
Internal Revenue Service
IRS/TPC Research Conference
June 2017

Corresponding Author Alex Turk (alex.h.turk@irs.gov)

Overview

- Background and Objective
- Data and Methodology
- Form 1040 and Form 941 Results
  - Recovery Rate
  - Unpaid Assessments Inventory Value
- Conclusions

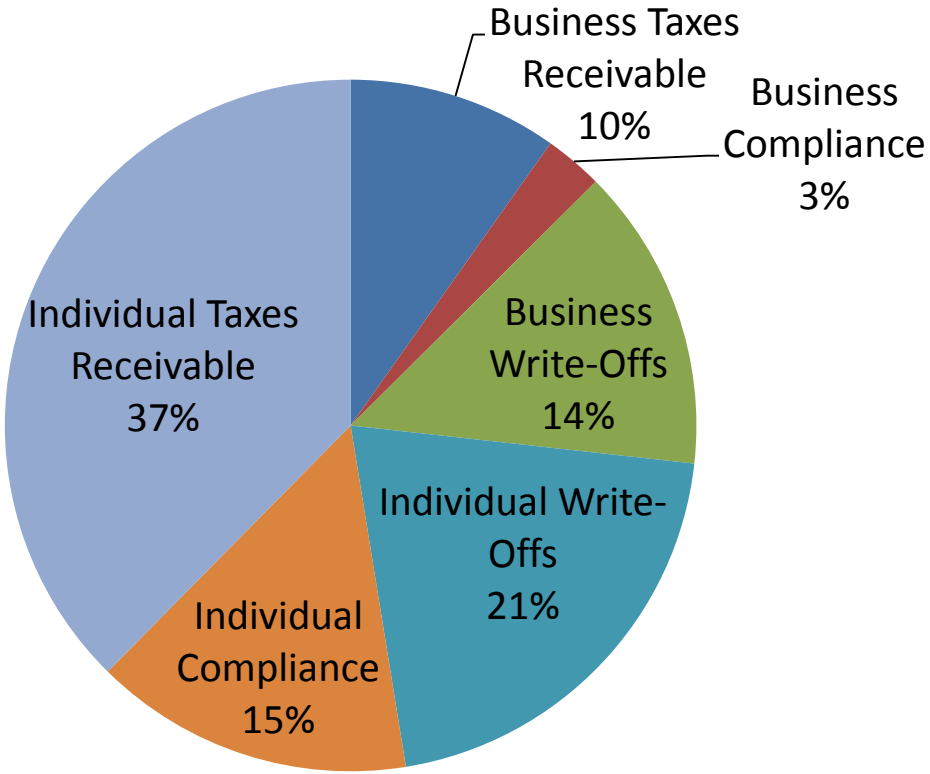
Financial Statement Reporting of UA

- As of Fiscal Year 2016 there were 400 billion dollars in unpaid assessments the IRS has the authority to collect.
  - 10 year collection statute
- The current method for estimating the collectable value of unpaid assessments involves conducting intensive reviews of a sample
  - Resource and time consuming
  - Accuracy risk

Unpaid Assessments Financial Classes

- Taxes Receivables
  - Voluntarily reported assessments and IRS enforcement assessments where the taxpayer has agreed.
  - IRS reports on its financial statements an estimated dollar amount it is likely to collect from the taxes receivable portion of the unpaid assessments inventory.
- Compliance Assessments
  - Un-agreed enforcement assessments.
- Write-offs
  - Amounts deemed to have little collection potential, but by statute must remain on the books for ten years.

Composition of the Total Gross Unpaid Assessments



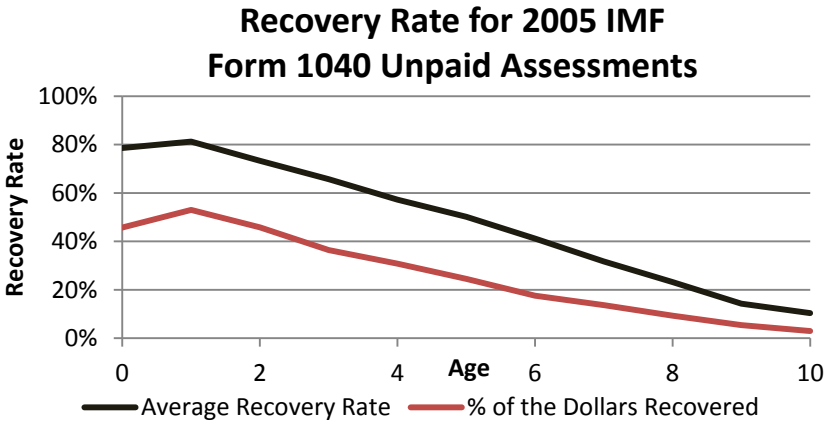
Source: Custodial Detail Database (CDDB) as of September 30, 2016, individual Master File and Business Master File extract cycles 201637.

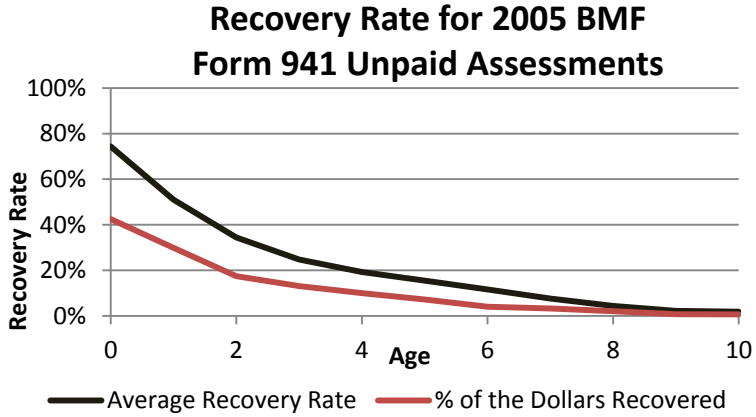
Objective

- Develop a predictive model to determine the net realizable value of each unpaid assessment at each point in time
  - Estimate the proportion of the current balance that will be recovered over the remaining life of the unpaid assessment
  - Recovery Rate: total net payments in the future as a percentage of the current unpaid balance
- Discount the current balance of each assessment based on the estimated proportion that will be recovered

Example of Collection Rates

- Older debt is less collectible and
- Less collectible debt gets older





Source: Compliance Data Warehouse, Unpaid Assessment Entity and Module Information, Unpaid Assessment Inventory as of January, 2005, net payments on the associated modules 2005-2015

Data

- **Data for Model Development**
  - 11 Years of Unpaid Assessment Inventory
    - Repeated cross section of UA 2004-2014 in January of each year
  - Annual net payment amounts
    - 2002 to 2016(June) for each module
  - Data comes from Compliance Data Warehouse Unpaid Assessments

- **Data Dilemma**
  - Cases from recent years may be more relevant in terms of IRS resources and policy.
  - Older years have more cases where the full payment stream is observed.

- **Methodology to Control for Unobserved Payments**
  - Models approximate the potential payments not observed by the end of sample period of the data (Calendar year 2016)
  - Controlling for truncation allows for a “full statute” estimate of the value

Model Methodology

- Define recovery as total net payments in the future as a percentage of the current balance
  - Payments are NOT discounted based on when they are received
  - Recovery is defined as 100 percent when the future payments exceed the current balance
- Model generates an estimated recovery percentage (ranges from 0 to 100 percent)
- Estimated value = expected percent recovered multiplied by current balance
- Separate models/calculations for individual and business tax classes
- Models all cases regardless of financial classification

Overview of the Model

Let

- P_t be the net payments made during a year on an unpaid assessment module and
- B_n be the current total module balance, then

$$\mathbf{Y = \frac{\sum_{t=n}^{10} P_t}{B_n}}$$

Then let

$$\boldsymbol{R} \textbf{ = Max (Y,1)}$$

We can then model recovery, *R*, as

$$\textbf{\textit{Estimated Recovery}} = E(R) = F(X\beta) = \frac{e^{X\beta}}{1+e^{X\beta}}$$

Where F () is a cumulative logistic distribution function.

- The non-linear logistic regression model will provide the expected recovery, ranging between zero and one, on each module given the module characteristics X.

Controlling for Unobserved Payments

- A case has unobserved payments when
  1. At the end of our sample, the case is sill in UA and
  2. The observed recovery rate is less than 1

- Let T=1 if the above conditions are met, zero otherwise, then model T as

$$\textbf{\textit{Prob(T=1)}} = \frac{e^{Z\propto}}{1+e^{Z\propto}}$$

  Where Z Contains
  - Variables in X
  - Year dummy variables

- Provides a probability of the payment stream being truncated
  - Included in the recovery model

Controlling for Unobserved Payments

- $X_t \beta = \beta_0 + \beta_1 \ln(\text{Module Balance}) + \ldots$

  $+\beta_p$(Probability of not observing all payments)

  $+\beta_T$(Time Remaining on the statute at the end of the sample)

  - This equals zero if recovery is 100 percent or more and there is time left on the statute

- For a "full statute" estimate of recovery, set to zero:
  - Probability of not observing all payments and,
  - Time remaining on the statute at the end of the sample

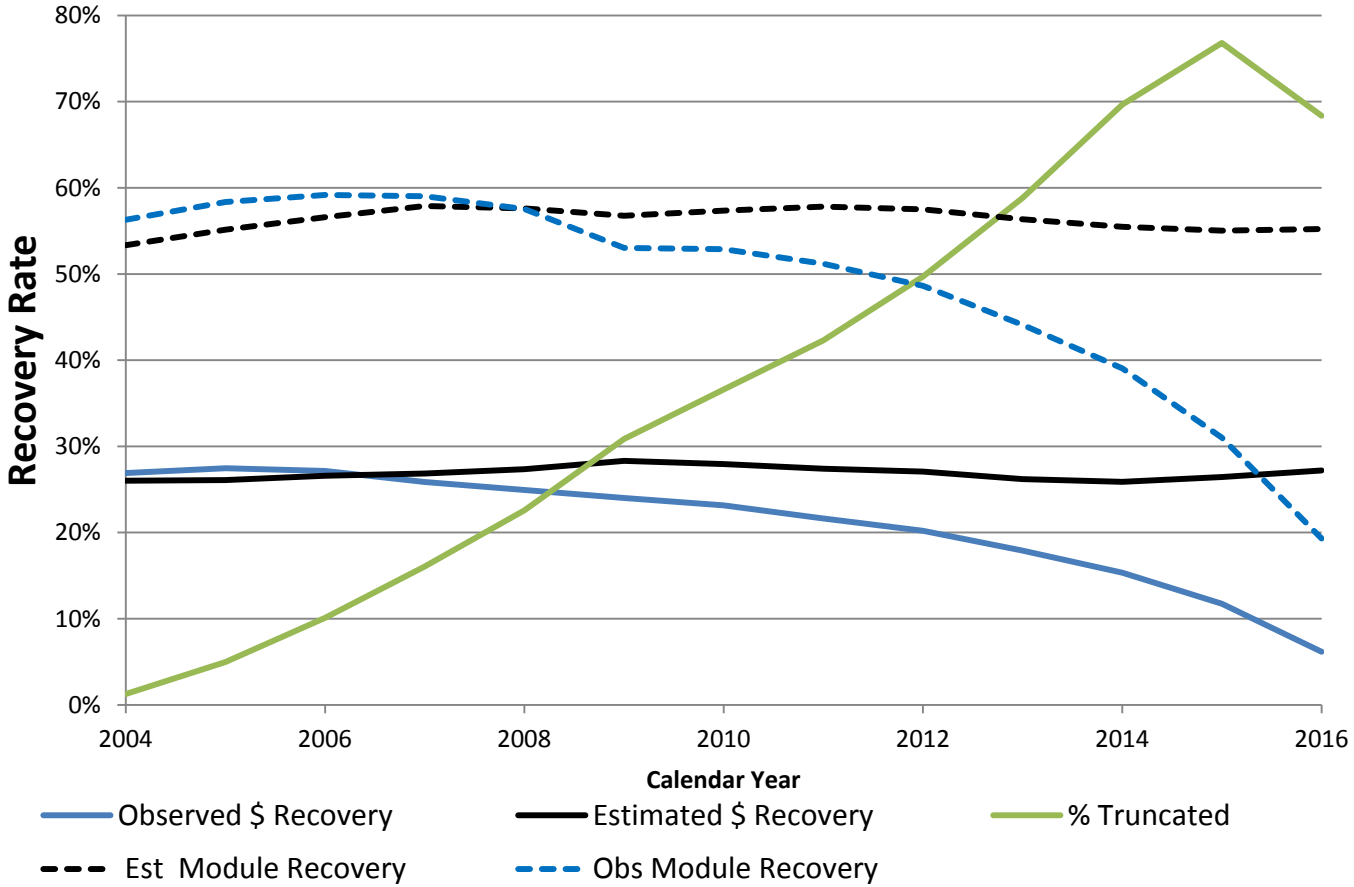
Dealing with Payment Truncation

Table 1: Recovery Model Payment Truncation Controls*

	Probability of Truncated Payments	Time Remaining at the end of the Sample
Form 940	2.732	-1.916
	(0.022)	(0.013)
Form 941	2.232	-1.125
	(0.011)	(0.003)
Form 1040	0.791	-0.776
	(0.009)	(0.002)
Form 1065	1.350	-1.327
	(0.025)	(0.012)
Form 1120x	1.770	-0.999
	(0.035)	(0.007)
TFRP	-0.456	-0.601
	(0.015)	(0.003)
Business Other	1.330	-1.214
	(0.014)	(0.006)
Individual Other	0.198	-0.616
	(0.084)	(0.019)

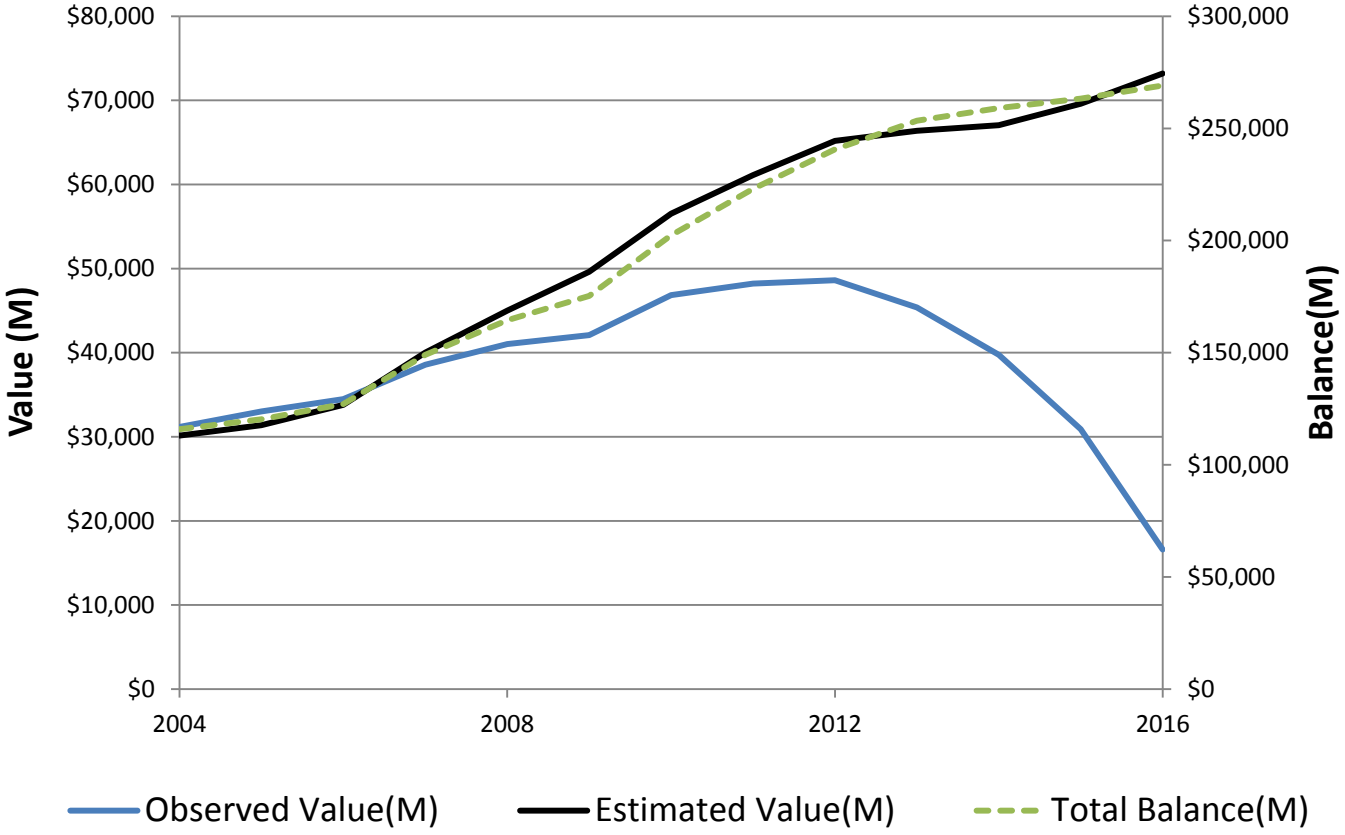
* All estimates are significant the 5% level

Form 1040 Results



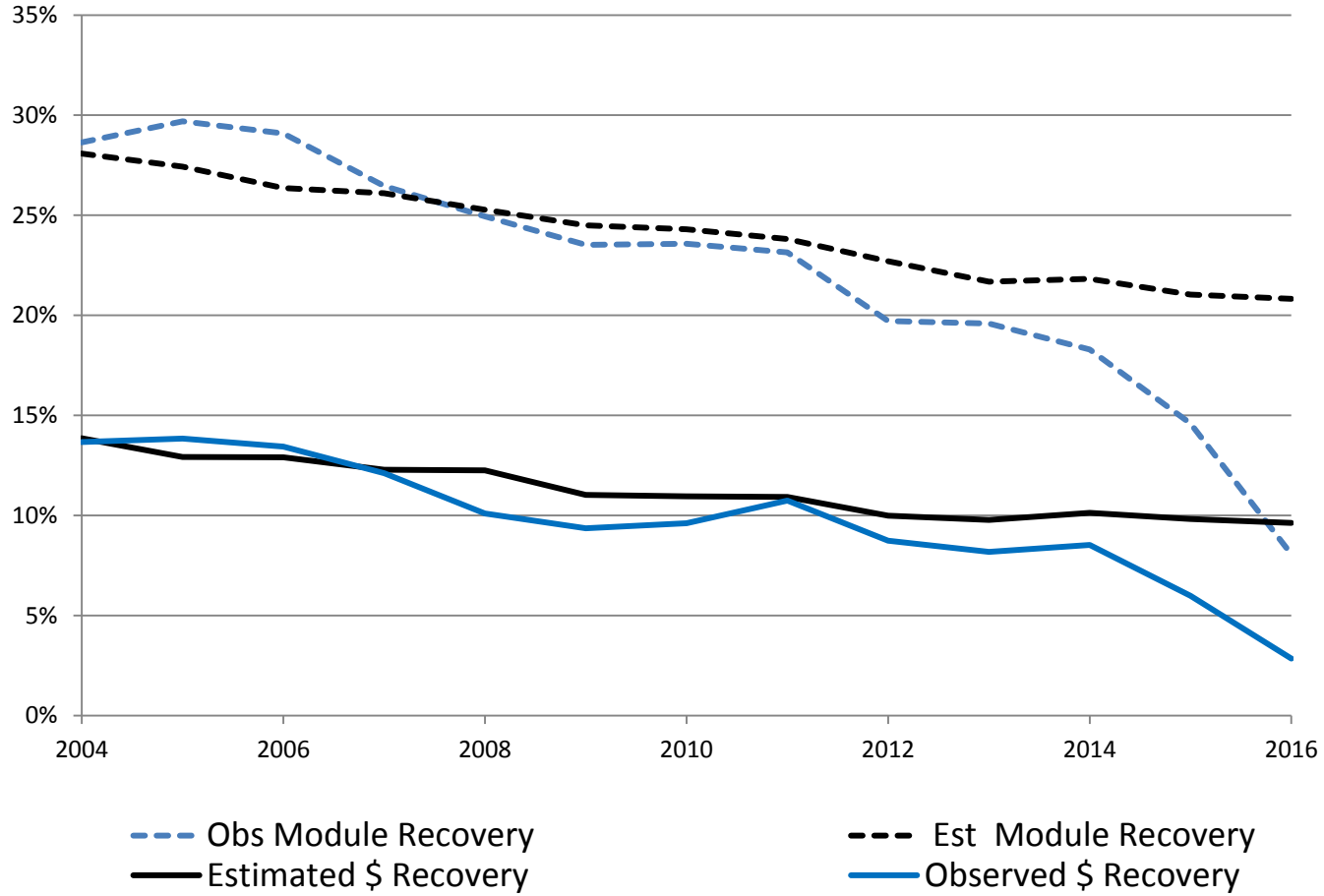
All Form 1040 UA Inventory– Average % of Modules and Dollars Recovered

Form 1040 Results



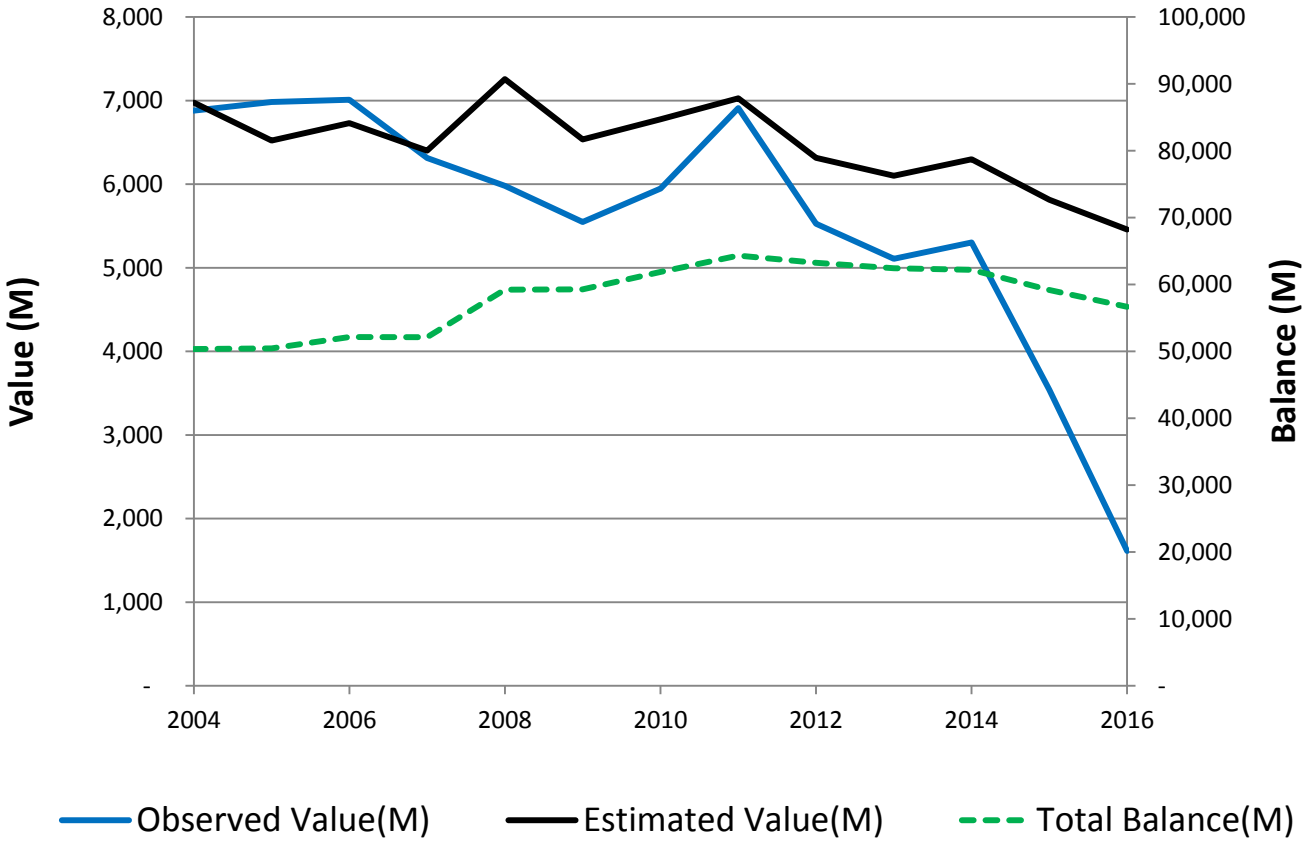
All Form 1040 – Aggregate Value and Module Balance

Form 941 Results



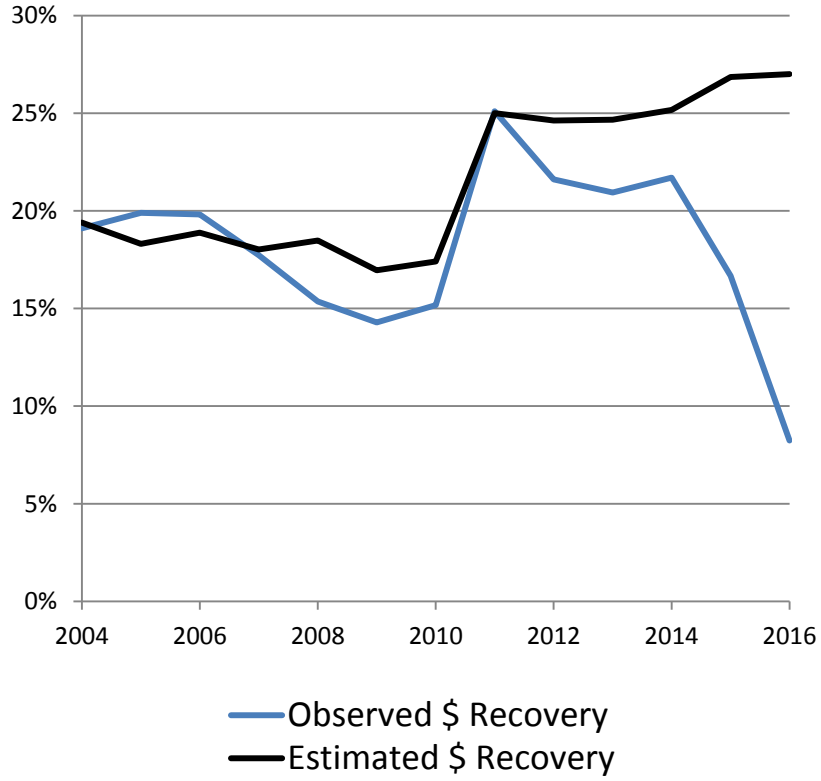
All Form 941– Average % of Modules and Dollars Recovered

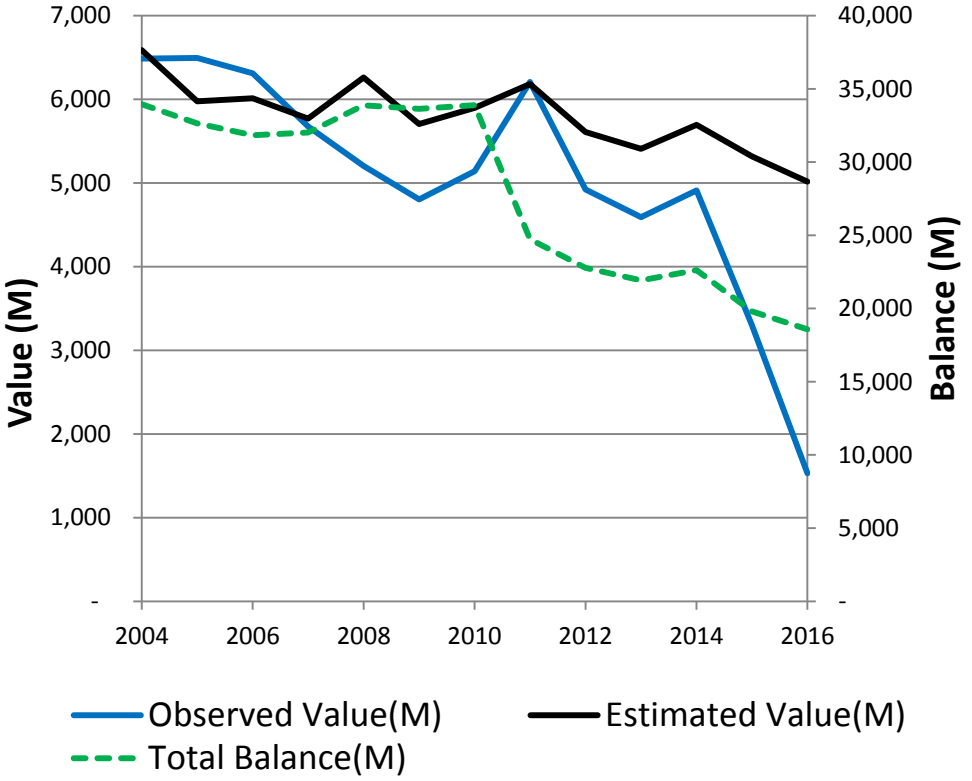
Form 941 Results



All Form 941–Aggregate Value and Module Balance

Form 941 Taxes Receivable





Conclusions

- Estimates derived from historical collectability observed over an extensive timeframe
- Transparent explanations for changes in the estimated value
- UA value can be continuously updated as newer information is acquired
- Estimates value for the entire UA Inventory
- Helps ensure clean audit opinions on the IRS custodial financial statements