

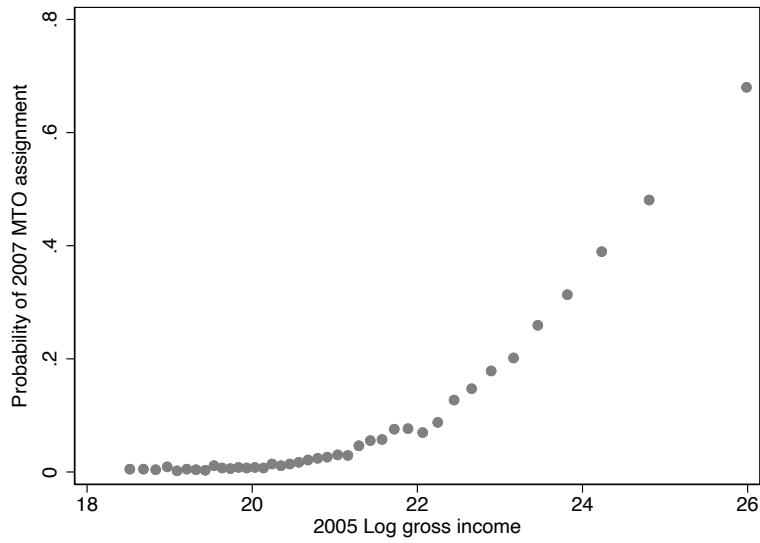
**Tax Administration vs. Tax Rates:
Evidence from Corporate Taxation in Indonesia**

M. Chatib Basri, Mayara Felix, Rema Hanna, and Benjamin A. Olken

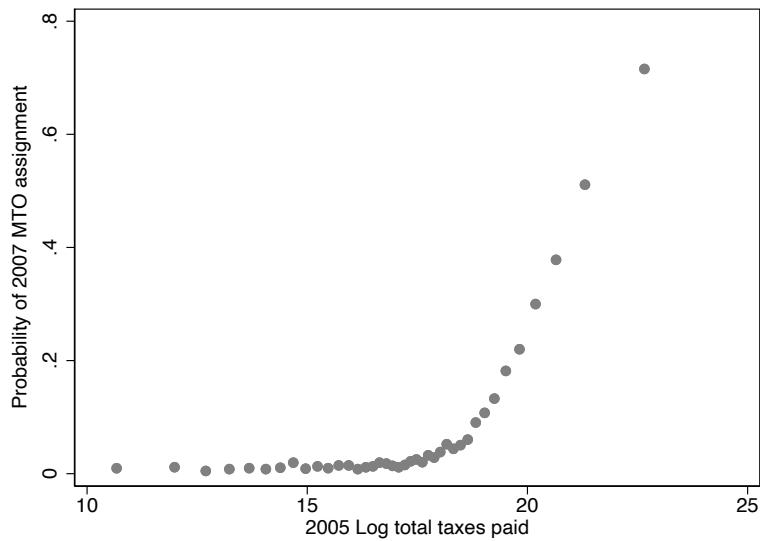
Online Appendix

Figure A.1: Probability of MTO assignment

Panel A: As a function of match tax year (2005) gross income

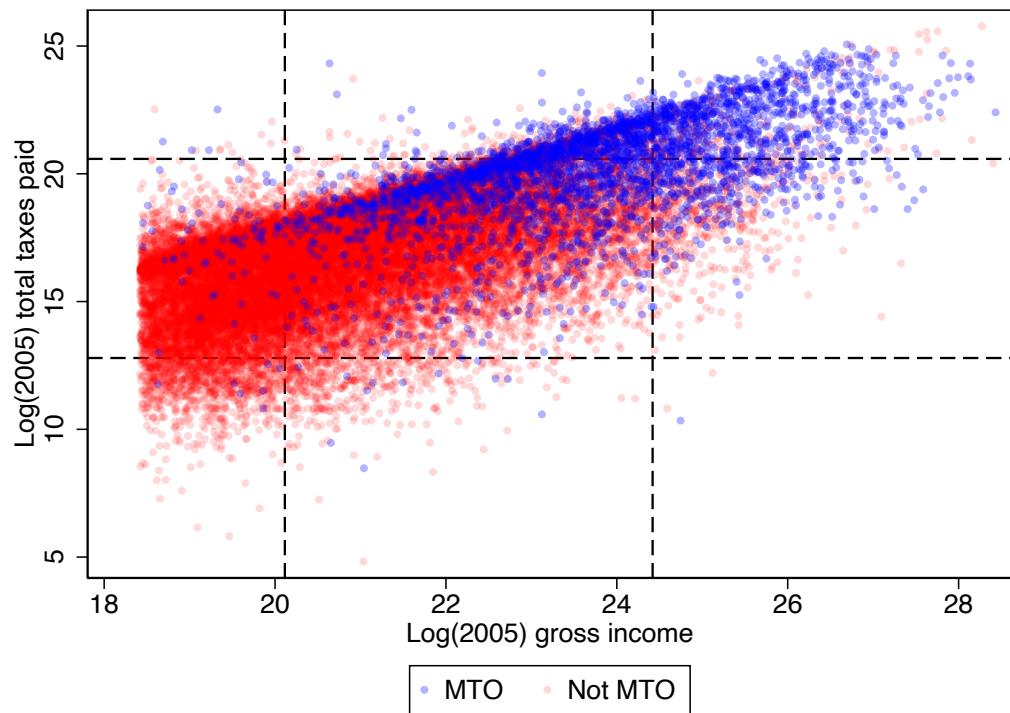


Panel B: As a function of match tax year (2005) total taxes paid



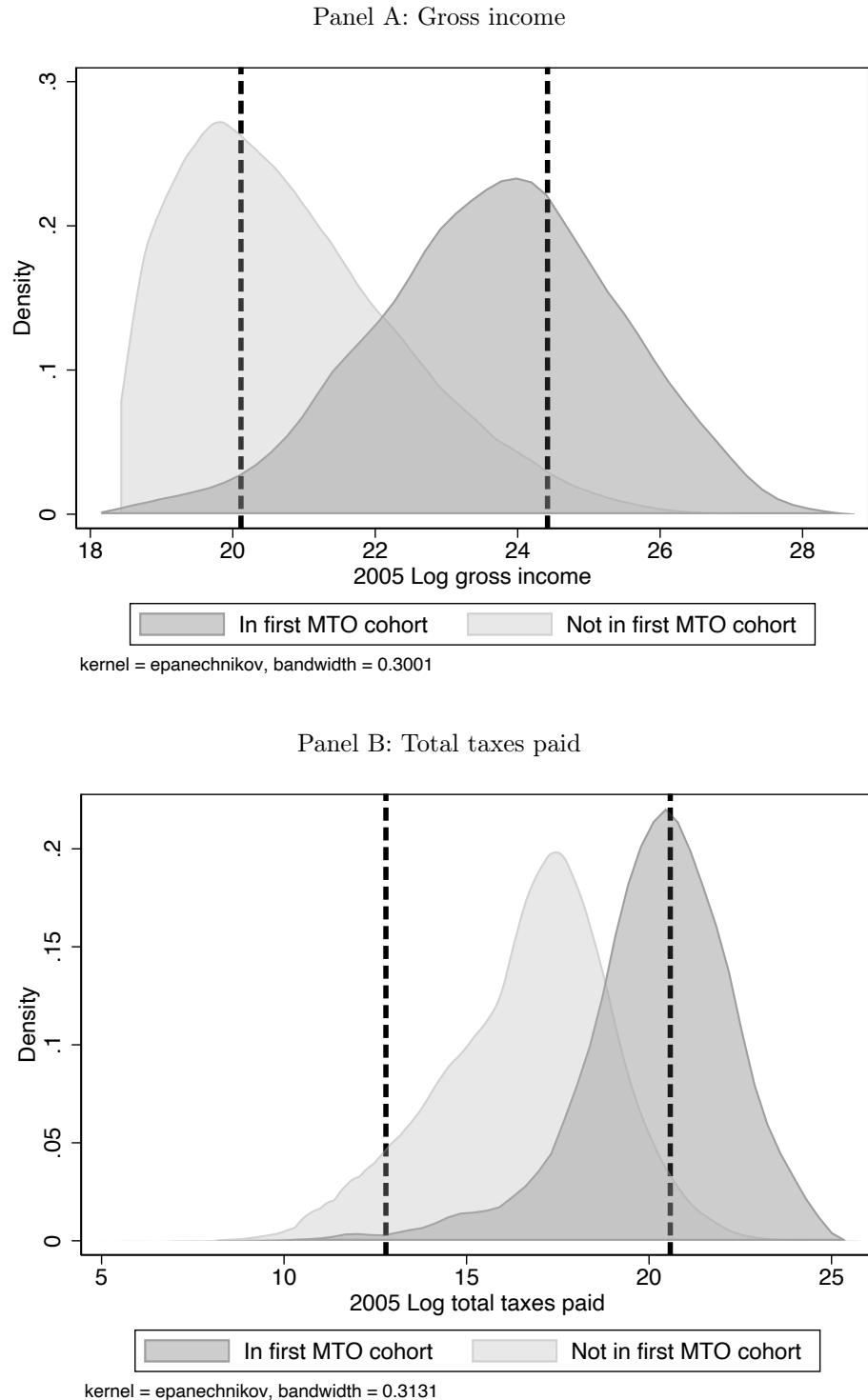
Notes: This figure displays the percent of taxpayers assigned to MTO in 2007 as a function of MTO assignment input variables (total taxes paid and gross income) for tax year 2005. Percentages are plotted against forty equal-sized bins of the 2005 log gross income and log total taxes paid distribution of taxpayers in eligible origin tax offices as of 2006.

Figure A.2: Joint distribution of taxpayer gross and taxable income



Notes: This figure shows the joint distribution of taxpayers' 2005 log gross income and 2005 log total taxes paid. Each blue dot is a taxpayer assigned to MTO's first cohort, while each red dot is a taxpayer not assigned to MTO's first cohort. Dotted black lines indicate the lower bound and upper bounds of the 2.5th-97.5th percentile common support.

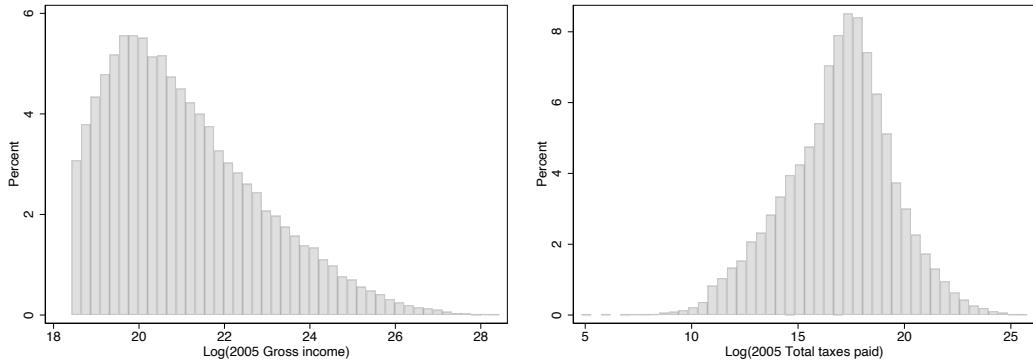
Figure A.3: Common support restrictions for taxpayer size distributions



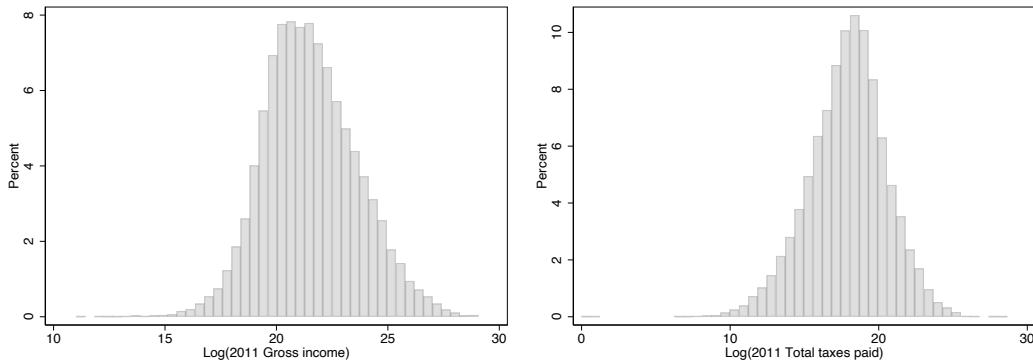
Notes: This figure shows the distributions of taxpayer 2005 log gross income and 2005 log total taxes paid by MTO 2007 assignment status. Dotted black lines indicate the lower bound and upper bound of the 2.5th-97.5th percentile common support.

Figure A.4: Taxpayer size distributions pre- and post- MTO creation

Panel A: Pre-MTO (tax year 2005)

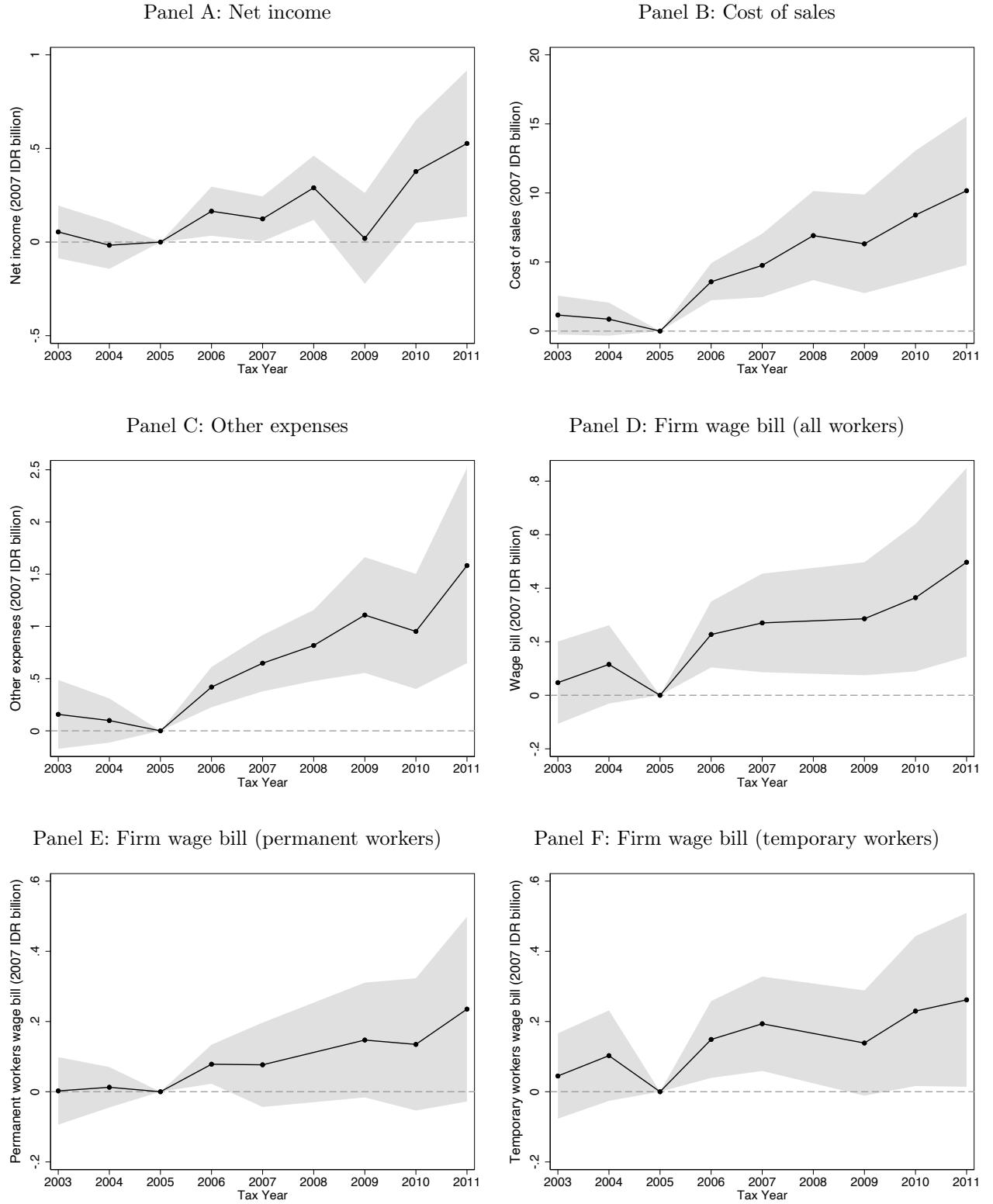


Panel B: Post-MTO (tax year 2011)



Notes: This figure shows the distributions of taxpayer log gross income and log total taxes paid before (tax year 2005) and after (tax year 2011) the creation of MTO. 2005 log gross income distribution is truncated at gross income sample restriction of IDR 100 million Rp (roughly USD 10,000).

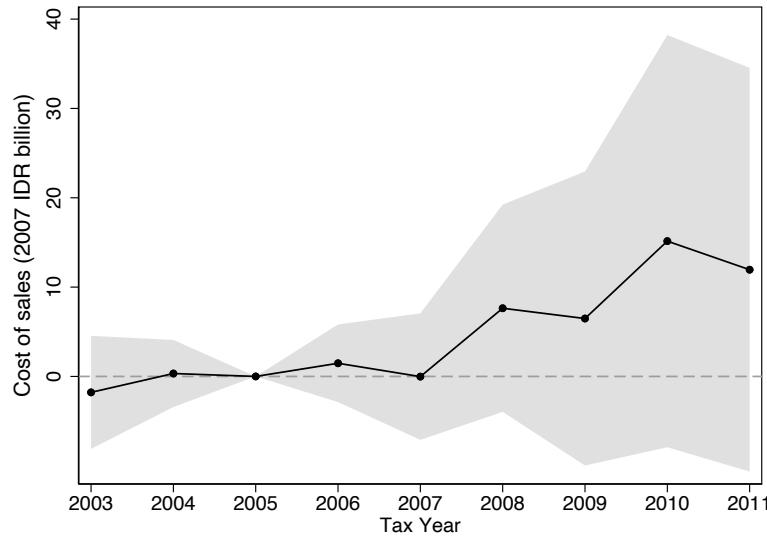
Figure A.5: MTO effect on detailed tax filing outcomes



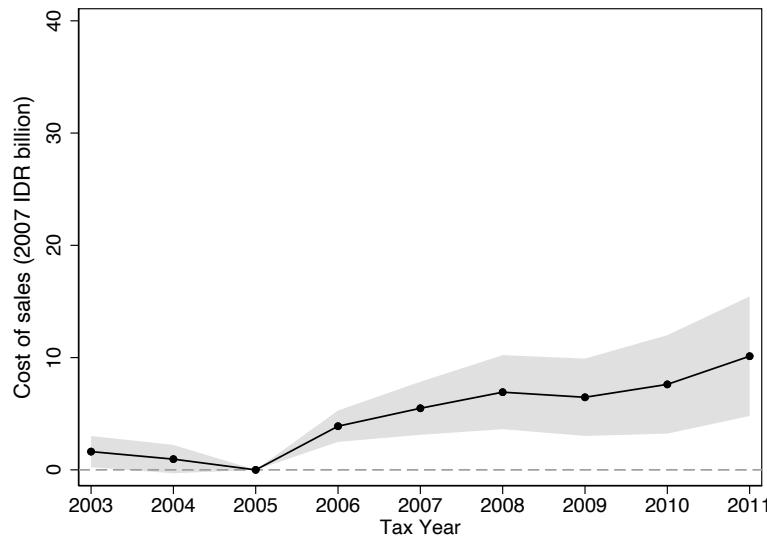
Notes: See notes to Figure 4, Table A.10, and Table 2.

Figure A.6: MTO effect on cost of sales, split by base year taxable income

Panel A: Taxpayers with zero taxable income in 2005



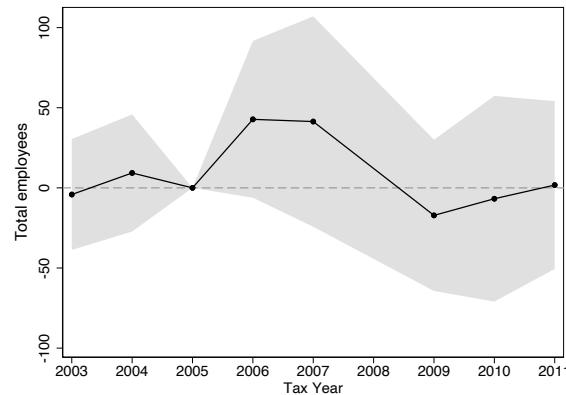
Panel B: Taxpayers with positive taxable income in 2005



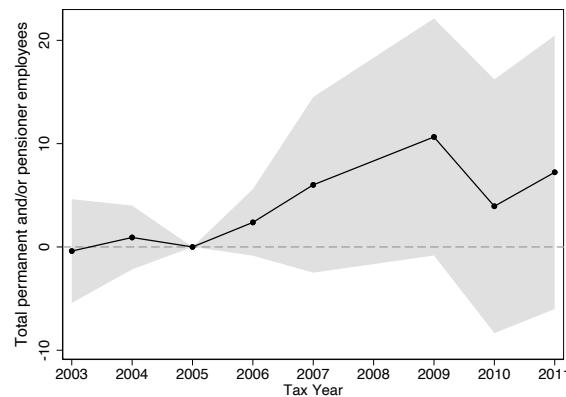
Notes: This figure shows year-by-year reduced form effects of MTO treatment on cost of sales by two groups: taxpayers with zero vs. positive 2005 taxable income.

Figure A.7: MTO effect on Employment

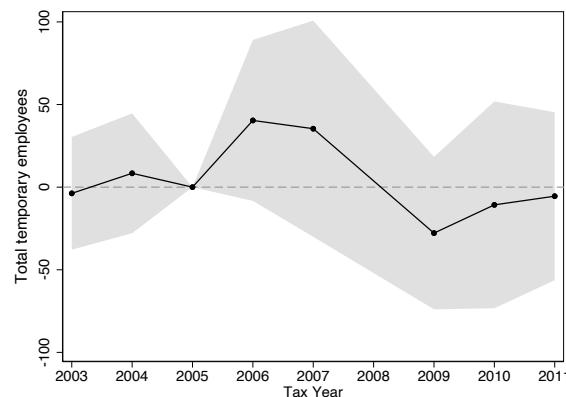
Panel A: All workers



Panel B: Permanent

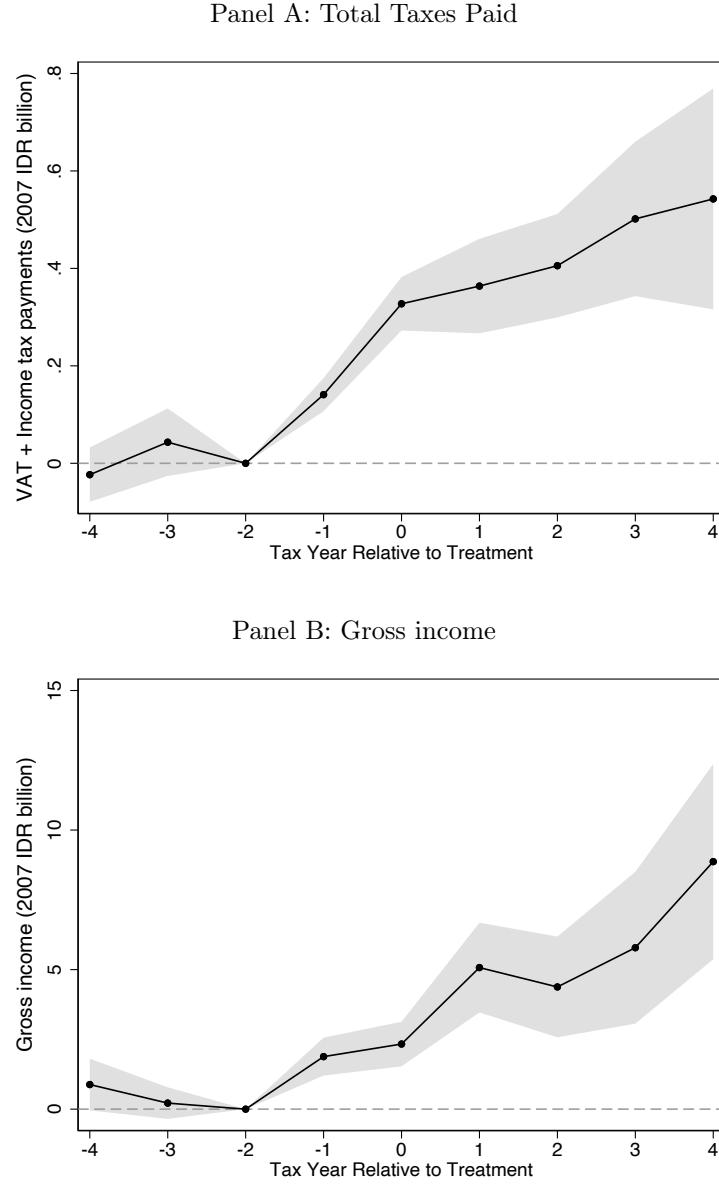


Panel C: Temporary



Notes: See notes to Figure 4. Firm employment data are from corporate employment tax withholding form SPT 1721. Employment data for tax year 2008 are not available. See Data Appendix for details.

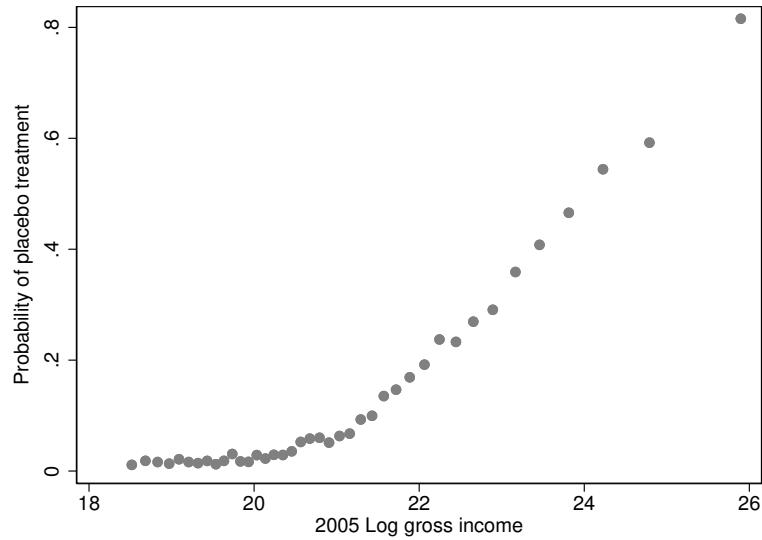
Figure A.8: MTO effects, including MTOs started in 2005 and 2006



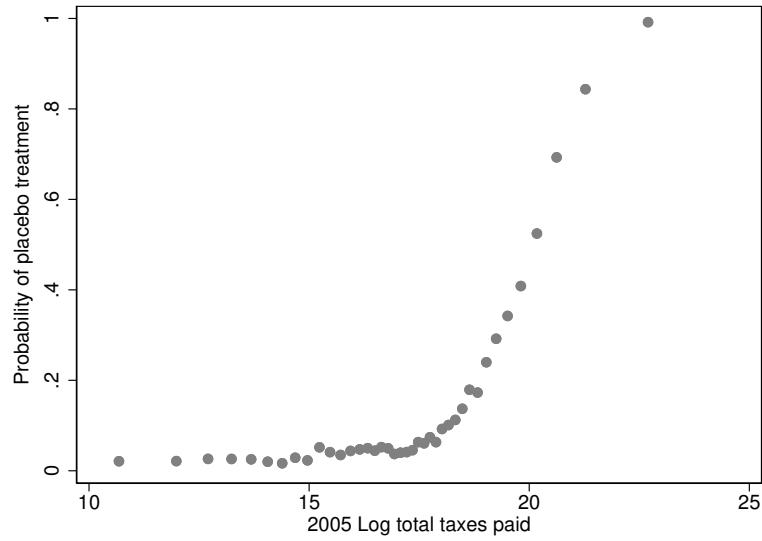
Notes: This figure shows year-by-year reduced form effects of MTO treatment on total taxes paid and gross income including the 5 MTOs created in 2005 and 2006 to the main sample of 13 MTOs created in 2007. Year-by-year effects are estimated relative to the year of MTO assignment by stacking the 2005, 2006, and 2007 MTO assignment cohorts, and slightly modifying equation (16) to be defined in relative years. In particular, year-by-year effects are coefficients on interactions of the MTO assignment dummy variable M_{i0} (equivalent to M_{iFC} in equation (16)) with year dummies, omitting the interaction and main effect dummies for base relative year -2 (the last tax year that filings would have been available to the tax office at the time of each MTO assignment in relative year zero). As MTO assignment occurred in different years, year fixed effects are also included. The stacked regression is weighted following the same balancing methodology as in Figure 4. Specifically, the weights used are taxpayer-specific and constructed by applying Hainmueller (2012)'s entropy-balancing methodology to the MTO assignment formula inputs (gross income and total taxes paid). The formula inputs are for tax year 2005 for the 2007 MTO cohort, tax year 2004 for the 2006 cohort, and tax year 2003 for the 2005 cohort. Taxpayer-level total taxes paid data are from the Treasury, and include payments from all branches of the same corporate entities. Reported income data are from tax filing form SPT 1771 (annual corporate income tax return), and are reported by the taxpayer headquarters on behalf of all branches of the same corporate entity. IDR values are deflated to 2007 IDR using Indonesia's GDP deflator. Solid lines are point estimates; dashed lines are 95% confidence intervals based on standard errors clustered at the taxpayer level.

Figure A.9: Probability of placebo treatment assignment among non-MTO taxpayers

Panel A: As a function of match tax year (2005) gross income

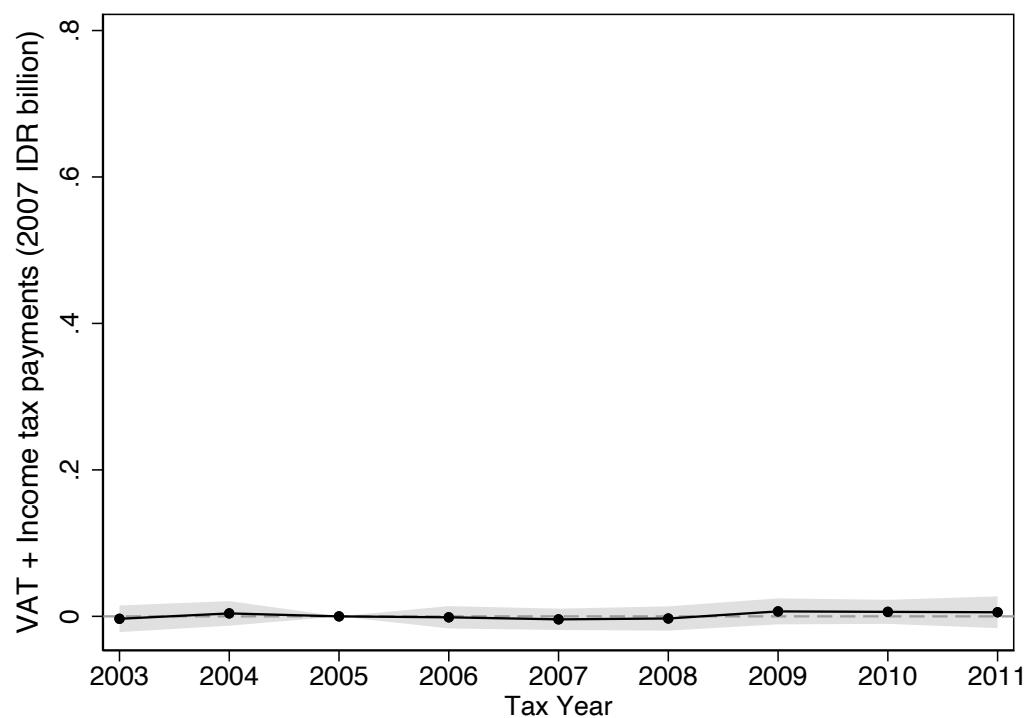


Panel B: As a function of match tax year (2005) total taxes paid



Notes: See Section 4.2.4. This figure displays the percent of non-MTO taxpayers assigned to a placebo treatment as a function of the placebo treatment input variables (total taxes paid and gross income) for tax year 2005.

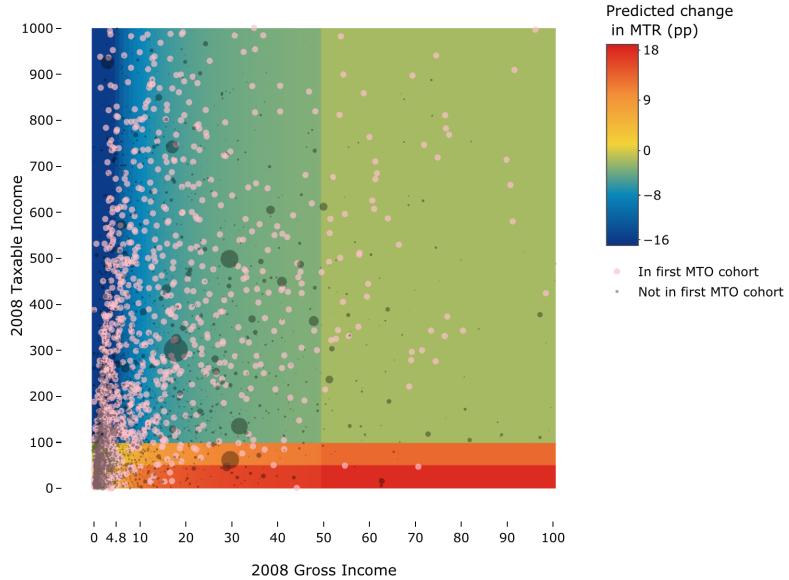
Figure A.10: Placebo effect on Total taxes paid



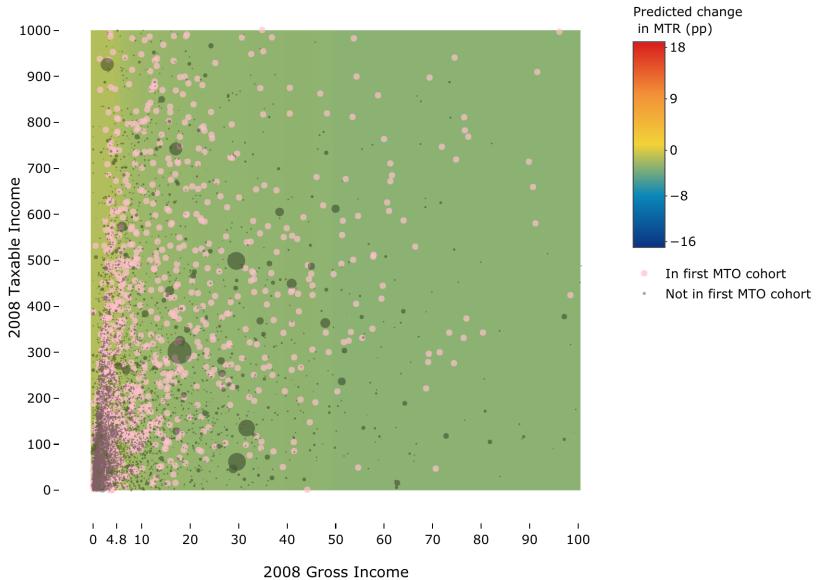
Notes: See notes to Figures 4 and A.9. Y-axis displays the same scale as the MTO effect on total taxes paid.

Figure A.11: Taxpayer density along MTR variation from 2009 corporate tax rate reform

Panel A: 2008-2009 schedule change

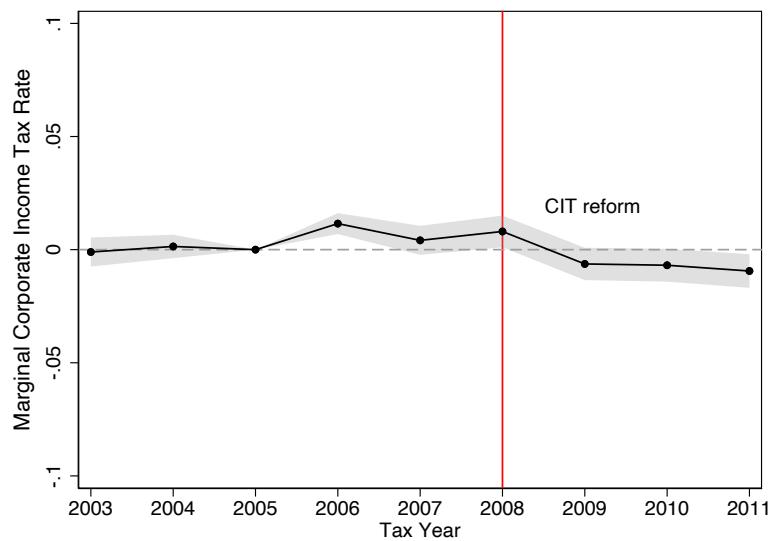


Panel B: 2009-2010 tax rate cut



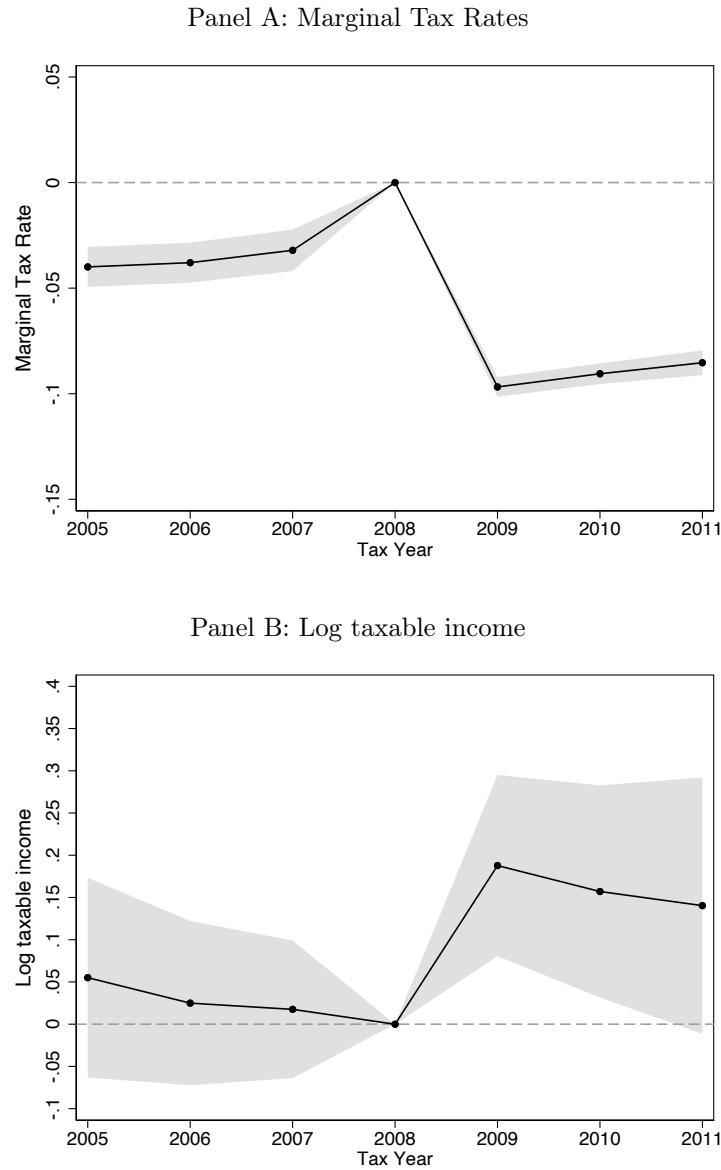
Notes: This figure displays the marginal tax rate change variation induced by Indonesia's 2009 tax rate reform within the ETI estimation analysis sample. Scatter plot marker sizes are proportional to taxpayer-specific entropy-balancing weights. See Section 5 for a detailed description of how predicted marginal tax rates are computed.

Figure A.12: MTO effect on corporate income tax marginal tax rate



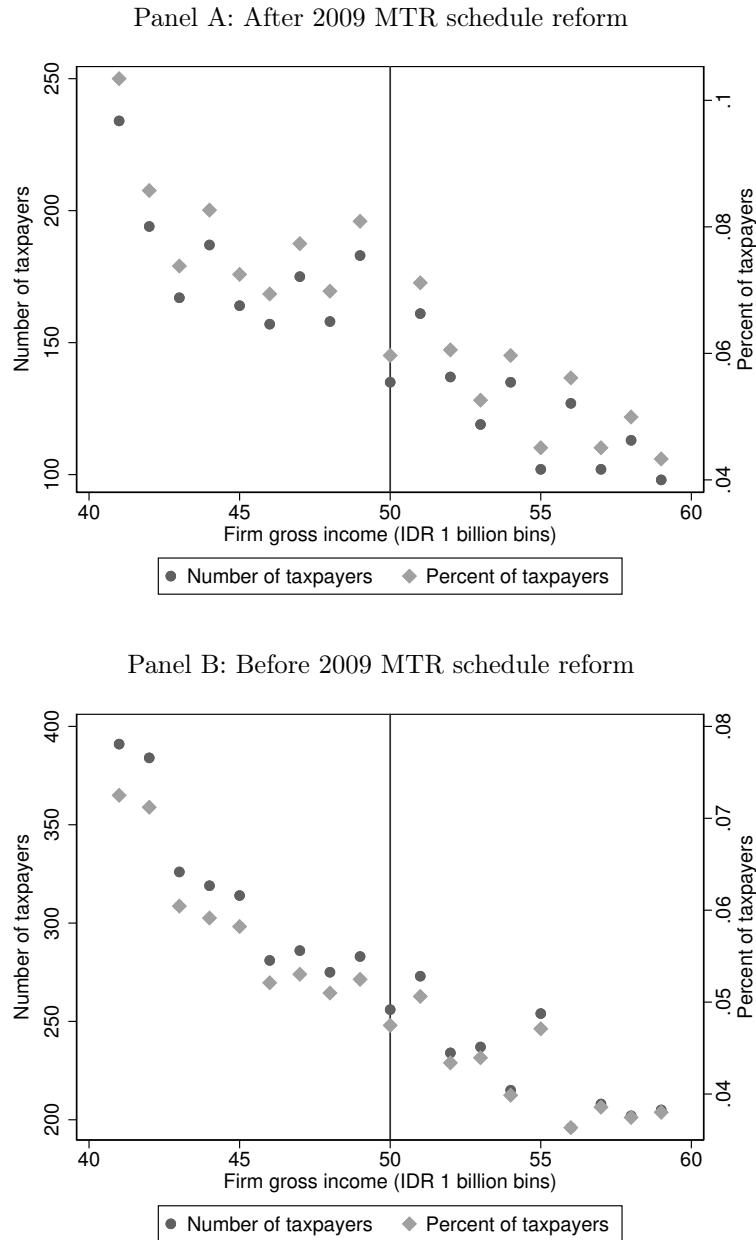
Notes: See notes to Figure 4. This figure plots year-by-year coefficients of the effect of MTO assignment on the marginal corporate income tax rate faced by taxpayers. Taxpayers' MTR are measured according to the MTR schedules presented in Section 2.1.2. The red line indicates the year of the MTR schedule reform.

Figure A.13: Effect of a large predicted tax cut in 2009 on marginal tax rates and log taxable income



Notes: This figure presents regression coefficients from a regression of each outcome (i.e., marginal tax rate or log taxable income) on year dummies (omitting 2008) interacted with a dummy indicating whether the taxpayer was predicted to experience a large tax rate cut in 2009 (top 50% of tax rate cuts, with an average of 15 percentage points cut). The regression also includes taxpayer fixed effects and controls for the 2008 log gross income and 2008 log taxable income, each interacted with year dummies (and again, omitting 2008). The control group was predicted to experience a small tax cut (bottom 50% of tax cuts, with an average of 3 percentage points cut). The regression is thus conditional on taxpayers who were predicted to experience a tax cut in 2009, and is weighted by MTO balancing weights. Standard errors are clustered at the taxpayer level.

Figure A.14: Bunching at notch before and after MTR schedule reform



Notes: This figure shows taxpayer density at the IDR 50 billion notch introduced by the 2009 corporate income tax schedule. The sample includes data for tax years 2003-2011 for all corporate taxpayers with non-zero taxable income.

Table A.1: Tax Office Staffing

	MTO tax offices				Non-MTO tax offices			
	2008 (1)	2009 (2)	2010 (3)	2011 (4)	2008 (5)	2009 (6)	2010 (7)	2011 (8)
Taxpayers-to-staff ratios								
Taxpayers per Auditor	18	24	23	21	107	107	115	125
Taxpayers per AR	17	26	25	20	56	105	93	80
Taxpayers per staff	4	6	6	6	10	16	17	17
Auditors								
Total auditors	329	370	366	361	1,110	1,668	1,643	1,591
Has college degree	0.79	0.79	0.84	0.90	0.74	0.64	0.70	0.75
Female	0.07	0.07	0.07	0.06	0.09	0.09	0.09	0.09
Years in DGT	8.6	9.1	10.1	11.1	7.8	7.7	8.7	9.7
Monthly salary (2007 IDR thousands)	6,227	5,920	5,616	5,880	6,070	5,473	5,167	5,295
Account Representatives								
Total ARs	349	341	341	369	2,101	1,862	2,057	2,494
Has college degree	0.83	0.86	0.85	0.81	0.70	0.70	0.68	0.70
Female	0.16	0.17	0.23	0.23	0.27	0.32	0.31	0.32
Years in DGT	8.3	9.2	9.9	10.4	7.9	9.0	9.6	9.8
Monthly salary (2007 IDR thousands)	4,502	4,426	4,237	4,279	4,490	4,417	4,114	4,073

Notes: This table displays tax office staffing descriptive statistics for MTO vs. non-MTO tax offices. Tax office staff characteristics data are from DGT's internal human resources database.

Table A.2: Baseline (2006 calendar year) characteristics of staff assigned to MTO vs. non-MTO in 2007-2008

	Assigned to MTO (1)	Assigned to non-MTO (2)
<i>Panel A: Auditors</i>		
Job performance		
Total Staff DP3 Score	563.1	564.4
Performance	78.7	78.9
Initiative	78.1	78.2
Responsibility	78.4	78.6
Cooperation	78.3	78.4
Honesty	78.4	78.5
Obedience	78.3	78.4
Loyalty	91.0	91.0
Other characteristics		
Has college degree	0.78	0.79
Female	0.06	0.12
Years in DGT	6.0	5.9
<i>Panel B: Account Representatives</i>		
Job performance		
Total Staff DP3 Score	561.1	562.2
Performance	78.7	78.9
Initiative	78.0	78.2
Responsibility	78.4	78.6
Cooperation	78.4	78.5
Honesty	78.3	78.5
Obedience	78.3	78.4
Loyalty	91.0	91.0
Other characteristics		
Has college degree	0.99	0.91
Female	0.35	0.28
Years in DGT	5.4	5.7

Notes: This table displays baseline (calendar year 2006) descriptive statistics for auditors and account representatives assigned to MTO vs. non-MTO tax offices upon their creation in 2007-2008. Note that this sample is conditional staff already employed at DGT as of 2006, and therefore excludes any new auditors or account representatives hired in 2007-2008. Tax office staff characteristics data are from DGT's internal human resources database.

Table A.3: Indonesia's Medium Taxpayer Offices

MTO	Included in Analysis?	Creation Year	Overseen Provinces or Districts
KPP Madya Jakarta Pusat	No	2004	DKI Jakarta (Center)
KPP Madya Batam	No	2005	Riau
KPP Madya Pekanbaru	No	2006	Riau Islands
KPP Madya Denpasar	No	2006	Bali
KPP Madya Tangerang	No	2006	Banten
KPP Madya Bekasi	No	2006	West Java
KPP Madya Jakarta Barat	Yes	2007	DKI Jakarta (West)
KPP Madya Jakarta Selatan I	Yes	2007	DKI Jakarta (South)
KPP Madya Jakarta Timur	Yes	2007	DKI Jakarta (East)
KPP Madya Jakarta Utara	Yes	2007	DKI Jakarta (North)
KPP Madya Bandung	Yes	2007	West Java
KPP Madya Semarang	Yes	2007	Central Java
KPP Madya Surabaya	Yes	2007	East Java
KPP Madya Sidoarjo	Yes	2007	East Java
KPP Madya Malang	Yes	2007	East Java
KPP Madya Balikpapan	Yes	2007	East Kalimantan
KPP Madya Makassar	Yes	2007	South, Southeast, and West Sulawesi
KPP Madya Palembang	Yes	2007	South Sumatra and Bangka Belitung Islands
<u>KPP Madya Medan</u>	<u>Yes</u>	<u>2007</u>	<u>North Sumatra</u>

Notes: This table lists all 19 KPP Madya offices in Indonesia operating as of 2019, along with their respective oversight regions. Table A.6 and Figure A.8 show robustness results including the 5 MTOs created in 2005-2006. KPP Madya Jakarta Pusat could not be included because the data needed for MTO assignment as of 2004 (for tax years 2000-2002) are not available.

Table A.4: Analysis sample restrictions

Criteria (1)	Total taxpayers (2)	Assigned to MTO in 2007 (3)	Not assigned to MTO in 2007 (4)
In eligible tax office as of pre-treatment year	101,786	4,272	97,514
Baseline gross income above IDR 100 million	60,611	4,183	4,183
<u>2005</u> gross income and taxes paid within common support	<u>20,862</u>	<u>1,478</u>	<u>19,384</u>

Notes: This table shows taxpayer counts by treatment status following each analysis sample restriction. Eligible tax offices are the origin tax offices from which MTO taxpayers were selected according to the MTO creation regulations for the 13 KPP Madya offices created in 2007. Treatment status in columns (3)-(4) are computed based on the tax office in which the taxpayer files any corporate income taxes over years 2007-2008. A treated (untreated) taxpayer is in the common support when its gross income and total taxes paid fall within the 2.5th and 97.5th percentiles of the respective distributions among untreated (treated) taxpayers. Table A.6 shows robustness results to including very small taxpayers (that is, no baseline gross income restriction), and to allowing increasing the common support cutoffs to 1st - 99th percentiles. MTO creation regulations are available in the Directorate General of Taxes website: <http://www.pajak.go.id/>, and they are: KEP-30-PJ-2007 (Balikpapan); KEP-25-PJ-2007 (Bandung); Nomor KEP-21-PJ-2007 (Jakarta Barat); KEP-22-PJ-2007 (Jakarta Selatan); KEP-23-PJ-2007 (Jakarta Timur); KEP-24-PJ-2007 (Jakarta Utara); KEP-31-PJ-2007 (Makassar); KEP-29-PJ-2007 (Malang); KEP-19-PJ-2007 (Medan); KEP-20-PJ-2007 (Palembang); KEP-26-PJ-2007 (Semarang); KEP-28-PJ-2007 (Sidoarjo); KEP-27-PJ-2007 (Surabaya).

Table A.5: Robustness to alternative weighting schemes

	Robustness to weighting method and matched years					
	Main specification	Unweighted	Logit IPW 2005	Entropy 2003-2005	Logit IPW 2003-2005	Random Forest IPW 2003-2005
	(1)	(2)	(3)	(4)	(5)	(6)
Observations	163,579	163,579	161,953	95,174	94,221	94,238
Treated observations	11,815	11,815	11,721	6,954	6,887	6,888
<i>Panel A: Tax payments (2007 IDR billion)</i>						
Total tax payments	0.520	0.508	1.104	0.536	0.681	0.539
	(0.096)	(0.075)	(0.444)	(0.140)	(0.135)	(0.111)
VAT	0.366	0.350	0.828	0.383	0.493	0.389
	(0.078)	(0.061)	(0.352)	(0.118)	(0.091)	(0.091)
Corporate Income Tax	0.074	0.072	0.093	0.075	0.055	0.072
	(0.014)	(0.011)	(0.033)	(0.020)	(0.011)	(0.015)
Other income taxes	0.080	0.086	0.182	0.077	0.133	0.078
	(0.017)	(0.012)	(0.065)	(0.019)	(0.048)	(0.014)
<i>Panel B: Reported income (2007 IDR billion)</i>						
Gross income	9.106	7.665	10.793	9.457	8.220	8.394
	(2.160)	(1.664)	(3.097)	(3.088)	(1.896)	(2.290)
Taxable Income	0.245	0.243	0.480	0.266	0.175	0.279
	(0.071)	(0.055)	(0.252)	(0.096)	(0.059)	(0.077)
Total corporate income tax due	0.067	0.062	0.129	0.075	0.048	0.074
	(0.020)	(0.015)	(0.068)	(0.026)	(0.015)	(0.020)
<i>Panel C: Employment</i>						
Total workers	12,498	3.826	33.891	24.922	53.596	19.289
	(21.271)	(16.319)	(12.834)	(21.195)	(22.036)	(16.779)
Permanent workers	10.496	13.490	17.228	15.262	17.919	16.844
	(5.840)	(3.318)	(4.687)	(7.073)	(6.265)	(4.006)
Temporary workers	2.001	-9.665	16.663	9.659	35.676	2.445
	(20.596)	(16.127)	(12.315)	(20.301)	(22.838)	(16.556)
Total wage bill (2007)	0.367	0.294	0.527	0.586	0.599	0.432
	(0.140)	(0.090)	(0.111)	(0.173)	(0.146)	(0.120)
Permanent workers	0.201	0.265	0.435	0.253	0.394	0.286
	(0.097)	(0.052)	(0.095)	(0.110)	(0.131)	(0.064)
Temporary workers	0.166	0.029	0.092	0.333	0.205	0.145
	(0.100)	(0.071)	(0.049)	(0.127)	(0.108)	(0.100)
Average yearly wage (2007 IDR million)	2.641	2.459	4.008	2.565	2.902	0.002
	(0.957)	(0.706)	(1.246)	(1.385)	(1.688)	(0.001)

Notes: See notes to Table 1. This table shows MTO treatment effect robustness results to alternative weighting schemes. The random forest IPW weights are constructed with predicted treatment probabilities estimated via a random forest algorithm that is fed a total of 984 variables. These include: regional tax office dummies, industry dummies, origin tax office dummies, and for each tax year: all line items in CIT filing for each year; all tax payments by tax year broken down by tax type; all available variables on enforcement (e.g., assessment letter dummies, confiscation letter dummies, etc.); dummies for whether CIT tax filing was on time; estimated corrected amounts for gross income, total taxes due, and taxable income for correction CIT filings; on-time tax payments broken down by all available tax types; late payments by tax type; number of employees broken down by type (temporary vs. permanent); and total income paid to employees broken down by type.

Table A.6: Robustness to alternative sample restrictions

	Main specification	Robustness to sample restriction:					
		No common support restriction	No gross income restriction	Restrict sample to 1st-99th common support		Adding 2005 and 2006 MTOs	Restrict to years 2003-2009
		(1)	(2)	Weighted	Unweighted	(6)	(7)
Observations	163,579	455,888	192,569	293,741	293,741	209,258	130,875
Treated observations	11,815	33,064	10,210	16,425	16,425	14,246	9,492
<i>Panel A: Tax payments (2007 IDR billion)</i>							
Total tax payments	0.520 (0.096)	1.553 (0.148)	0.448 (0.111)	0.312 (0.241)	0.611 (0.066)	0.323 (0.068)	0.464 (0.077)
VAT	0.366 (0.078)	0.713 (0.096)	0.330 (0.090)	0.187 (0.184)	0.378 (0.047)	0.228 (0.056)	0.339 (0.063)
Corporate Income Tax	0.074 (0.014)	0.550 (0.067)	0.052 (0.013)	0.052 (0.055)	0.122 (0.025)	0.045 (0.009)	0.061 (0.011)
Other income taxes	0.080 (0.017)	0.291 (0.031)	0.067 (0.018)	0.073 (0.038)	0.111 (0.012)	0.050 (0.010)	0.064 (0.014)
<i>Panel B: Reported income (2007 IDR billion)</i>							
Gross income	9.106 (2.160)	10.202 (2.707)	5.986 (2.144)	5.160 (2.842)	6.925 (1.358)	3.980 (1.204)	7.663 (1.835)
Taxable Income	0.245 (0.071)	1.776 (0.245)	0.149 (0.081)	0.166 (0.236)	0.404 (0.105)	0.142 (0.048)	0.183 (0.061)
Total corporate income tax due	0.067 (0.020)	0.478 (0.072)	0.041 (0.023)	0.053 (0.063)	0.109 (0.029)	0.034 (0.013)	0.059 (0.018)
<i>Panel C: Employment</i>							
Total workers	12.498 (21.271)	-41.089 (20.217)	31.980 (17.556)	9.918 (29.718)	0.025 (14.526)	1.392 (18.033)	28.596 (30.211)
Permanent workers	10.496 (5.840)	25.423 (6.680)	16.647 (4.505)	7.960 (13.913)	21.854 (7.101)	12.049 (3.092)	12.600 (5.080)
Temporary workers	2.001 (20.596)	-66.511 (19.064)	15.333 (17.184)	1.958 (23.936)	-21.829 (12.956)	-10.656 (17.674)	15.996 (29.788)
Total wage bill (2007 IDR billion)	0.367 (0.140)	-0.881 (0.515)	0.382 (0.124)	0.246 (0.310)	0.305 (0.138)	-0.144 (0.471)	0.370 (0.125)
Permanent workers	0.201 (0.097)	0.285 (0.195)	0.237 (0.077)	0.197 (0.262)	0.417 (0.129)	-0.244 (0.466)	0.208 (0.078)
Temporary workers	0.166 (0.100)	-1.165 (0.475)	0.145 (0.102)	0.048 (0.125)	-0.112 (0.063)	0.101 (0.066)	0.162 (0.092)
Average yearly wage (2007 IDR million)	2.641 (0.957)	4.435 (4.253)	2.877 (0.783)	1.850 (0.001)	1.605 (0.001)	-9.923 (12.183)	3.999 (1.238)

Notes: See notes to Table 1. This table shows MTO treatment effect robustness results to alternative sample restrictions.

Table A.7: Robustness to alternative standard error clustering levels

	Robustness to clustering		
	Main specification	Clustering at	Clustering at
		origin tax office	regional tax office
	(1)	(2)	(3)
Observations	163,579	163,579	163,579
Treated observations	11,815	11,815	11,815
<i>Panel A: Tax payments (2007 IDR billion)</i>			
Total tax payments	0.520 (0.096)	0.520 (0.095)	0.520 (0.098)
VAT	0.366 (0.078)	0.366 (0.078)	0.366 (0.081)
Corporate Income Tax	0.074 (0.014)	0.074 (0.014)	0.074 (0.014)
Other income taxes	0.080 (0.017)	0.080 (0.017)	0.080 (0.020)
<i>Panel B: Reported income (2007 IDR billion)</i>			
Gross income	9.106 (2.160)	9.106 (2.224)	9.106 (2.342)
Taxable Income	0.245 (0.071)	0.245 (0.069)	0.245 (0.055)
Total corporate income tax due	0.067 (0.020)	0.067 (0.019)	0.067 (0.015)
<i>Panel C: Employment</i>			
Total workers	12.498 (21.271)	12.498 (18.406)	12.498 (20.021)
Permanent workers	10.496 (5.840)	10.496 (5.861)	10.496 (4.381)
Temporary workers	2.001 (20.596)	2.001 (18.332)	2.001 (19.501)
Total wage bill (2007 IDR billion)	0.367 (0.140)	0.367 (0.129)	0.367 (0.133)
Permanent workers	0.201 (0.097)	0.201 (0.105)	0.201 (0.097)
Temporary workers	0.166 (0.100)	0.166 (0.089)	0.166 (0.085)
Average yearly wage (2007 IDR million)	2.641 (0.957)	2.641 (0.950)	2.641 (0.911)

Notes: See notes to Table 1. This table shows MTO treatment effect robustness results to the levels at which standard errors are clustered.

Table A.8: First stage of MTO regression

Instrument:	Treatment: Taxpayer in MTO in current year
	(1)
(Assigned to MTO in 2007) \times	0.648
(Year > 2005)	(0.008)
F-statistic	6,582.1

Notes: This table shows first stage estimates for MTO treatment effect as defined in equation (17). Standard errors are clustered at the taxpayer level.

Table A.9: Administrative Costs

	MTO (1)	Not MTO (2)
<i>Total budget (2007 IDR billion)</i>		
Staff	85.8	908.3
Goods + Capital	55.1	1187.8
Total	140.9	2096.0
<i>Number of corporate taxpayers</i>	18,051	1,115,850
<i>Cost per corporate taxpayer</i>	0.00789	0.00095

Notes: Budget data from 2016, deflated to 2007 IDR using Indonesia's GDP deflator. Taxpayer counts based on all taxpayers who filed SPT 1771 in calendar year 2016 or paid any taxes in 2016, and reflects taxpayers across all 19 regional tax offices. Taxpayers who did not file SPT 1771 in 2016 and who were never in the MTO but paid taxes in 2016 assumed to be in PTO (Primary Tax Office). We assume half of all PTO costs are for corporate taxation.

Table A.10: Detailed effects of MTO on corporate income tax returns

Tax Filing item (2007 IDR billion)	Weighted means				MTO effect (IV)	
	Pre-treatment		N (3)	Treated post-treatment counterfactual (4)	Point estimate (5)	Standard error (6)
	Untreated (1)	Treated (2)				
Gross income	13.04	13.04	136,445	12.07	9.106	(2.160)
- Cost of sales	10.34	10.21	135,861	9.37	7.617	(2.010)
- Other expenses	2.20	2.39	136,395	2.11	1.054	(0.234)
<i>Net income from business</i>	0.68	0.49	136,987	0.54	0.490	(0.163)
+ Net income from side business	0.04	0.01	136,972	-0.04	-0.015	(0.080)
<i>Total domestic commercial net income</i>	0.72	0.50	136,910	0.50	0.474	(0.148)
+ Total foreign commercial net income	0.00	0.00	136,914	0.00	0.004	(0.009)
<i>Total commercial net income</i>	0.72	0.50	137,044	0.52	0.461	(0.152)
- Non-taxable inc. and inc. subject to final tax	0.86	0.52	137,451	0.23	0.963	(0.451)
+ Total positive fiscal adjustment	0.54	0.41	137,448	0.18	0.784	(0.424)
- Total negative fiscal adjustment	0.03	0.03	137,446	0.21	-0.120	(0.115)
<i>Fiscal net income</i>	0.31	0.37	137,446	0.34	0.313	(0.091)
- Compensation for fiscal loss carried forward	0.02	0.03	137,441	0.03	-0.010	(0.019)
<i>Taxable Income</i>	0.39	0.45	137,442	0.47	0.245	(0.071)
<i>Total corporate income tax due</i>	0.09	0.12	137,443	0.12	0.067	(0.020)

Notes: See notes to Table 1.

Table A.11: Detailed effects of MTO on tax payments

Tax payments (2007 IDR billion)	Weighted means				MTO effect (IV)	
	Pre-treatment		N	Treated post-treatment counterfactual	Point estimate	Standard error
	Untreated	Treated				
Total	0.372	0.372	163,579	0.408	0.520	(0.096)
VAT	0.262	0.260	163,579	0.275	0.366	(0.078)
Domestic	0.237	0.230	163,579	0.228	0.284	(0.057)
Imported	0.023	0.027	163,579	0.045	0.082	(0.047)
Other	0.001	0.002	163,579	0.001	0.001	(0.001)
Corporate Income Tax	0.049	0.056	163,579	0.062	0.074	(0.014)
<i>Other income taxes</i>						
Employee income tax withholding	0.029	0.025	163,579	0.036	0.021	(0.007)
Other	0.033	0.030	163,579	0.034	0.059	(0.013)

Notes: See notes to Table 1.

Table A.12: MTO reduced form effect heterogeneity by taxpayer baseline size

	In first MTO cohort x post (1)	In first MTO cohort x post x base size (2)	In first MTO cohort x post (3)	In first MTO cohort x post x base size (4)
	<i>Panel A: Base size is 2005 gross income</i>		<i>Panel B: Base size is 2005 taxable income</i>	
Total taxes paid	0.379 (0.106)	0.002 (0.004)	0.294 (0.101)	0.245 (0.148)
N		187,406		187,406

Notes: See notes to Table 1.

Table A.13: Effect of reform-induced change in net of tax CIT on various outcomes

	All taxpayers (1)	MTO (2)	Not MTO (3)	P-value of MTO vs. Not MTO (4)
<i>Panel A: Taxable income reporting</i>				
Intensive margin (Elasticity of Taxable Income)				
Δ Ln(Taxable Income)	0.579 (0.198)	0.344 (0.380)	0.764 (0.214)	0.335
N	12,816	726	12,090	
Extensive margin				
Δ Reports positive Taxable Income	0.441 (0.068)	0.471 (0.132)	0.417 (0.065)	0.718
N	19,570	1,106	18,464	
<i>Panel B: Other income reporting outcomes</i>				
Δ Ln(Gross Income)	-0.013 (0.177)	0.155 (0.331)	-0.095 (0.195)	0.514
N	12,648	720	11,928	
Reports higher Taxable Income than in base year	0.911 (0.149)	0.605 (0.305)	1.092 (0.150)	0.151
N	12,816	726	12,090	
<i>Panel C: Tax payments</i>				
Δ Ln(Corporate Income Tax payments)	0.651 (0.232)	-0.072 (0.470)	1.072 (0.240)	0.030
N	12,552	722	11,830	
Δ Ln(Total Income Tax payments)	0.549 (0.189)	0.299 (0.354)	0.715 (0.213)	0.312
N	12,602	724	11,878	
Δ Ln(Total VAT payments)	-0.130 (0.323)	-0.763 (0.689)	0.156 (0.278)	0.214
N	9,780	616	9,164	
<i>Panel D: Employment</i>				
Δ Ln(Total workers)	0.124 (0.214)	0.245 (0.443)	0.085 (0.200)	0.739
N	8,778	520	8,258	
Δ Ln(Permanent workers)	0.131 (0.198)	0.130 (0.423)	0.129 (0.165)	0.999
N	8,618	516	8,102	
Taxpayer FE	Yes	Yes	Yes	
Year FE	Yes	Yes	Yes	

Notes: See notes to Table 6. This table shows coefficients from regressions of various outcomes (displayed on separate rows) on the change in log net of tax CIT marginal tax rate induced by Indonesia's Marginal Tax Rate Schedule reform. All regressions are estimated in the same sample and using the same specification as the ETI specification (20), except for the extensive margin regression, which includes taxpayers reporting zero taxable income. Taxpayers reporting zero taxable income are assumed to face the smallest marginal tax rate in the pre-reform MTR schedule (defined based on taxable income cutoffs), and their predicted MTR in the post-reform MTR schedule (defined based on gross income cutoffs). Following the main ETI specification, all regressions with logged outcome variables further include a base-year log outcome variable control.

Table A.14: Robustness of ETI estimates

	Main specification (1)	Unweighted regressions (2)	Re-estimated weights (3)	Restricting estimation to 2007-2010 balanced sample (4)	Using lagged data for instrument and baseline controls (5)	No taxpayer fixed effect (6)	No baseline controls (7)	Use 2008-2009 change only (8)	Use 2008-2010 change only (9)	Predicted tax cut (10)	By 2008-2009 predicted tax change Predicted tax raise (11)
<i>Panel A: First Stage</i>											
Endogenous:	0.979	0.984	0.986	0.977	0.954	0.960	0.969	0.953	0.957	0.982	0.989
$\Delta \ln(\text{Net of tax rate})$	(0.010)	(0.003)	(0.017)	(0.010)	(0.013)	(0.008)	(0.012)	(0.009)	(0.010)	(0.013)	(0.053)
F-statistic	10173.650	146048.300	3441.327	9621.134	5089.842	14709.310	6669.979	11244.390	8,914.13	5635.501	344.596
N	12,816	26,298	6,916	10,784	10,904	14,768	13,146	8,284	7,681	9,444	3,372
<i>Panel B: IV (ETI estimate)</i>											
Outcome:	0.579	0.676	0.535	0.402	0.471	1.063	0.471	1.008	1.120	0.606	1.248
$\Delta \ln(\text{Taxable Income})$	(0.198)	(0.073)	(0.329)	(0.201)	(0.373)	(0.255)	(0.354)	(0.305)	(0.350)	(0.232)	(1.325)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Taxpayer FE	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes
Sector FE	No	No	No	No	No	Yes	No	Yes	Yes	No	No
MTO dummy	No	No	No	No	No	Yes	No	Yes	Yes	No	No
<i>Panel C: MTR raise needed to generate MTO effect on Corporate Income Tax revenues</i>											
Taxing MTO taxpayers	Laffer	Laffer	Laffer	28 pp	29 pp	Laffer	29 pp	Laffer	Laffer	Laffer	Laffer
Taxing all taxpayers	8 pp	9 pp	8 pp	7 pp	7 pp	Laffer	7 pp	12 pp	15 pp	8 pp	Laffer
<i>Panel D: Revenue-maximizing corporate income tax rate</i>											
Revenue-max CIT MTR	57%	53%	58%	65%	62%	41%	62%	43%	40%	55%	38%

Notes: See notes to Table 6 and Section 5.2.2. Values in Panel C are calculated based on ETI point estimates. Counterfactual MTR increases are displayed as "Laffer" whenever it is not possible to raise the respective amount of tax revenues without exceeding the revenue-maximizing tax rate implied by each ETI point estimate.

Table A.15: Robustness to ETI heterogeneity by MTO assignment vs. treatment status

	Weighted by MTO balancing weights			Unweighted		
	MTO status		P-value of MTO vs. Not MTO	MTO status		P-value of MTO vs. Not MTO
	MTO (1)	Not MTO (2)	difference (3)	MTO (4)	Not MTO (5)	difference (6)
<i>Panel A: MTO status indicates taxpayer was in MTO first cohort assignment</i>						
$\Delta \ln(\text{Taxable Income})$	0.344 (0.380)	0.764 (0.214)	0.335	0.344 (0.380)	0.609 (0.094)	0.498
N	726	12,090		726	12,090	
<i>Panel B: MTO status indicates whether taxpayer was in MTO in each outcome year</i>						
$\Delta \ln(\text{Taxable Income})$	0.640 (0.414)	0.537 (0.189)	0.878	0.977 (0.425)	0.586 (0.096)	0.496
N	956	11,304		956	11,304	
Taxpayer FE	Yes	Yes		Yes	Yes	
Year FE	Yes	Yes		Yes	Yes	

Notes: See notes to Table 6. This table shows robustness estimates for the difference in ETIs between MTO and non-MTO taxpayers. Columns (1)-(3) present estimates weighted by MTO balancing weights, while columns (4)-(5) show unweighted estimates. Panel A shows replicates the ETI estimates presented in Table 6, for which MTO status is defined based on first MTO cohort assignment. Panel B presents estimates for which MTO status is define based on actual MTO treatment in each regression year. As regression years are 2008-2010, Panel B includes taxpayers assigned to MTO in the 2009 MTO expansion.

Table A.16: CIT income tax increases to match MTO effects: extrapolated counterfactual

MTO IV treatment effect (IDR billion)	MTR raise needed to generate MTO effect on total revenue		
	Taxing MTO taxpayers	Taxing all taxpayers	(3)
(1)	(2)		
<i>Panel A: Main counterfactual: tax change among analysis sample taxpayers</i>			
Corporate Income Tax	0.086	Laffer	8 pp
Total Income Taxes	0.180	Laffer	16 pp
<i>Panel B: Counterfactual tax change extrapolated to taxpayers in 19 regions</i>			
Corporate Income Tax	0.086	7 pp	6 pp
Total Income Taxes	0.180	15 pp	12 pp

Notes: See notes to Table 7.

Table A.17: Industry and Geographic composition of all MTO and PTO taxpayers

	MTO (1)	PTO (2)	MTO share (3)	MTO share of base year total taxes paid (4)
<i>Panel A: Sectoral composition</i>				
Wholesale or retail trade	5,431	134,885	4%	60%
Manufacturing	2,322	13,296	15%	72%
Construction	2,172	80,567	3%	49%
Other service activities	1,574	34,611	4%	64%
Financial services, insurance, real estate	981	15,088	6%	70%
Mining and/or extraction	872	5,932	13%	60%
Transportation	717	12,193	6%	64%
Telecommunications and/or publishing	244	11,442	2%	58%
Hotels and restaurants	196	3,458	5%	56%
Healthcare and social work	163	5,170	3%	62%
Education	82	8,680	1%	44%
Total	14,672	316,642	4%	64%
<i>Panel B: Geographic composition</i>				
Java (except Jakarta)	5,299	189,379	3%	67%
Jakarta	4,363	117,430	4%	61%
Sumatra	1,614	31,621	5%	72%
Riau Islands	1,679	32,295	5%	67%
Kalimantan	971	21,100	4%	69%
Sulawesi	847	29,212	3%	63%
Bali	812	17,294	4%	76%
Total	15,585	438,331	4%	64%

Notes: This table presents descriptive statistics for industry and geographic location for all taxpayers in MTO by 2011. MTO status and geographic region is determined based on filing of SPT 1771 (Corporate Income Taxes). Industry code is determined based on filing of SPT 1721 (payroll taxes). Percent of total taxes paid is based on 2005 tax year. Firms that did not file any SPT 1771 or SPT 1721 forms by 2011 are excluded from these tables.

Table A.18: 2005 average tax payments for all MTO and PTO taxpayers

<u>Tax payments (2007 IDR billion)</u>	MTO (1)	PTO (2)
Total	3.232	0.097
<i>VAT</i>		
Domestic	2.033	0.125
Imported	1.360	0.091
Other	2.346	0.725
Other	0.264	0.052
<i>Corporate Income Tax</i>	0.794	0.028
<i>Other income taxes</i>		
Employee income tax withholding	0.456	0.093
Other	0.591	0.038
Taxpayers	13,838	561,767

Notes: This table presents descriptive statistics of base year tax payments for all taxpayers in MTO as of 2011. MTO status is based on filing of SPT 1771 by 2011. Taxpayers that did not file any SPT 1771 by 2011 but made tax payments are assumed to be in PTOs of regional tax offices whose MTO creation was in 2007. Figures are based on payments for tax year 2005.

Table A.19: 2005 average CIT line items for all MTO and PTO taxpayers

Tax Filing item (2007 IDR billion)	MTO (1)	PTO (2)
Gross income	80.12	4.82
- Cost of sales	70.12	5.06
- Other expenses	11.85	0.73
<i>Net income from business</i>	3.74	0.14
+ Net income from side business	1.11	0.04
<i>Total domestic commercial net income</i>	4.59	0.16
+ Total foreign commercial net income	0.02	0.01
<i>Total commercial net income</i>	4.84	0.29
- Non-taxable inc. and inc. subject to final tax	5.19	0.57
+ Total positive fiscal adjustment	2.73	0.28
- Total negative fiscal adjustment	2.09	0.19
<i>Fiscal net income</i>	2.18	0.03
- Compensation for fiscal loss carried forward	0.40	0.02
<i>Taxable Income</i>	2.32	0.07
<i>Total corporate income tax due</i>	0.85	0.03
Total Taxpayers	12,683	136,433

Notes: This table presents descriptive statistics of base year corporate income tax line items for all taxpayers in MTO as of 2011. MTO status is based on filing of SPT 1771 by 2011. Figures are based on filings for tax year 2005. Firms that did not file SPT 1771 for tax year 2005 are excluded from this table.

Table A.20: 2005 average employment for all MTO and PTO taxpayers

	MTO (1)	PTO (2)
Total workers	331.00	51.71
Permanent workers	137.44	24.86
Temporary workers	193.56	26.85
Total wage bill (2007 IDR billion)	5.37	0.88
Permanent workers	3.62	0.71
Temporary workers	1.74	0.17
Average yearly wage (2007 IDR million)	0.03	0.01
Total taxpayers	12,257	164,554

Notes: This table presents descriptive statistics of base year employment for all taxpayers in MTO as of 2011. MTO status is based on filing of SPT 1771 by 2011. Employment data is based on form SPT 1721. Taxpayers that did not file any SPT 1771 by 2011 but filed SPT 1721 are assumed to be in PTOs. Figures are based on SPT 1721 filings for tax year 2005. Firms that did not file any SPT 1771 by 2011 or did not file SPT 1721 for tax year 2005 are excluded from this table.

A Data Appendix

Corporate Income Tax: Form SPT 1771

Taxpayers file SPT 1771 forms at the headquarter level, reporting aggregate income across all branches. The corporate income tax filing microdata includes all non-identified line items from Form SPT 1771, and are tracked over time under consistent variable names.⁵⁶

Each observation in the dataset is a taxpayer filing for a particular tax year at a particular date. The variables in the SPT 1771 microdata contain each line item from the main form (SPT 1771) and its Annex I (SPT 1771-I). In particular, it includes each component of the major corporate income tax line items, such as net income (gross income - cost of sales - other expenses), fiscal net income (net income +/- fiscal adjustments), taxable income (fiscal net income - compensation for fiscal loss carried forward), and the amount of tax overpaid or underpaid by the taxpayer as of the year end.

When analyzing effects on tax payments, we assume that all corporate income tax overpayments are refunded to the taxpayer, and thus subtract them from corporate income taxes paid as reported in the payments data. In practice, less than 1% of taxpayers in our analysis sample overpaid corporate income taxes.

Finally, SPT 1771 microdata includes the tax office code under which the corporate income tax form was filed, and an indicator for whether the filing is a correction filing or an original filing. We use the tax office code under which SPT 1771 was filed to define whether the taxpayer has been assigned to an MTO or not, and the correction indicator to construct variables tracking correction filing timing and content.

Employee Income Tax Withholding: Form SPT 1721

Firms are required to report the amount of personal income tax withheld from employees' paychecks on a monthly basis through Form SPT Masa 1721. The SPT 1721 microdata consists of two datasets, one covering tax years 2002-2008, and the other covering tax years 2009-2013. The split reflects a major change in form SPT 1721 that produced finer reporting by different employee categories. Because only very few observations are available for tax year 2008 (the last year under the old form), we exclude SPT 1721 records for tax year 2008 from all analyses.

⁵⁶The forms SPT 1771 and SPT 1771-I have also remained largely unchanged over the analysis period, and are available at http://www.pajak.go.id/sites/default/files/formulir_pajak/Formulir%20SPT%201771-%24.pdf.

Each observation in the 2002-2008 dataset is a branch-level year-end reporting of cumulative income tax withholdings, reported at the branch level. The 2009-2013 data is further disaggregated by month, with cumulative totals for the year reported in the month of December. In terms of variables, the information consistently reported in both datasets includes: number of employees, wage bill, and individual income tax withheld. These data are also separated by two groups of employees: permanent and/or pensioner employees, and temporary employees.⁵⁷

We combine the two datasets to construct a taxpayer-level annual panel dataset . Within each dataset, we aggregate the branch-level data to the taxpayer level. As the 2002-2008 data are reported in year-end totals, we use the year-end total reported in the December monthly filing for the 2009-2013 data.

Tax Payments

Detailed tax payments data are from the Treasurer’s Modul Penerimaan Negara (MPN; State Revenues Module) database, and cover all types of income tax and VAT paid by corporations.

Each observation in the tax payments data is a branch-level payment made on a particular date for a particular tax type and month. The tax type variable differentiates different types of income and VAT. We break taxes down by the following major categories: corporate income taxes, VAT, and other income taxes.⁵⁸

Tax Audits, Assessments, and Disputes

DGT may conduct a tax audit of any or all of a taxpayer’s filings and payments. At the end of every audit, DGT issues a tax assessment letter and/or a tax collection letter to the taxpayer. The tax assessment letter informs the taxpayer of outstanding tax obligations

⁵⁷Number of employees at year-end in the 2002-2008 data and in the 2009-2013 data reflect the total of unique employees employed during the respective tax year. While the 2009-2013 data distinguishes between permanent vs. pensioner employees, the 2002-2008 data does not. As a result, we sum the 2009-2013 employee numbers to construct a consistent series of permanent and/or pensioner employment.

⁵⁸These categories are sub-divided in the data by tax articles. For income taxes: PPh Pasal 25/29 (corporate income tax monthly installments and year-end payments), PPh Pasal 21 (domestic employee withholding), PPh Pasal 26 (foreign employee withholding), PPh Pasal 22 (income tax on import transactions), PPh Pasal 23 (income tax on capital transactions), and PPh Final or Pasal 4 (2) (income tax withholding on gross payments of certain items). For VAT: PPn Domestic, PPn Import, and PPn Other. Tax payments that count towards a company corporate income tax liability include PPh Pasal 25/29, PPh Pasal 23 and PPh Pasal 22. Finally, the payment data also includes codes for administrative penalties levied on income and/or VAT taxes. These penalties account for roughly 0.08% of all tax payments in the data.

(none, underpaid, overpaid), while the tax collection letter is typically used to levy administrative tax sanctions resulting from the audit.⁵⁹ Our tax audit microdata consists of two datasets covering this audit process.

The first dataset covers all audits since 2009, and documents what was audited and why (that is, the audit triggers). Each observation in this dataset is an audit occurrence, and it includes the following main variables: the taxpayer anonymized ID, the audit date, the object audited (e.g., CIT, VAT, location changes), the tax period audited (e.g., a particular month or range of months), and the audit trigger (e.g., risk analysis, office routine, etc.).

The second dataset is specific to VAT audits, and covers the audit result process for all audits since 2002. Each observation in this dataset is either the issuance of a tax collection letter or of a VAT underpayment tax assessment letter. The available variables are: the taxpayer anonymized ID; the issuance type (collection or underpayment assessment) and date; and the total underpaid amount (or administrative penalty) found in the audit.

In addition, because either a tax collection letter or an underpayment letter is a legal instrument with which DGT may confiscate the owed amount/levied penalties, this dataset further includes as variables the issuance dates of all subsequent letters exchanged between DGT and the taxpayer during the tax dispute process. Specifically, these are: a warning letter (issued if the amount/penalty is not paid by its deadline), a distress warrant (issued if the underpaid tax is not settled within 21 days of the warning letter), and a confiscation letter (issued if the underpaid amount is not settled within 48 hours of the distress warrant).

Finally, because, by law, taxpayers are only required to pay the amount of taxes they agree to have underpaid (so long as the amount to which the taxpayer disagrees is formally disputed through an objection letter), the data further includes: the amount of taxes the taxpayer disagrees to have underpaid; the date in which the taxpayer filed an objection letter concerning the disagreed amount; and lastly, in case the objection is denied, the date in which the taxpayer filed an appeal to the Tax Court requesting further review of the case.

Tax Office staffing

We compute staff descriptive statistics for MTO and PTO offices using anonymized staff-level panel data provided by DGT. These data include basic staff demographic characteristics, as well as information on staff position (i.e., auditor or AR) at different points in time.

⁵⁹For a more detailed description of Indonesia's tax audit and assessment process, see, for example, <https://www.pwc.com/id/en/pocket-tax-book/english/pocket-tax-book-2019.pdf>.

Information on staff position and years of experience are then matched with position-specific and experience-specific wage schedules to compute average salary statistics.

Sample Restrictions for Matching

When constructing our analysis sample and computing balancing weights, we attempt to mimic the MTO assignment process conducted by DGT as closely as possible. Appendix Table A.4 outlines each sample restriction step. First, we focus on taxpayers who were registered as of 2006 in a tax office from which MTO taxpayers were sourced (that is, in an “eligible” tax office for MTO selection). The list of tax offices from which MTO taxpayers were sourced can be obtained separately for each MTO from its creation regulation.⁶⁰ This brings us to 101,829 corporate taxpayers registered in an eligible tax office as of 2006, of which 4,272 were assigned to an MTO in 2007.

Second, a large number of the taxpayers registered in eligible tax offices are small microbusinesses that would not have been shortlisted for MTO assignment. We therefore exclude taxpayers with gross income below IDR 100 million (roughly USD 10,000 at the 2007 exchange rate) during baseline years 2003-2005, bringing the shortlisted sample to 60,600 taxpayers, 4,181 of which were assigned to an MTO in 2007.

Finally, as recommended in the propensity score and matching literature (Dehejia and Wahba, 1999; Heckman, Ichimura and Todd, 1997; Stuart, 2010), we focus on taxpayers whose baseline MTO assignment inputs share common support. We define common support based on the 2.5th and 97.5th percentiles of each MTO assignment input. For example, in our main specification the matched variables are the 2005 gross income and the 2005 total taxes paid. The treated (untreated) taxpayers in the common support are those whose 2005 gross income and total taxes paid fall within the 2.5th and 97.5th percentiles of the 2005 gross income and total taxes paid distributions of the untreated (treated) taxpayers.

With this final restriction in place, we arrive at our analysis sample of 20,858 taxpayers, 1,479 of which are assigned to an MTO. Appendix Table A.6 presents robustness results to the gross income and common support restrictions.

⁶⁰In particular, each regulation lists in an attachment all the NPWPs (Tax IDs) assigned to its respective newly created MTO. NPWPs are composed of 15 digits. The first 9 digits uniquely identify the firm, the next three identify the tax office in which the NPWP is registered, and the last 3 identify the branch (e.g., 000 indicates headquarters). While we cannot directly match these IDs to our data as our data are anonymized, we can extract from each NPWP in the regulation the origin tax office from which it came as the NPWP’s middle 10th-12th digits.

B Model Appendix: Adding an evasion margin on the cost dimension

Suppose that in addition to the model outlined in Section 3 above, we add, as in Best et al. (2015), for lines that are not hidden (i.e., for which firms pay taxes), firms have another margin of evasion: they may misreport costs $\hat{c} \neq c(y)$ at a cost $\alpha g(\hat{c} - c(y))$, with $g(0) = 0$ and g convex, such that $0 \leq \hat{c} \leq y$. We assume that some fraction of reported costs μ are not deductible from taxes.⁶¹

For business lines on which firms that evade taxes entirely, the decision remains unchanged from the model above.

For business lines on which firms do not evade entirely, instead of the maximization problem in equation (1), these firms solve the following:

$$\max_{y, \hat{c}} (1 - \tau)y - c(y) + \tau\mu\hat{c} - \alpha g(\hat{c} - c(y)) \quad (24)$$

which for an interior solution (i.e., $0 < \hat{c} < y$) yields the optimum conditions

$$c'(y^t) = 1 - \tau \frac{1 - \mu}{1 - \tau\mu} \quad (25)$$

and

$$\alpha g'(\hat{c} - c(y^t)) = \tau\mu \quad (26)$$

where y^t is the optimal level of production y for firms that pay tax.

In this model, an increase in the cost of evasion α reduces evasion for these business lines, as they will increase their reported costs (see equation (26)). It does not, however, affect real output choices for business lines paying taxes as long as we are at an interior solution where $\hat{c} < y$), which remained governed by equation (25).

To understand the net effect of an increase in enforcement α , we need to reconsider the indifference condition for which business lines will evade or not (i.e., equation (5)). This is now given by:

$$y_{l^*}^e(\alpha) - c(y_{l^*}^e(\alpha)) - \alpha b(y_{l^*}^e(\alpha))h(l^*) = (1 - \tau)y^p - c(y^p) + \tau\mu\hat{c} - \alpha g(\hat{c} - c(y^p)) \quad (27)$$

An increase in α now has an ambiguous effect on the extensive margin decision, because

⁶¹Best et al. (2015) endogenize μ . We take it as a fixed parameter for our purposes.

there are now two effects. As in equation (5), increasing α decreases the profits from an evaded business line (the left-hand side of equation (27)), because it increases evasion costs (by $b(y_l^e(\alpha))h(l^*)$, from the envelope theorem).⁶² On the other hand, it also reduces the after-tax profits from a non-evaded business line, because the intensive margin cost of evasion has also increased (by $g(\hat{c} - c(y^p))$, again by the envelope theorem). Which of these dominates is ambiguous.

This implies that there is a possibility that, when there is both intensive margin and extensive margin evasion, increasing enforcement costs could actually backfire, i.e., could lead to a decrease in total tax revenue. For this to happen, however, two conditions would need to hold. First, one would need that $g(\hat{c} - c(y^p)) > b(y_l^e(\alpha))h(l^*)$, so increasing α leads to more extensive margin evasion, rather than less. Second, the lost tax revenue from marginal lines that are induced to evade entirely (given by $\tau[y^p - \tau\mu\hat{c}] \frac{\partial l^*}{\partial \alpha}$), would have to offset the increase in tax revenue for all infra-marginal lines (given by $-\int_{l^*}^L \tau\mu \frac{\partial \hat{c}}{\partial \alpha}$).

The welfare analysis in Section 3.3, however, is unaffected by considering the possibility of intensive margin evasion as well. The only difference is that (unobserved) private compliance costs in equation (8), γ , now need to include private compliance costs for both fully evading and partially evading business lines. This can be written as

$$\gamma = \int_0^{l^*} \alpha b(y_l^e(\alpha))h(l) + \int_{l^*}^L \alpha g(\hat{c} - c(y^p))$$

Otherwise, the key expressions for calculating the effect of administrative and tax changes on welfare in equations (8), (9), (12), and (14) that guide our empirical analysis remain unchanged.

C Tax formulas

We slightly modify the notation in Section 3 to account for the fact that we have a progressive tax schedule, and so we consider changes to the top marginal rate. Using the notation from Saez, Slemrod and Giertz (see 2012), we note that a change in marginal tax rates has two components, a mechanical effect (dM) and a behavioral effect (dB). Under the assumption of a constant ETI ε and that all taxpayers above \bar{z} face a single marginal

⁶²Note that this would imply a reduction in reported revenues, since some lines would now evade entirely; the increase in reported costs would be ambiguous, since lines evading entirely would cease reporting costs, but those only partially evading would report higher costs.

tax rate, the mechanical effect of a tax change $d\tau$ is given by:

$$dM \equiv N \cdot (z^m - \bar{z}) d\tau > 0 \quad (28)$$

while the behavioral effect is:

$$dB \equiv -N \cdot \varepsilon \cdot z^m \left(\frac{\tau}{1 - \tau} \right) d\tau < 0 \quad (29)$$

where z^m is the average taxable income among those taxpayers, and τ is the top marginal tax rate. In other words, dM is the total revenue that would be raised for a percentage point change $d\tau$ to the top marginal tax rate τ absent any behavioral responses, whereas dB captures the behavioral reduction in total taxable income reported for that same change. The change in revenue is the difference between the mechanical effect and the behavioral effect, i.e., $dR = dM + dB$.

Combining these terms yields the expression for the marginal excess burden of taxation:

$$-\frac{dB}{dR} = \frac{\varepsilon \tau \rho}{1 - \tau - \varepsilon \tau \rho} \quad (30)$$

where $\rho = \left(\frac{z^m}{z^m - \bar{z}} \right)$ is the Pareto parameter.

We can also use the estimated ETI to compute optimal marginal tax rates as a function of v , the marginal cost of public funds. Modifying equation (9) to take into account the fact that we are considering a top marginal tax rate change, the top optimal tax rate is given by $\tau^* = \frac{1}{1 + \rho \varepsilon \frac{v}{v-1}}$. This is given by rewriting equation (9) as $W_\tau = (v - 1)dM + vdB$, and using equations (28) and (29).

To compare the administration reform with the tax change, recall that in Section 3.1, we derived in equation (12) the relationship between marginal tax rate changes and changes in administration. This is given by:

$$\frac{d\tau}{d\alpha}|_R = -\frac{\tau \frac{dz}{d\alpha} - \frac{da}{d\alpha}}{z \left(1 - \frac{\tau}{1 - \tau} \varepsilon_{1 - \tau} \right)} \quad (31)$$

where $\tau \frac{dz}{d\alpha} - \frac{da}{d\alpha}$ is the empirically estimated change in tax revenue (net of administration costs) from the introduction of the MTO estimated in Section 4, $\varepsilon_{1 - \tau}$ is the estimated elasticity of taxable income with respect to the net of tax rate estimated in Section 5.2.2, and τ is the marginal tax rate from which we are starting. To take this to the data, we modify this equation slightly to account for the fact that we have a progressive tax schedule,

and therefore are considering changes to the top rates. Modifying equation (31) to consider the effect of an increase in the top marginal rate yields:

$$\frac{d\tau}{d\alpha}|_R = - \frac{\overbrace{\tau \frac{dz}{d\alpha} - \frac{da}{d\alpha}}^{\text{Total MTO effect}}}{\underbrace{N(z^m - \bar{z})}_{\text{Total income subject to raise}} \left[1 - \underbrace{\left(\frac{\tau}{1-\tau} \right) \varepsilon_{1-\tau} \left(\frac{z^m}{z^m - \bar{z}} \right)}_{\text{Behavioral effect}} \right]} \quad (32)$$

where N is the number of taxpayers above the 2006 top rate taxable income threshold \bar{z} of IDR 100 million (i.e., those already paying the top marginal rate), $\rho = (\frac{z^m}{z^m - \bar{z}})$ can be computed from the tax data, and τ is the pre-period, top marginal tax rate (30 percent).