Corporate Taxation and Evasion Responses: Evidence from a Minimum Tax in Honduras

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Online Appendix

For Online Publication

A Appendix Graphs and Table

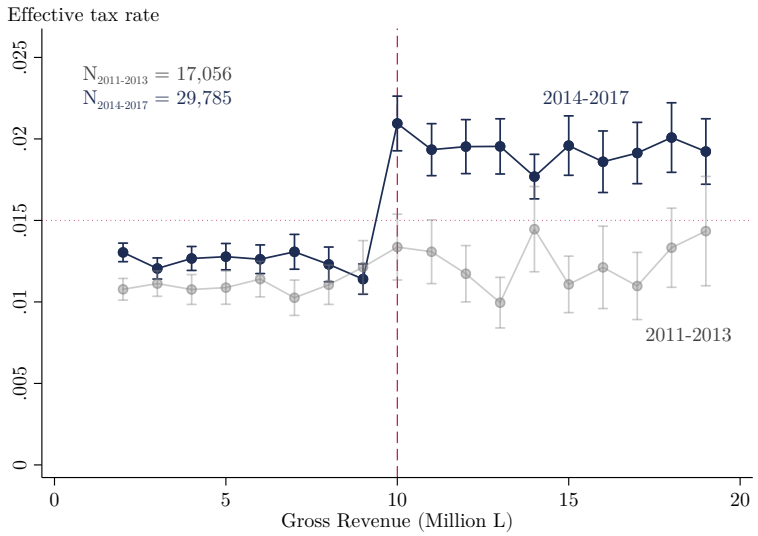
Figure A1: Taxes as percentage of GDP across countries

(a) Tax revenue

(b) Corporate income tax revenue

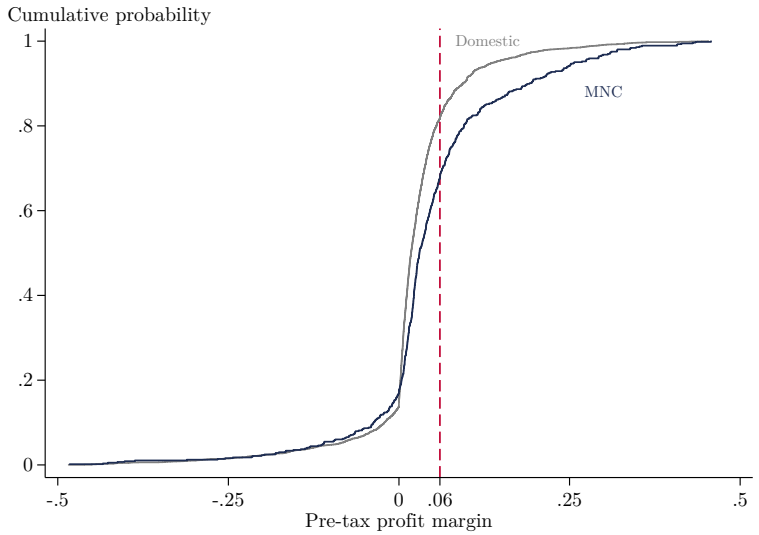
Note: These figures plot countries' tax revenue (Panel A) and corporate income tax revenue (Panel B) as percentage of GDP vs. (log) per capita GDP in 2016. Per capita GDP is expressed in PPP current dollars. Source: (World Bank 2020) and IMF's World Revenue Longitudinal Data (International Monetary Fund 2016).

Figure A2: Average effective tax rate across declared revenue distribution



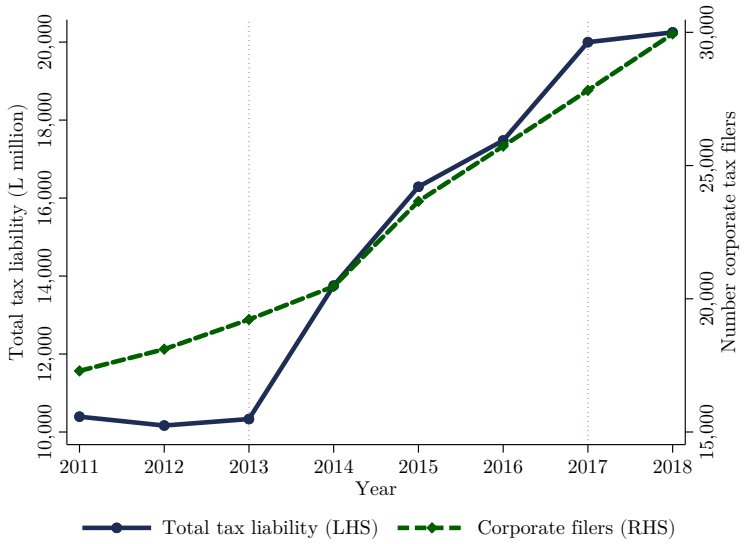
Note: This figure presents mean and 95% confidence intervals of the effective tax rate, defined as the ratio between taxes due and gross revenue, for each bin of declared gross revenue. It documents that the minimum tax increased effective tax rates for corporations declaring more the L10 million: the average effective rate increases by approximately 1 p.p. around the threshold in 2014-2017, with no equivalent variation in 2011-2013, before the policy was introduced. Bins are L1 million wide. Sample is restricted to taxpayers declaring between L2-20 million and effective rate is trimmed at 99th percentile. The blue line refers to the pooled sample of taxpayers in 2014-2017, when the minimum tax was in place, while the gray line refers to the pooled sample of 2011-2013, before the introduction of the policy.

Figure A3: Pre-tax profit margin CDF - Domestic vs. Multinational corporations



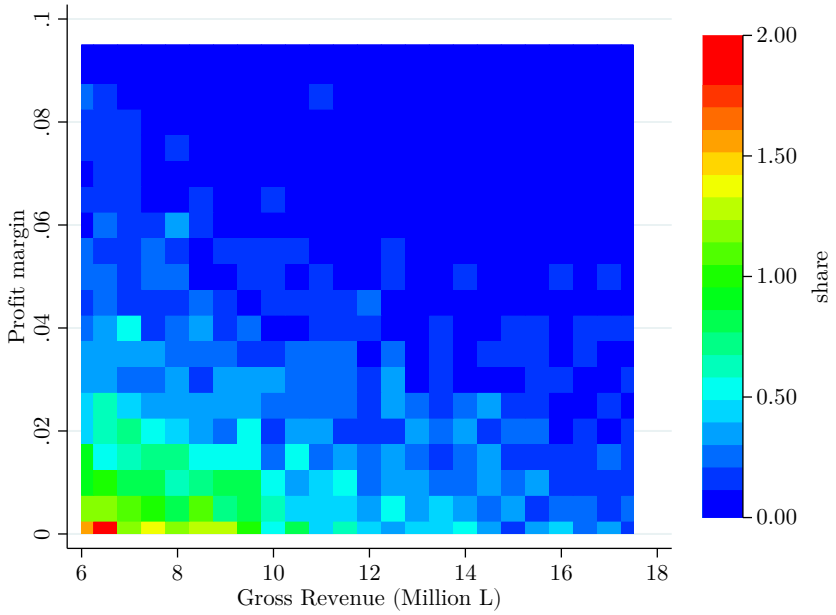
Note: This figure presents the cumulative distribution functions (CDF) of pre-tax profit margins by domestic and multinational firms in 2013, before the introduction of the minimum tax. The CDF of MNCs is shifted to the right, indicating higher declared profit margin across the distribution. In particular, approximately 30% of MNC declared profit margins above the 6% threshold that separates the minimum tax and profit regimes in 2014-2017, while this number is less than 20% for domestic corporations. MNCs are defined as taxpayers that present transfer pricing declarations at some point in 2014-2018. The sample is restricted to taxpayers declaring at least L8 million in gross revenue and the distribution is trimmed at the 1st and 99th percentiles.

Figure A4: Total corporate tax liability and number of filers

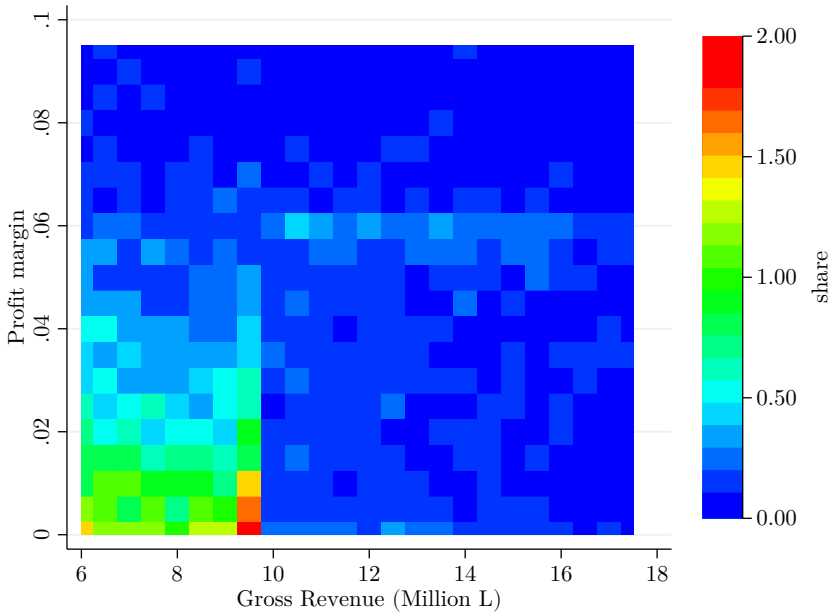


Note: This figure presents, for each year in the period 2011-2018, the total number of corporate tax filers in our sample and the total tax liability. It documents the very significant increase in aggregate tax liability between 2013 and 2014, when the minimum tax was introduced. The sample excludes taxpayers exempt from all income taxes.

Figure A5: Heatmap of corporations on Revenue vs. Profit margin space



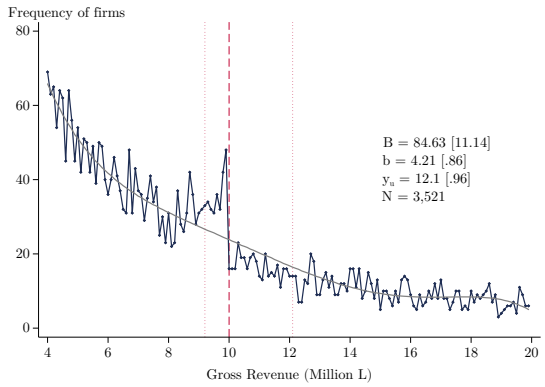
(a) 2011-2013 (before minimum tax)



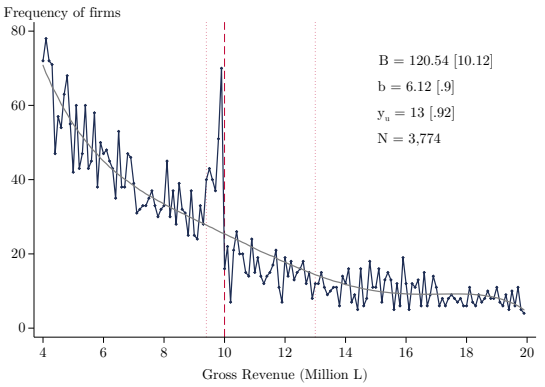
(b) 2014-2017

Note: These figures present heatmaps of the empirical distribution of corporations according to declared gross revenue (x-axis) and profit margin (y-axis). Panel A refers to the period 2011-2013, before the introduction of the minimum tax, while panel B refers to 2014-2017, while the minimum tax was in place with a L10 million exemption threshold. These figures summarized the response of firms to the minimum tax. First, we observe an increase in the number of firms reporting revenue immediately below the L10 million exemption threshold. Second, for firms declaring revenue significantly above that level we observe an increase in declared profit margins around the 6% level, which separates the revenue and profit taxation regimes. Bins are L500,000 wide for revenue and 0.5 p.p. wide for profit margin.

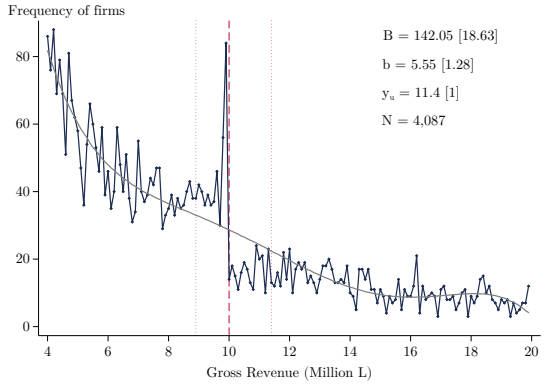
Figure A6: Empirical Density of Gross Revenue around L10 million threshold



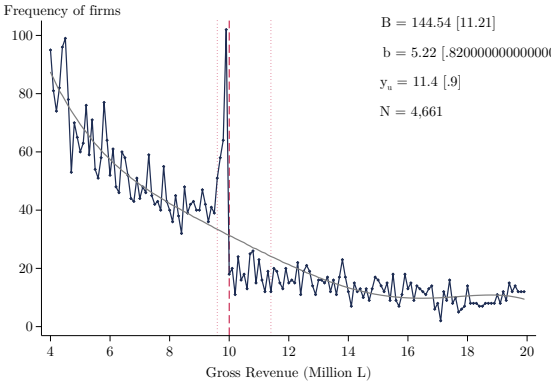
(a) 2014



(b) 2015



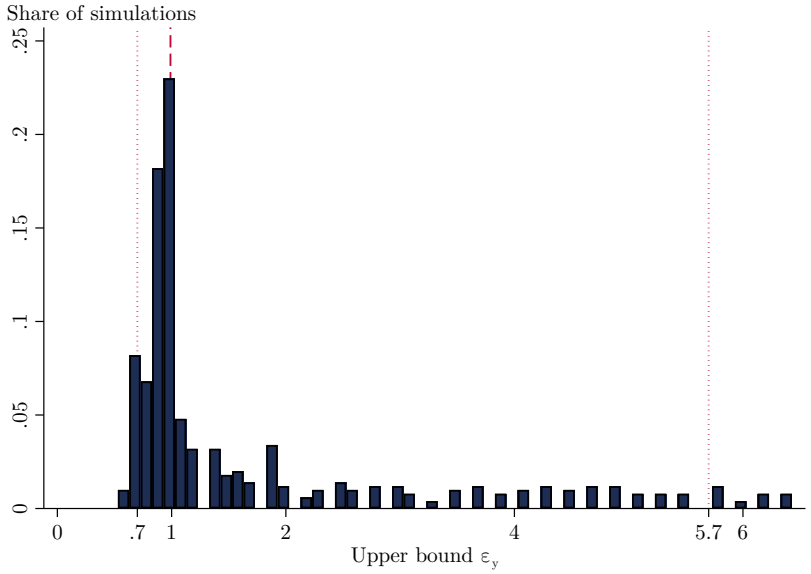
(c) 2016



(d) 2017

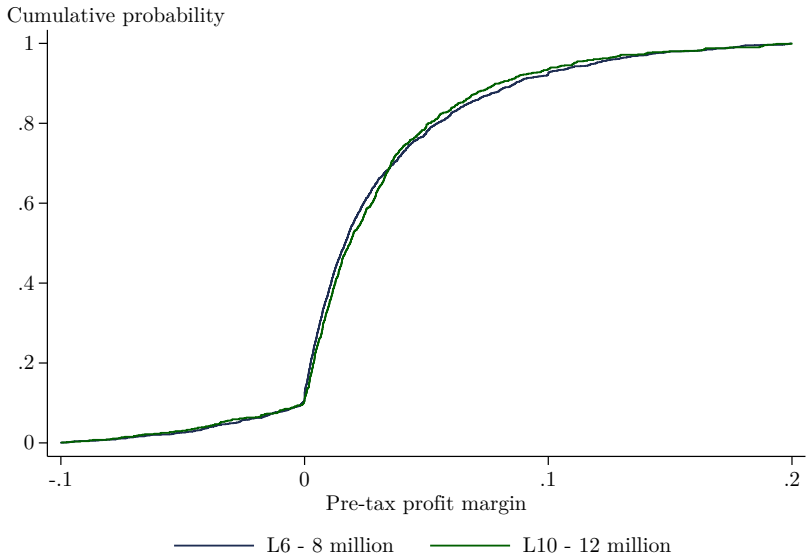
Note: These figures present empirical and counterfactual densities of declared gross revenue for each year in the period 2014-2017. The lower bound of the bunching region is chosen visually while the upper bound is obtained using the convergence method discussed in Section 4.3. The dashed line marks the L10 million notch while the dotted lines mark the lower and upper bounds of the bunching region. For each year we present the excess mass below the notch (B), the excess mass as a share of the predicted mass in the bunching region (b), the upper bound obtained from the convergence method (y_u) and the underlying number of taxpayers in each figure (N). Standard errors in brackets are obtained through bootstrapping. Bins are L100,000 wide.

Figure A7: Histogram of revenue elasticity bootstrap estimate for pooled sample (2014-2017)



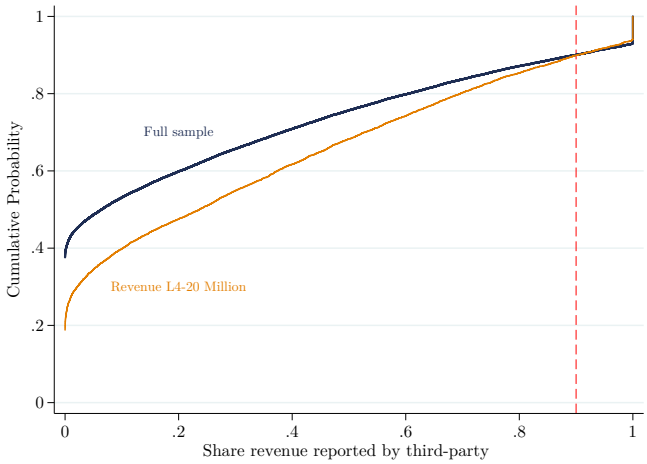
Note: This figure presents the histogram of 500 bootstrap estimates for the upper bound elasticity using the pooled sample of corporation filing in 2014-2017. The dashed line marks the point estimate of $\epsilon_y = 0.99$, while the two dotted lines mark percentiles 2.5 and 97.5 of the distribution. The empirical 95% confidence interval is $[0.7, 5.7]$. Bins are 0.1 wide.

Figure A8: CDF of profit margin for different revenue ranges



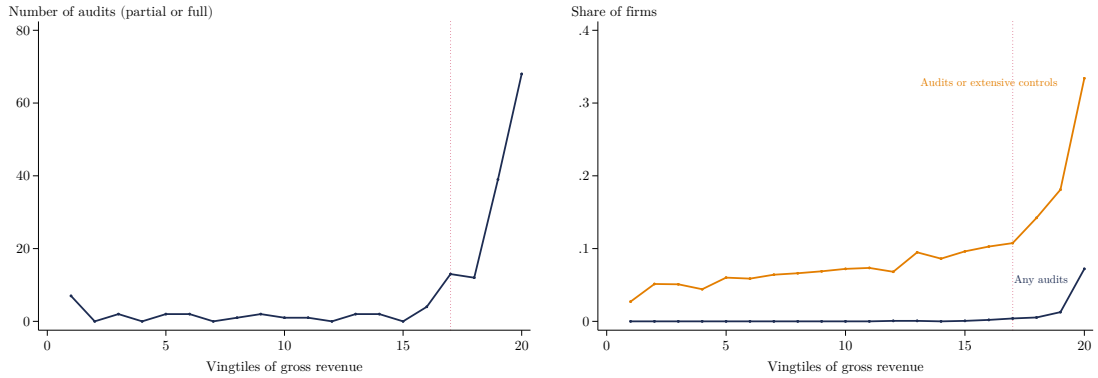
Note: This figure presents cumulative distribution functions (CDFs) of profit margins in 2011-2013, for corporations reporting gross revenues between L6 - 8 million and between L10-12 million. The distributions are trimmed at -10% and 20%. The profit margin distributions are similar across different revenue levels, suggesting the assumption used to estimate the lower bound revenue elasticity (using profit margin distribution below the L10 million notch as the counterfactual distribution above the notch) is reasonable.

Figure A9: Share of revenue reported by third-parties



Note: This figure presents cumulative distribution functions (CDF) for the share of self-declared revenue that is also independently reported by third-parties. The sample is restricted to tax filers in 2018 and CDFs are presented separately for the entire sample (blue) and for those taxpayers declaring revenue in the vicinity of the L10 million threshold (L4 - 20 million) (orange). The dashed line shows that, in both samples, only 10% of taxpayers have 90% of more of their self-declared revenue independently reported by third-parties. For 40% of the total sample and 20% of the larger firms, no third-party reports are available.

Figure A10: Enforcement actions across revenue distribution

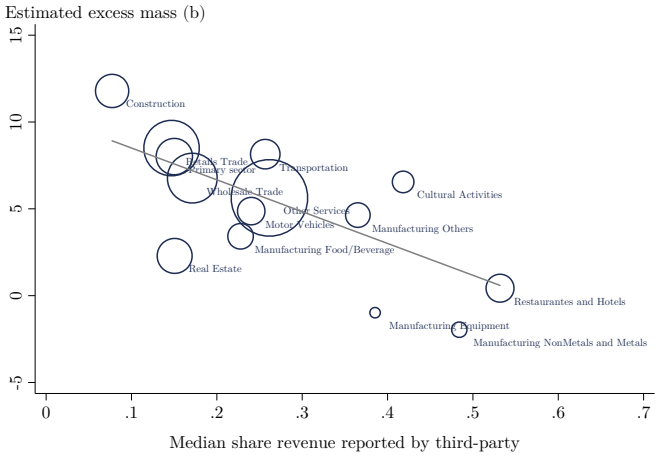


(a) Number of audits per vingtile of corporate revenue (2014)

(b) Share of firms receiving enforcement actions per vingtile of revenue (2018)

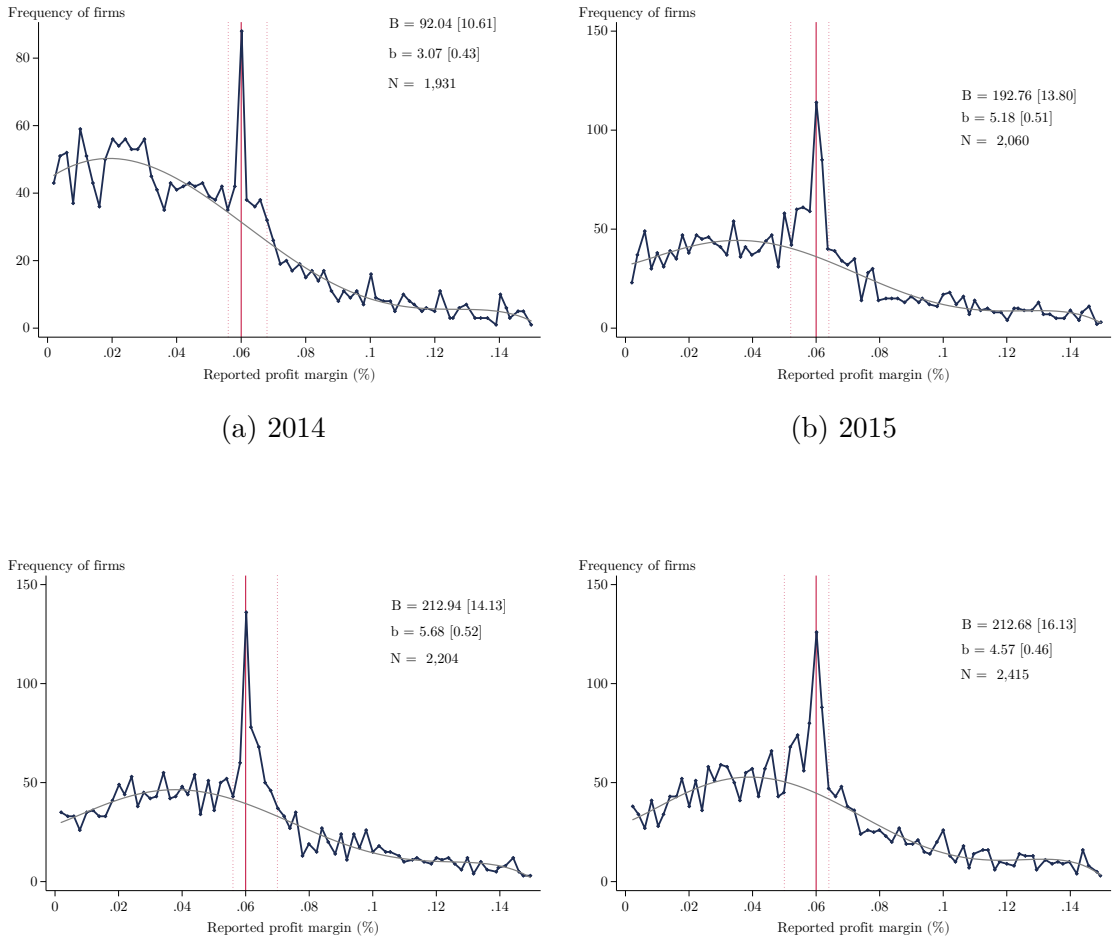
Note: These figures document the relationship between enforcement actions and firms' size. In panel (a) we compute the number of full or partial audits by gross revenue vingtile in 2014, while in panel (b) we compute the share of firms in each vingtile that faced an audit (blue line) or any kind of enforcement action (audit or extensive controls) (orange line) in 2018. The dotted line marks the 80th percentile of the size distribution, which approximately coincides with the L10 million exemption threshold for the minimum tax policy in 2014-2017.

Figure A11: Scatter plot of amount of bunching vs. revenue observability across industries - alternative sectoral definition



Note: This figure presents a scatter plot of estimated excess mass at the L10 million threshold and the median share of self-reported revenue also informed by third parties in each industry. Excess mass is defined as the excess number of firms bunching at the L10 million notch as a ratio of the predicted mass at the notch. The share of reported revenues is calculated in 2018, for firms declaring gross revenues in the interval L5-15 million. The size of markers is proportional to the reported sales in 2018 by industries. Industries are defined to approximate the same sectoral definition as in Almunia and Lopez-Rodriguez (2018).

Figure A12: Empirical Density of profits around 6% threshold



(a) 2014

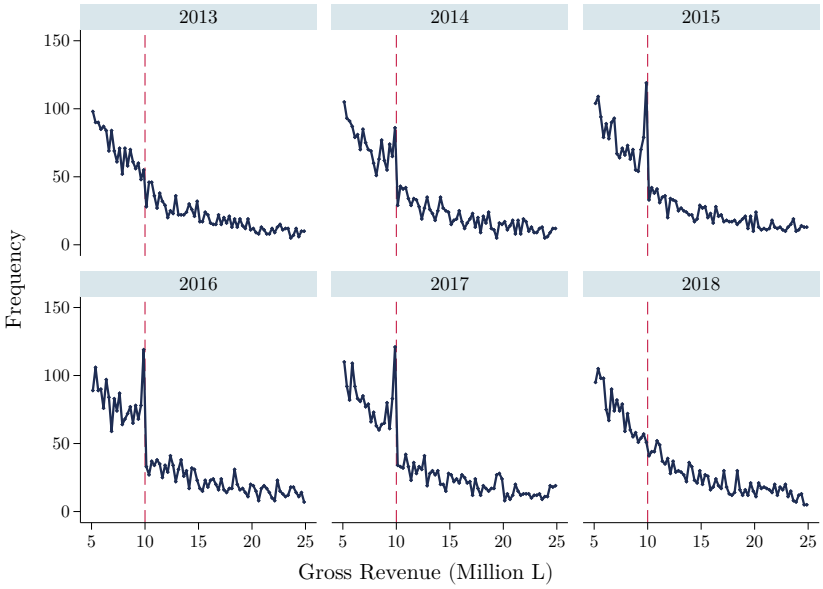
(b) 2015

(c) 2016

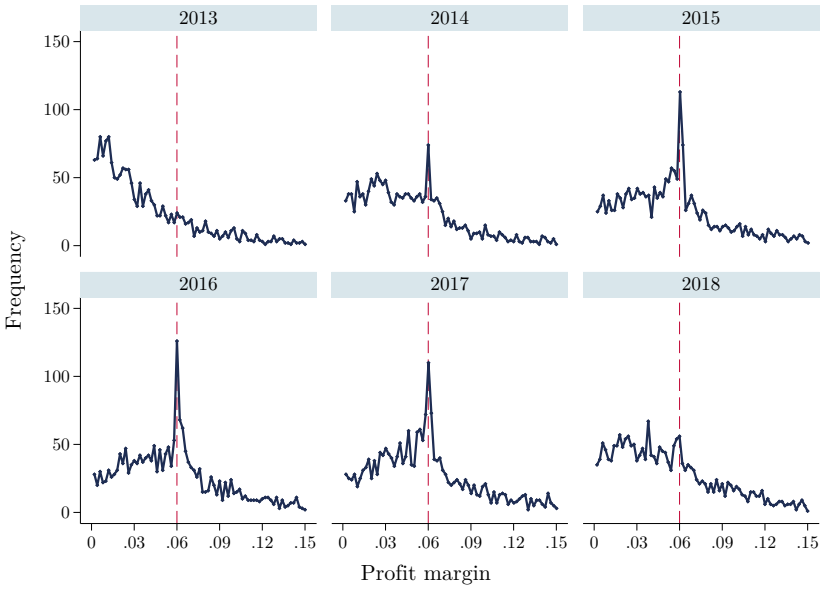
(d) 2017

Note: These figures present the empirical and estimated counterfactual distributions of profit margins for each year in the period 2014-2017. The lower and upper bounds of the bunching region are determined visually. The solid red line marks the 6% kink while the dotted lines present the lower and upper bounds of the bunching region. For each year we present the excess mass around the kink (B), the excess mass as a share of predicted density around the kink (b) and the underlying number of taxpayers in each figure (N). Standard errors in brackets are obtained through bootstrapping. Bins are 0.2 percentage points wide and the first bin starts at 0.1%, such that the 6% kink is the midpoint of a bin.

Figure A13: Robustness: Balanced panel of corporations (2013-2018)



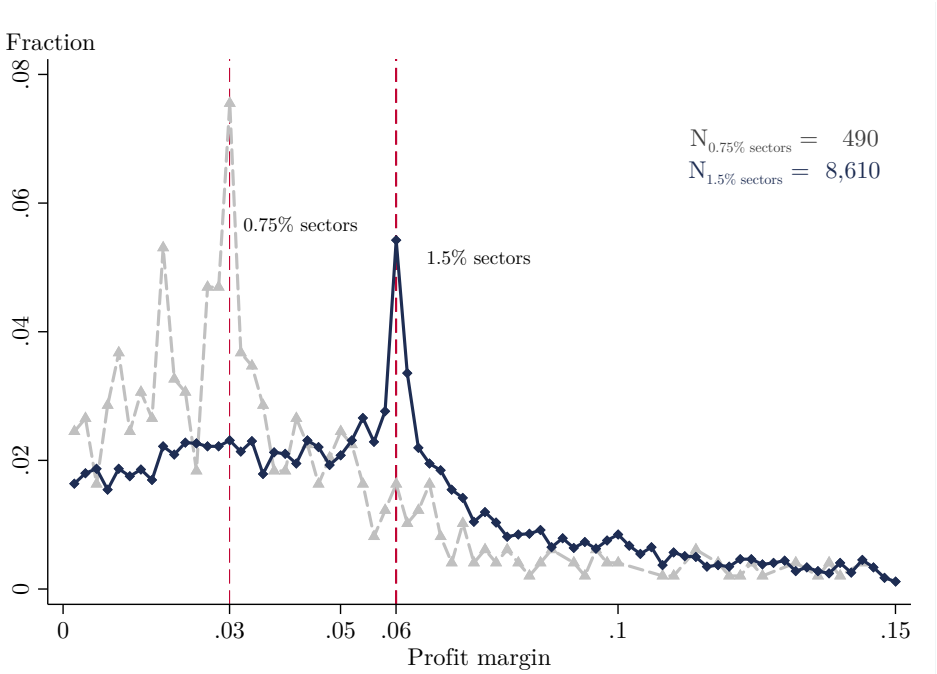
(a) Gross revenue empirical density



(b) Profit margin empirical density

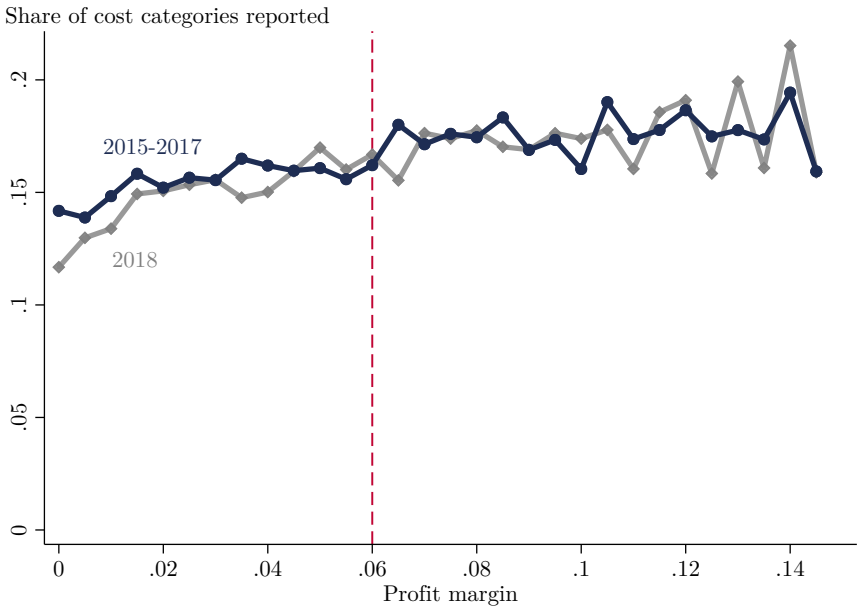
Note: This figure presents the empirical density of gross revenues (Panel A) and profit margins (Panel B) for a balanced panel of 12,172 firms, for each year in the period 2013-2018. It documents the same pattern observed for the full sample. Panel A shows a smooth distribution of gross revenue around the L10 million notch in 2013 and 2018, but significant excess mass between 2014-2017. This is evidence that taxpayers respond to the minimum tax by strategically bunching below the exemption threshold. Panel B shows that taxpayers liable for the minimum tax increase their reported profit margin and bunch around a 6% margin, which separates the minimum tax and profit taxation regimes. Bins are L250,000 wide in Panel A and 0.2 p.p. wide in Panel B. The sample in Panel B is restricted to firms reporting gross revenue above L13 million in each year.

Figure A14: Empirical Density around 6% profit margin threshold - 0.75% vs. 1.5% sectors (2014-2017)

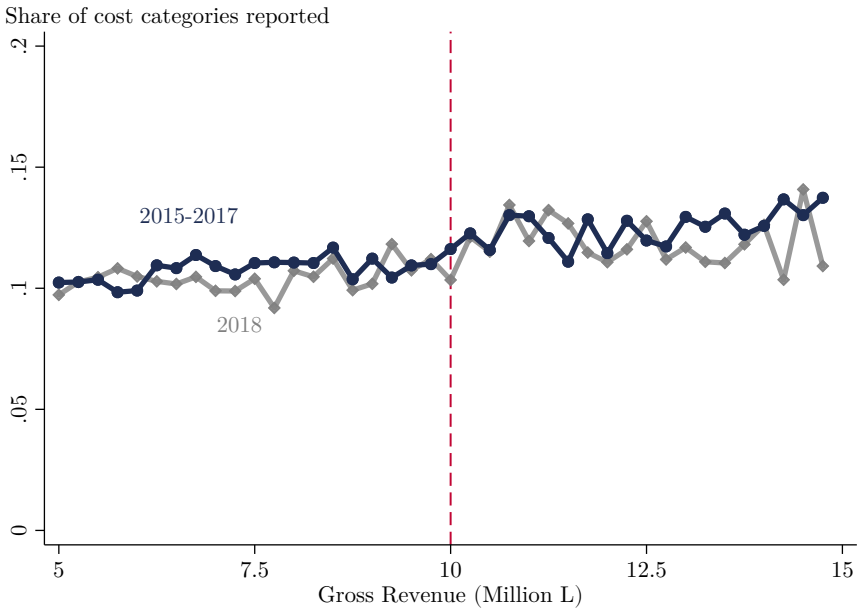


Note: This figure presents the empirical density of reported profit margins for firms subject to the 1.5% minimum tax (in solid blue) and those in sectors subject to the 0.75% rate (in dashed gray) for the period 2014-2017. The sample is restricted to firms reporting revenue above L13 million (infra marginal to revenue bunching). Bins are 0.2 p.p. wide and the first bins starts at 0.1% such that the 6% kink is the midpoint of a bin.

Figure A15: Average number of cost categories with positive deduction



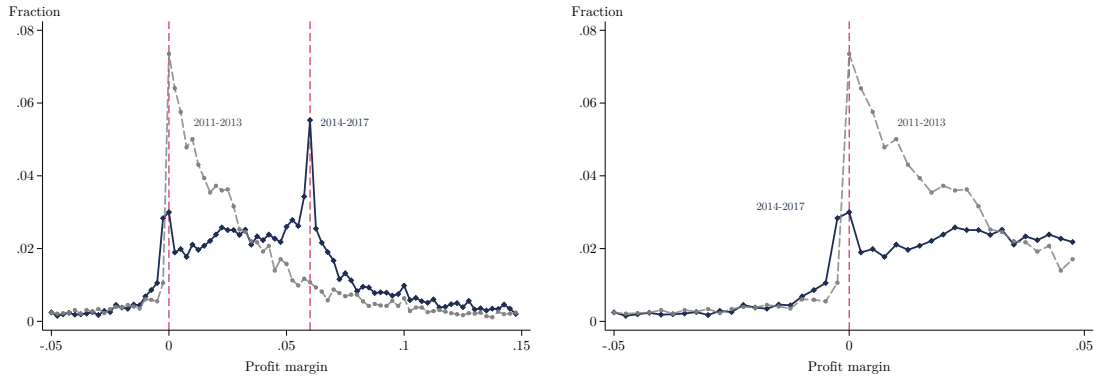
(a) Around 6% profit margin kink



(b) Around L10 million notch

Note: This figure presents the average share of all cost categories reported by taxpayers in each bin. Panel (a) restricts the sample to taxpayers reporting revenue above L12 million and therefore infra-marginal to the revenue bunching behavior. Profit margin bins are 0.5% wide. The blue line represents declarations in the period 2015-2017, when the minimum tax affected a large number of taxpayers, while the gray line refers to declarations in 2018, when only a small subset of corporations were affected by the minimum tax. Panel (b) compares the usage of cost categories across the reported gross revenue distribution, for the period 2015-2017 (blue) and 2018 (gray). Both panels restrict the sample to taxpayers filing electronically, for which detailed cost categories are available.

Figure A16: Distribution of profit margins

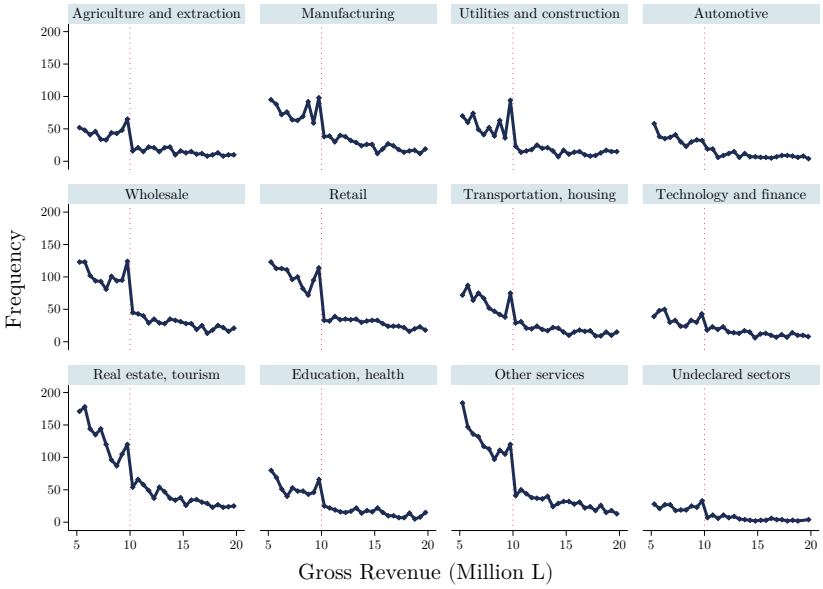


(a) Profit margin distribution - including losses

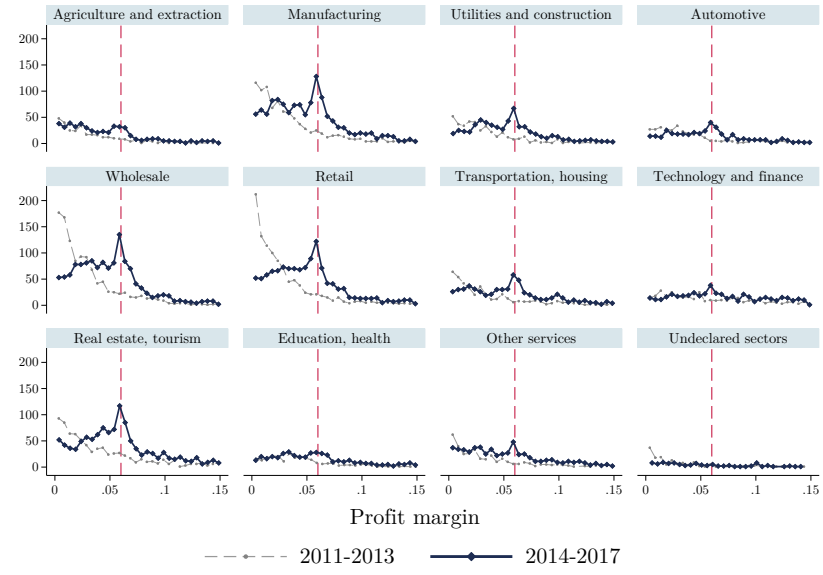
(b) Profit margin distribution - Zooming on losses

Note: These figures present the distribution of claimed profit margins for firms with revenue above L13 million, for the periods before (2011-2013) and after (2014-2017) the introduction of the corporate minimum tax.

Figure A17: Robustness: Behavioral responses by economic sector



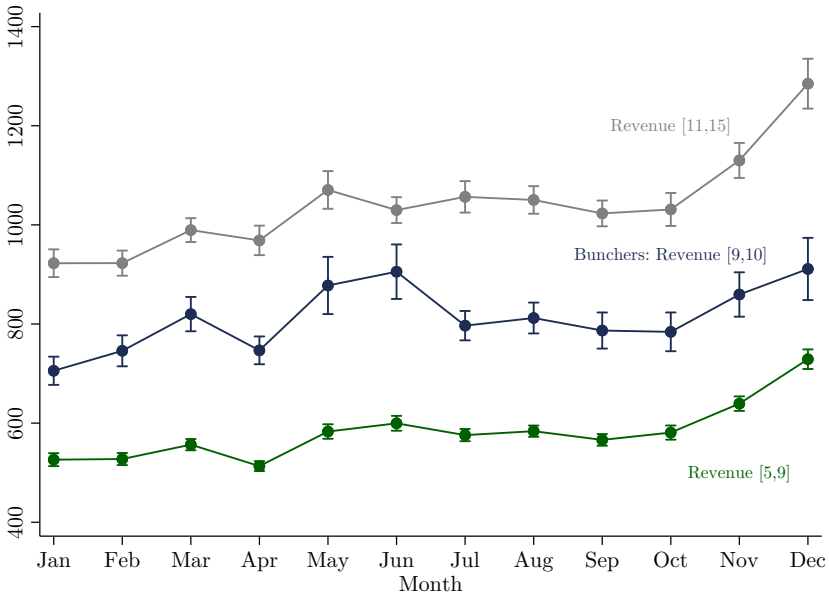
(a) Gross revenue empirical density



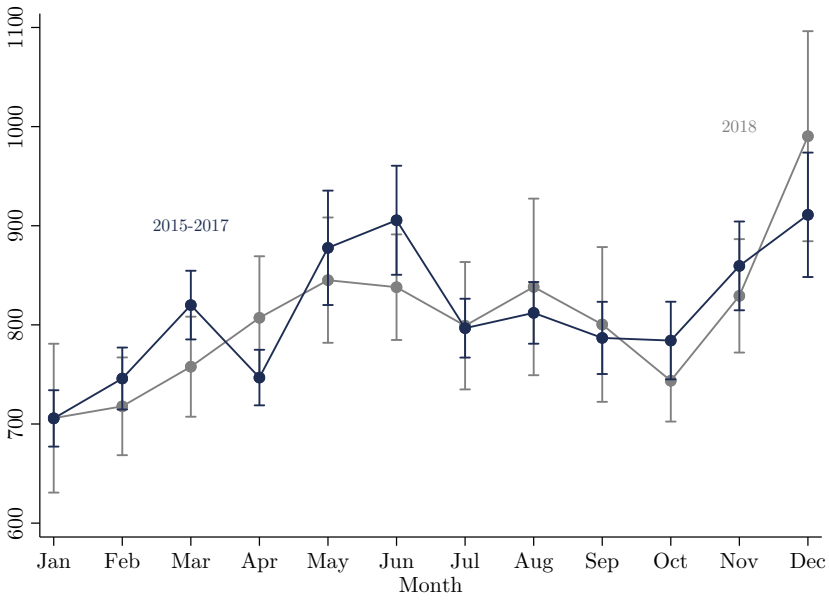
(b) Profit margin empirical density

Note: This figure presents the empirical density of gross revenues (panel A) and profit margins (Panel B) for firms in different economic sector for the period 2014-2017 pooled. Panel A documents that bunching below the notch is observed, in different degrees, for firms in the majority of sectors. Panel B shows that before the introduction of the minimum tax (2011-2013) the profit margin distribution is smooth around the 6% kink and presents a steep negative slope. With the introduction of the minimum taxation, the distribution shifts to the right and present excess mass around the kink. Bins are L500,000 wide in Panel A and 0.5 p.p. wide in Panel B. The sample in Panel B is restricted to firms reporting revenue above L13 million (infra marginal to the revenue bunching).

Figure A18: Monthly sales for firms with different yearly gross revenue



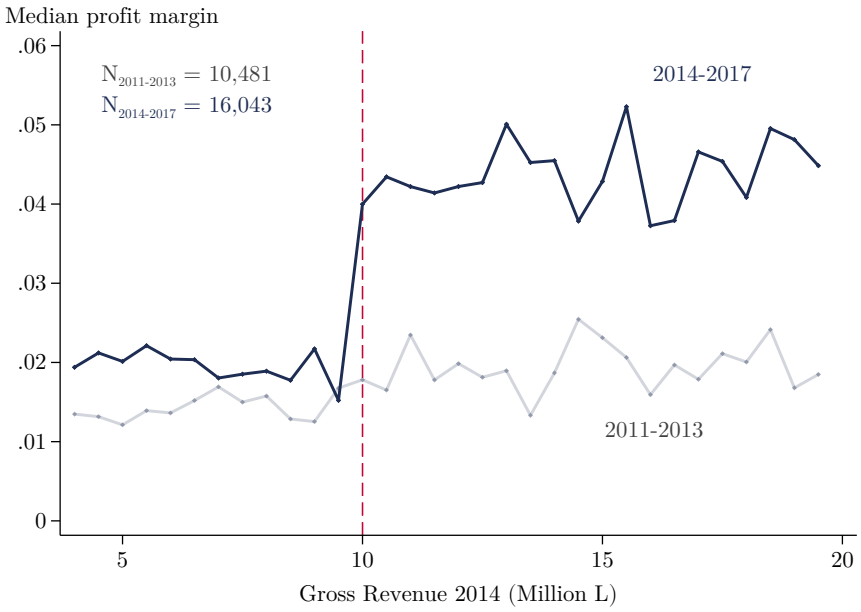
(a) 2015-2017 - Around L10 million notch



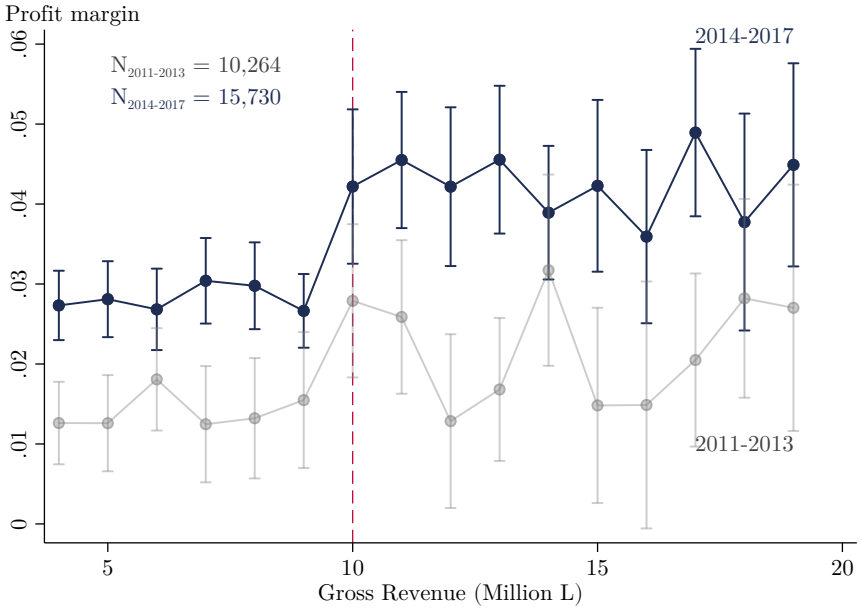
(b) 2015-2017 vs. 2018 - Below notch

Note: This figure presents average and 95% CI monthly sales separately for firms declaring gross revenue in L5-9 million, L9-10 million and L11-15 million bins on period 2015-2017 (Panel A), and for firms declaring gross revenue between L9-10 million in 2015-2017 and 2018. The sample is restricted to firms filing both monthly sales taxes and yearly income taxes and only include firm-year observations for which the total amount of monthly revenue falls within 5% of the total revenue declared in the yearly Income Tax Declaration,

Figure A19: Reported profit margin by gross revenue



(a) Median profit margin



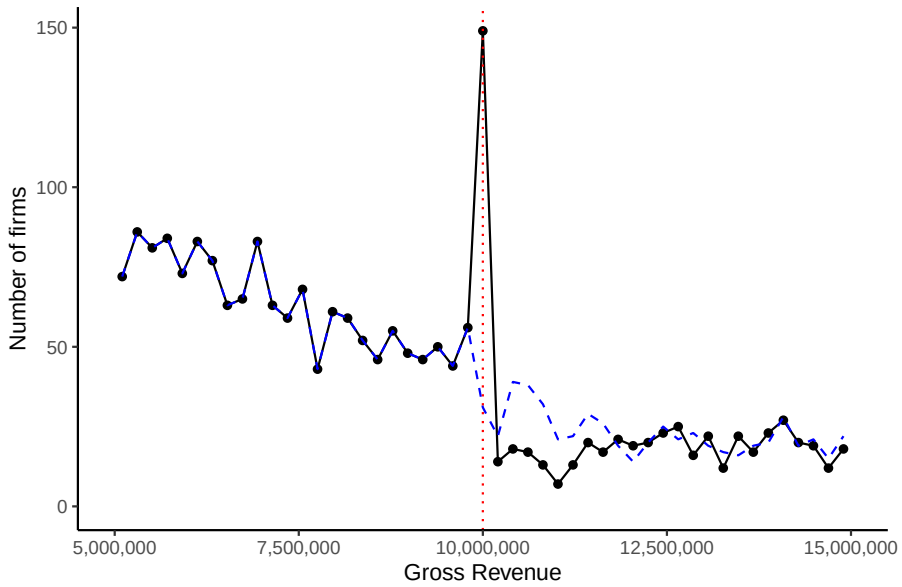
(b) Average profit margin

Note: This figure presents median (Panel A) and average with 95% CI (Panel B) reported profit margins by firms in two groups: 2011-2013, before the introduction of the minimum tax, and 2014-2017, then the minimum tax was in place for corporations with gross revenue above L10 million. The figure illustrates that corporations liable for the minimum tax increase their reported profit margins, consistent with the disappearance of the incentive to over report deductions in order to minimize tax liability. Bins are L500,000 wide in Panel A and L1 million in Panel B. Profit margins are trimmed at the 1st and 99th percentiles in Panel B.

Figure A20: Average number of wage workers by gross revenue (2015-2017 vs. 2018)

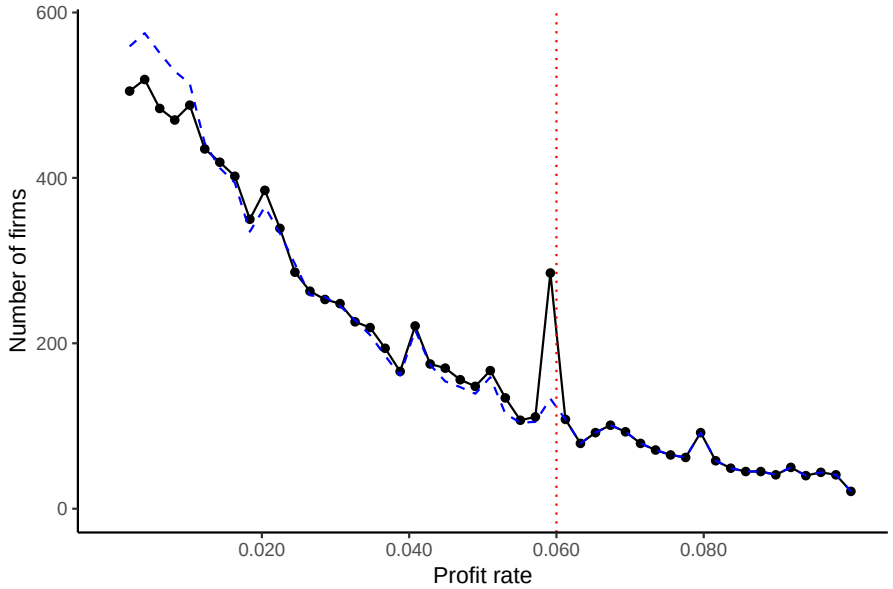
Note: This figure presents the average number of wage workers for firms in each gross revenue bin in 2015-2017 (when the exemption threshold was L10 million) and 2018 (when the threshold increased to L300 million). The number of wage workers is computed as the number of unique individuals for which the firm withheld taxes on wages. Firms are not required to withhold taxes if the total amount paid is below the exemption threshold for non-incorporated individuals, so these estimates of number of workers should be interpreted as lower bounds. The sample is limited to firms declaring at least one employee withholding (between 50-60% of firms declaring gross revenue above L5 million).

Figure A21: Calibrated model - bunching on L10 million revenue notch



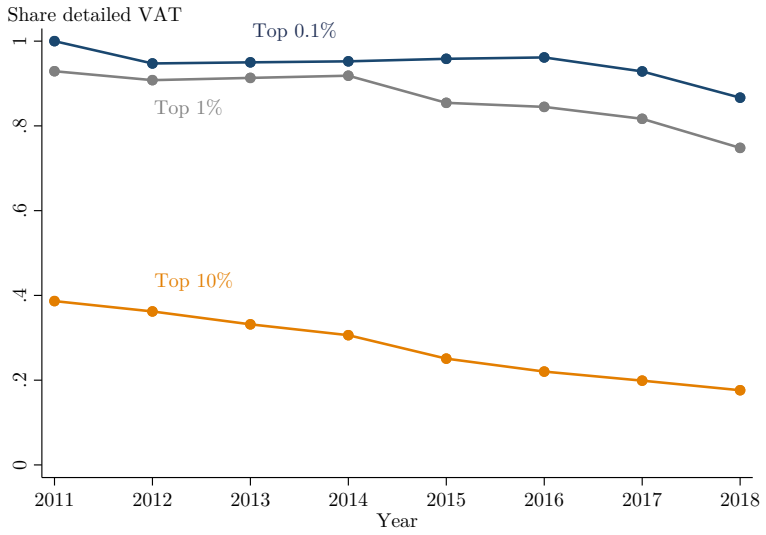
Note: This figure presents the density of simulated gross revenue using our calibrated model. The blue dashed line is the simulated density under profit taxation, while the solid black line presents the density under a Minimum Tax regime in which firms declaring above L10 million are subject to a minimum tax liability equivalent to 1,5% of their declared gross revenue.

Figure A22: Calibrated model - bunching on 6% profit margin kink



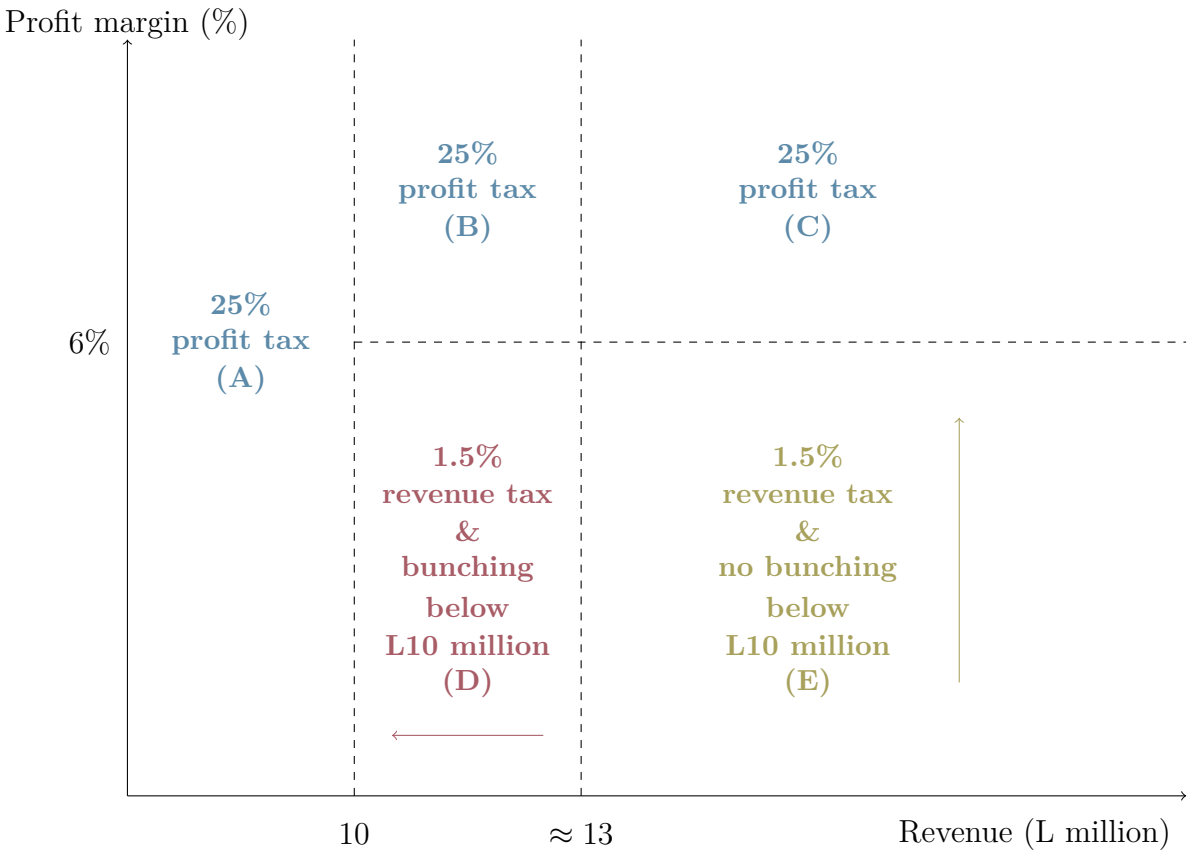
Note: This figure presents the density of simulated profit margin using our calibrated model. The blue dashed line is the simulated density under profit taxation, while the solid black line presents the density under a Minimum Tax regime in which firms declaring above L10 million are subject to a minimum tax liability equivalent to 1,5% of their declared gross revenue. We restrict the simulated sample to firms that choose to declared gross revenue above L12 million and are therefore infra-marginal to the bunching behavior at the notch.

Figure A23: Share of taxpayers mandated to file detailed VAT purchases



Note: This figure presents, for each year in the period 2011-2018, the share of taxpayers in each revenue group (top 0.1%, top 1% and top 10%) that are defined as medium or large. These are the taxpayers with an obligation to file individualized information on their purchases to claim VAT deductions, generating independent information on suppliers' revenues. The list of medium and large taxpayers was defined in 2011 and has not changed since. Groups are mutually exclusive, so the group defined as top 1% exclude taxpayers in the top 0.1% and the 10% group all those in the top 1% and 0.1%. The sample excludes taxpayers exempt from all income taxes.

Figure A24: Summary of minimum tax incentives on Revenue vs. Profit margin space



Note: This figure illustrates the theoretical effects of the minimum tax for firms that would have declared different combinations of gross revenue and profit margins. Corporations declaring gross revenue below L10 million (A) are exempt from the minimum tax, so are taxed on profits. Firms with revenue above L10 million but that would have declared profit margins above 6% (B and C) are not affected by the minimum tax either, since their effective tax rate (tax liability divided by revenue) is above 1.5% and they still pay taxes on their declared profits. Firms that would have declared revenue above L10 million and profit margin below 6% (D), on the other hand, will face the choice between i) reducing reported revenue below L10 million to avoid the minimum tax (bunching) or ii) stay above the exemption threshold and adjust to the fact they are taxed on revenues and not profit. Finally, firms declaring revenue significantly above L10 million and profit margin below 6% (E) are too large to bunch below the exemption threshold. Faced with revenue taxation, they will i) reduce reported revenue and ii) decrease reported costs, since incentives to misreport disappear. Both changes will lead to higher declared profit margins, creating an excess mass of firms declaring margins around the 6% threshold.

Table A1: Alternative order of polynomial - gross revenue distribution

	(1) Excess # Firms (B)	(2) Firms % counterfactual (b)	(3) y_u (upper bound)	(4) Δ Revenue (upper bound)	(5) ϵ_y (upper)	(6) ϵ_y (lower)
Order p = 3	604.30	8.82	14.70	4.70	5.96	0.60
	(33.71)	*(0.74)*	*(0.75)*	*(0.75)*	*(1.45)*	*(0.09)*
Order p = 4	569.91	6.78	12.90	2.90	2.45	0.50
	(31.09)	*(0.57)*	*(0.60)*	*(0.60)*	*(1.08)*	*(0.06)*
Order p = 6	494.55	5.69	12.30	2.30	1.58	0.35
	(26.11)	*(0.62)*	*(0.75)*	*(0.75)*	*(1.22)*	*(0.04)*

Note: This table presents results from replicating the exercises performed in **??** using different order of polynomials to estimate the counterfactual distribution of gross revenue for the sample of pooled taxpayers in 2014-2017. The baseline specification uses polynomial regression of order five, while in this table we present results using polynomials of order three, four and six.

Table A2: Number of enforcement actions per year

	Partial Audit (1)	Full audits (2)	Extensive (3)	Any control (%) (4)
2011	0	140		
2012	3	108		
2013	0	41		
2014	1	157		
2015	2	66		
2016	0	5		
2017	15	12	1,039	3.8
2018	98	50	2,672	9.2

Note: This table presents the number of partial audits (1), full audits (2), extensive controls (3) and the share of taxpayers receiving any of those enforcement actions per year. The numbers refer to taxpayer in the sample of corporations used in this paper.

Table A3: Alternative order of polynomial - Profit margin distribution

Year	(1) Excess Mass (B)	(2) Bunching(b)	(3) Delta Profit	(4) Estimated evasion ($\epsilon_y = 0.99$)
Order p = 3	779.64	5.38	1.10	-16.85
	(48.23)	*(0.41)*	*(0.10)*	*(1.48)*
Order p = 4	834.22	6.05	1.20	-18.52
	(43.07)	*(0.40)*	*(0.10)*	*(1.42)*
Order p = 6	788.99	5.49	1.10	-16.85
	(41.19)	*(0.38)*	*(0.10)*	*(1.36)*

Note: This table presents results from replicating the exercises performed in **??** using different order of polynomials to estimate the counterfactual distribution of profit margin for the sample of pooled taxpayers in 2014-2017. The baseline specification uses polynomial regression of order five, while in this table we present results using polynomials of order three, four and six.

Table A4: Estimated responses at the kink (Robustness - output evasion)

Year	(1) Delta Profit ($\Delta\Pi$)	(2) ($\epsilon_y = 0.5$)	(3) Estimated evasion ($\epsilon_y = 0.99$)	(4) ($\epsilon_y = 2$)
2014	0.60	-9.68	-8.74	-6.81
	(0.10)	*(1.61)*	*(1.61)*	*(1.61)*
2015	1.00	-16.77	-15.83	-13.90
	(0.10)	*(1.89)*	*(1.89)*	*(1.89)*
2016	1.10	-18.55	-17.61	-15.67
	(0.10)	*(1.88)*	*(1.88)*	*(1.88)*
2017	0.90	-15.00	-14.06	-12.13
	(0.10)	*(1.70)*	*(1.70)*	*(1.70)*
Pooled	1.10	-18.55	-17.61	-15.67
	(0.10)	*(1.55)*	*(1.55)*	*(1.55)*

Note: Note: This table presents estimates of change in reported profit margins and evasion estimates for each year in the period 2014-2017 and also for all years pooled. Column (1) presents estimated change in profit margins while columns (2) through (4) computes the estimated output evasion under different real elasticity (ϵ_y) scenarios.

Table A5: Cost evasion responses across economic sectors

Year	(1) Excess Mass (B)	(2) Bunching(b)	(3) Delta Profit	(4) Estimated evasion ($\epsilon_y = 0.99$)
Agriculture and extraction	38.35	6.06	1.20	-18.52
	(9.93)	*(2.11)*	*(0.40)*	*(7.16)*
Manufacturing	153.10	7.86	1.60	-25.18
	(15.93)	*(1.26)*	*(0.30)*	*(4.25)*
Utilities and construction	61.86	5.55	1.10	-16.85
	(9.43)	*(1.14)*	*(0.20)*	*(3.82)*
Automotive	49.72	7.91	1.60	-25.18
	(6.67)	*(1.61)*	*(0.30)*	*(5.42)*
Wholesale	132.19	5.66	1.10	-16.85
	(14.20)	*(0.81)*	*(0.20)*	*(2.76)*
Retail	85.16	3.71	0.70	-10.18
	(10.88)	*(0.57)*	*(0.10)*	*(1.95)*
Transportation, housing	69.39	8.09	1.60	-25.18
	(9.15)	*(1.71)*	*(0.30)*	*(5.79)*
Technology and finance	28.68	3.80	0.80	-11.85
	(6.42)	*(1.07)*	*(0.20)*	*(3.56)*
Real estate, tourism,other	93.89	4.15	0.80	-11.85
	(11.98)	*(0.66)*	*(0.10)*	*(2.20)*
Education, health, entertainment	31.71	4.59	0.90	-13.52
	(6.92)	*(1.28)*	*(0.30)*	*(4.18)*
Other services	34.21	4.04	0.80	-11.85
	(7.61)	*(1.10)*	*(0.20)*	*(3.77)*
Undeclared sectors	-1.93	-1.11	-0.20	4.82
	(4.39)	*(2.51)*	*(0.50)*	*(8.37)*

Note: This table presents estimates of change in reported profit margins and cost evasion for firms by economic sector, pooled for the 2014-2017 period. The first column reports the estimated excess number of firms (B) while column (2) reports the ratio between excess mass and average counterfactual density in the bunching region (b). Column (3) presents estimated change in profit margin, while column (4) present changes in cost misreporting using the decomposition in **??**.

B Approximating the elasticity with notch

In this section we adapt the exercise of Kleven and Waseem (2013) and Kleven (2018) to obtain the elasticity formula when taxpayers face a notch instead of a kink. The intuition behind the derivation is that we try to recover what would have been the kink that would "replicate" the same behavior observed with the notch. We start by considering the average slope of the indifference curve of the marginal buncher: this IC is tangent to the threshold using the hypothetical kink with slope $(1-\tau^*)$ and has slope of $(1-t_0-\Delta t)$ at the point $y^t+\Delta Y$. In our case, $t_0=0$ since the effective marginal rate on revenue is zero below the threshold, and $\Delta t=\tau_y=0.015$. We can write

$$\frac{\int_{y^T}^{y^t+\Delta Y} I'(y)dy}{\Delta Y} \approx \frac{I'(y^T)+I'(y^t+\Delta Y)}{2} = \frac{(1-\tau^*)+(1-t-\Delta t)}{2} = \frac{(1-\tau^*)+(1-\tau_y)}{2}$$

The implicit tax rate faced by corporations is the change in tax liability when we change the reported revenue from above the threshold to exactly at the notch:

$$\begin{aligned} t^* = \frac{T(y^t+\Delta Y)-T(y^T)}{\Delta Y} &= \frac{\tau_y(y^t+\Delta Y)-\tau_\pi(y^T-\hat{c})}{\Delta Y} \\ &= \tau_y + \frac{\tau_y y^T+\tau_\pi(y^T-\hat{c})}{\Delta Y} \end{aligned}$$

Combining the fact that we have these two approximations to the slope of the IC in that region, and that $\Delta t=0.015=\tau_y$, we can write:

$$\begin{aligned} 1-t^* &= \frac{(1-\tau^*)+(1-\tau_y)}{2} \\ \tau^* &= \tau_y + 2\left(\frac{\tau_y Y^T+\tau_\pi\big(y^T-\hat{c}\big)}{\Delta Y}\right) \end{aligned}$$

Plugging in the expression for τ^* in the usual expression for obtaining revenue elasticity when facing changes in marginal taxes we obtain:

$$\epsilon_{y,(1-t)} = \frac{\frac{\Delta Y}{Y^T}}{\frac{\Delta \tau^*}{(1-\tau^*)}} = \frac{\Delta Y}{Y^T}\left(\frac{1-\tau^*}{\tau^* - t_0}\right)$$
$$= \frac{\Delta Y}{Y^T}\left(\frac{1-\tau^*}{\tau_y + 2\left(\frac{\tau_y Y^T - \tau_\pi(Y_T - \hat{c})}{\Delta Y}\right)}\right)$$
$$= \left(\frac{1}{\tau_y\left(2 + \frac{\Delta Y}{Y^T}\right) - 2\tau_\pi \frac{(Y_T - \hat{c})}{Y_T}}\right)\left(\frac{\Delta Y}{Y^T}\right)^2 (1-\tau)$$

Some things are worth noting from this expression. First, for a firm with zero reported profit at the notch ($y^T = \hat{c}$), than the expression above simplifies to

$$\epsilon_{y,(1-\tau)} \approx \left(\frac{\Delta Y}{Y^T}\right)^2 \left(\frac{(1-\tau)}{\Delta \tau}\right)\left(\frac{1}{2 + \frac{\Delta Y}{Y^T}}\right)$$

which is exactly the same expression in Kleven and Waseem (2013). This is the expression we use to calculate the upper bound of elasticities presented in the text, since the taxpayer with highest incentive to bunch has profits only marginally above zero.

Second, note that if profit margin is exactly 6%, then it's true that

$$\tau_y\left(2 + \frac{\Delta Y}{Y^T}\right) - 2\tau_\pi 0.06 = 0.015\left(2 + \frac{\Delta Y}{Y^T}\right) - 2(0.25)0.06 = 0.015 * \frac{\Delta Y}{Y^T}$$

and the elasticity becomes

$$\epsilon_{y,(1-t)} = \left(\frac{1}{\tau_y(2 + \frac{\Delta Y}{Y^T}) - 2\tau_\pi \frac{(Y_T - c)}{Y_T}}\right)\left(\frac{\Delta Y}{Y^T}\right)^2 (1-\tau)$$
$$= \left(\frac{Y^T}{0.015\Delta Y}\right)\left(\frac{\Delta Y}{Y^T}\right)^2 (1-\tau)$$
$$= \left(\frac{\Delta Y}{Y^T}\right)\frac{(1-\tau)}{\tau_y} = \epsilon_{kink}$$

For a taxpayer with 6% reported profit margin, the exemption threshold represents a kink, not a notch, since their tax liability changes continuously around the cutoff.

C Estimation of revenue elasticity lower bound

Following Bachas and Soto (2021), we compute the lower-bound of average revenue elasticity considering that firms with different profit levels (generated by heterogeneity in fixed-costs) will face different incentives to bunch. First, recall that firms with counterfactual profits above 6% or below 0% will not decide to bunch, since they are not affected by the minimum tax. Second, for firms within that profit range, the incentive to bunch is directly proportional to their costs: firms with high costs (low profit margins) will have a strong incentive to bunch since their tax liability at the threshold will be small, while not bunching means a much larger tax liability based on their revenues.

Let $\Psi(y_0, c_0)$ be the joint distribution of revenue and costs. We can then express the amount of bunching taxpayers as

$$\begin{aligned} B &= \int_c \int_{Y^T}^{Y^T+\Delta Y} \Psi(y_0, c_0) dydc \\ &= \int_c \int_{Y^T}^{Y^T+\Delta Y} \phi_y(y_0)\phi(c_0) dydc \\ &= \int_{Y^T}^{Y^T+\Delta Y} \phi_y(y_0) \int_{c_0} \phi(c_0) dcdy \\ &= \int_{Y^T}^{Y^T+\Delta Y} \phi_y(y_0) \int_0^{m(y_0)} \phi(m_0) dmdy \end{aligned}$$

where in the second line we assume that the cost and revenue distributions are independent; in the third line we make it explicit that, for any given level of revenue, there is a cost region that will induce bunching; and in the last line we rewrite the expression as a function of profit levels instead of cost, and make it explicit that, for any given revenue level, only low-profit taxpayers will bunch, the upper threshold of which depends on the revenue level. Intuitively, for taxpayers very close to the notch, all those potentially affected by the minimum tax will decide to bunch, whereas those farther from it will only bunch if the differential tax liability is large due to their low profits.

In order to connect the cost/profit levels that induce bunching at each revenue level, recall that we previously computed that, for the marginal buncher at revenue level $Y^T + \Delta Y$, we can compute the revenue elasticity as

$$\epsilon_{y,(1-t)} = \left(\frac{1}{\tau_y(2 + \frac{\Delta Y}{Y^T}) - 2\tau_\pi \frac{(Y_T - \hat{c})}{Y_T}} \right) \left(\frac{\Delta Y}{Y^T} \right)^2$$

We can rewrite this equality putting the reported cost $\hat{c}$ in evidence:

$$\hat{c}^* = Y^T\left(1 - \frac{\tau_y}{\tau_\pi}\right) - \frac{\tau_y}{\tau_\pi}\frac{\Delta y}{2} + \frac{(\Delta y)^2}{2\epsilon_y \tau_\pi Y^T}$$

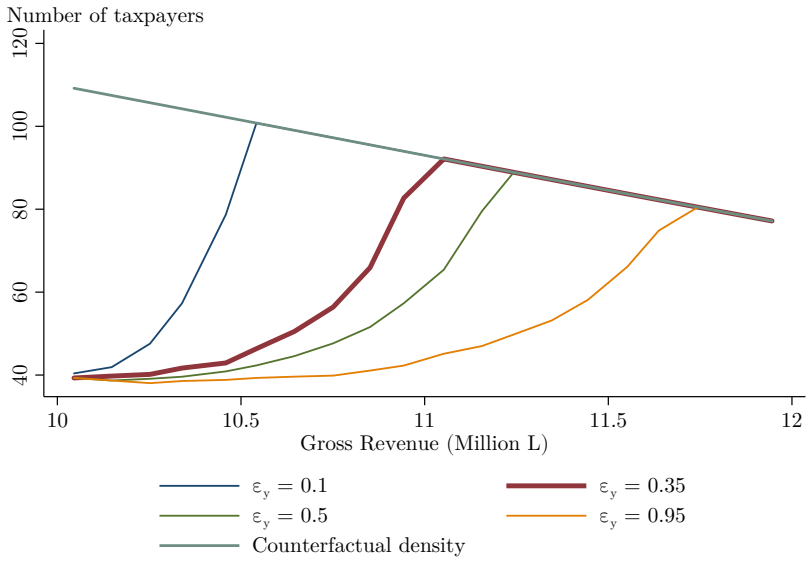
For a given revenue level and elasticity, $\hat{c}^*$ is the cost at the threshold that would make a taxpayer indifferent between bunching and staying above the notch. Any taxpayer with costs above that level, i.e. a lower profit margin, would decide to bunch.

We implement the estimation of the revenue elasticity ϵ_y in the following steps. First, we need to consider the counterfactual profit distribution that would be observed in the absence of the notch. For each period in our sample, we take that to be the observed profit margin density for firms reporting revenue in the interval L6 - 8 million[1]. We then proceed to compute, for each revenue bin (ΔY) and ϵ_y, what is the share of taxpayers with profit margin between 0 and the implied upper bound, and use the counterfactual density to obtain the number of taxpayers that bunch in each revenue bin. This allows us to obtain, for each potential revenue elasticity, the total number of predicted bunchers, which we compare to the estimated number of bunchers. The final elasticity, therefore, is the value that generates the same number of bunchers as the excess mass below the threshold.

We illustrate this procedure in Figure A25 for the pooled sample of taxpayers in 2014-2017. Each of the curves is a simulated density that would prevail under a different revenue elasticity, according to our methodology.

[1]We show in Figure A8 that the profit margin distribution is similar for the L6 - 8 million and L10-12 million range in the period before the introduction of the minimum tax.

Figure A25: Simulation to obtain average elasticity



Note: This figure presents the predicted density of gross revenues above the L10 million threshold and several simulations of what the density would have been given different revenue elasticities according to the model described above.

D Assessing dominated region with parametric model

As in Kleven and Waseem (2013), we consider a parametric model to assess what is the dominated region in our notch setting, that is, the interval of revenue that is (potentially) strictly dominated for taxpayers to locate at. Consider a simple version of our iso-elastic cost model (with no possibility to overreport costs), where firms are defined by a productivity parameter θ and a fixed-cost parameter α and profits are given by

$$\hat{\Pi}(y, \alpha) = y - \alpha - \frac{\theta}{1 + 1/e}\left(\frac{y}{\theta}\right)^{(1+1/e)} - T(y, \alpha)$$

First, note that under a pure profit tax ($T(y, \alpha) = \tau_\pi(y - c(y))$), we have that $y^* = \theta$, so the revenue choice reveals the productivity parameter. Under revenue taxation, the optimal revenue choice is $y^* = \theta(1 - \tau_y)^e$. Let the productivity of the marginal buncher be $\theta^T + \Delta\theta$. The marginal buncher is indifferent between reporting revenue exactly at the threshold or staying at their best interior solution.

Their profit under each decision are given by

$$\Pi_{Bunch} = (1-\tau_\pi)\Big(y^T - \alpha - \frac{\theta^T + \Delta\theta}{1+1/e}\Big(\frac{y^T}{\theta^T+\Delta\theta}\Big)^{1+1/e}\Big)$$

$$\begin{aligned}\Pi_{NotBunch} &= (1-\tau_y)y^* - \alpha - \frac{\theta^T+\Delta\theta}{1+1/e}\Big(\frac{y^*}{\theta^T+\Delta\theta}\Big)^{1+1/e} \\ &= (\theta^T+\Delta\theta)(1-\tau_y)^{1+e} - \alpha - \frac{\theta^T+\Delta\theta}{1+1/e}(1-\tau_y)^{1+e} \\ &= \frac{(\theta^T+\Delta\theta)(1-\tau_y)^{1+e}}{e+1} - \alpha\end{aligned}$$

Finally, since the internal solution for the marginal buncher, had they not bunched, could be written as $y^T + \Delta Y = (\theta^T + \Delta\theta)(1-\tau_y)^e$, we can replace the terms involving the (unobserved) taxpayer type with the (observed) thereshold and the (estimable) change in revenue. We then have

$$\begin{aligned}\Pi_{Bunch} &= \Pi_{NotBunch} \\ (1-\tau_\pi)\Big(y^T - \alpha - \frac{y^T+\Delta y}{(1-\tau_y)^e(1+1/e)}\Big(\frac{y^T(1-\tau_y)^e}{y^T+\Delta y}\Big)^{1+1/e}\Big) &= \frac{y^T+\Delta y}{(1-\tau_y)^e}\frac{(1-\tau_y)^{1+e}}{e+1} - \alpha \\ (1-\tau_\pi)(y^T-\alpha) - (1-\tau_\pi)(1-\tau_y)\frac{y^T+\Delta y}{1+1/e}\Big(\frac{y^T}{y^T+\Delta y}\Big)^{1+1/e} &= \frac{1-\tau_y}{e+1}(y^T+\Delta y) - \alpha\end{aligned}$$

Let's consider what happens when taxpayers have $e = 0$. Taking the limit of the above equality as elasticity goes to zero we get:

$$\begin{aligned}(1-\tau_\pi)(y^T-\alpha) - \frac{1-\tau_y}{1}(y^T+\Delta y) + \alpha &= 0 \\ Lim_{e\to 0}\Delta y &= \frac{\tau_y y^T - \tau_\pi(y^T-\alpha)}{1-\tau_y}\end{aligned}$$

Some things to note. First, if $1-\alpha/y^T = 0.06$, then $Lim_{e\to 0}\Delta y = 0$: for taxpayers with "profit margin" equal to 6% and zero elasticity, there exists no dominated region - the notch becomes a kink. For those with $y^T = \alpha$, so they report non-positive profits, $Lim_{e\to 0}\Delta y = \frac{\tau_y * y^T}{1-\tau_y} = L152,000$. These are the taxpayers with strongest incentive to bunch, and the region between L10 million and L10,152,000 is dominated. For those with taxable income rates between 0-6%, the dominated region lies between 0 and L152,000.

In our empirical estimation of elasticity we use bins of L100,000. According to the calculation above, no taxpayers with taxable income rate between 0 - 2% should

locate in that region. Using the counterfactual taxable income rate distribution, this group represents approximately 30% of taxpayers, meaning that no more than 70% of taxpayers could be observed reporting revenue above the threshold. As can be seen in Figure A25, for the first bin we observe less than 70 taxpayers while the counterfactual distribution predicts 110 taxpayers. So we cannot reject that, under 0 elasticity, all taxpayers that should bunch have actually bunched. Note that this is an extreme assumption, and we just cannot precisely explore the notch to recover "innatention" as in Kleven and Waseem (2013) or Londoño-Vélez and Ávila-Mahecha (2019).

E Model calibration details

We modify firms' profit function by making explicit assumption about the cost and misreporting loss functions. Firms have isoelastic costs and also isoelastic loss function from misreporting costs:

$$\hat{\Pi}(y,\hat{c}) = (1-\tau)y + \tau\mu\hat{c} - \alpha_i - \frac{\theta_i}{1+1/e}\left(\frac{y}{\theta_i}\right)^{(1+1/e)} - \frac{B_i}{1+1/\gamma}\Big(\hat{c} - c(y)\Big)^{(1+1/\gamma)}$$

Each taxpayer is characterized by the vector $(\theta_i, \alpha_i, B_i)$ that define productivity, fixed cost and evasion ability, respectively. Given our functional forms, optimal vector of output and reported costs $(y^*, \hat{c}^*(y^*))$ are:

$$\begin{aligned} y^* =& \theta(1-\tau_E)^e \\ \hat{c}^*(y^*) =& c(y^*) + B_i\Big(\tau\mu\Big)^\gamma \end{aligned}$$

where $\tau_E = \tau\Big(\frac{1-\mu}{1-\tau\mu}\Big)$. Note that if we have profit taxation then $\mu = 1$ and $\tau_E = 0$, so firm size is undistorted.

In order to calibrate the model, we use data for the 2013, when no notches or kinks were in place. Under profit taxation, we have:

$$\begin{aligned} y^* =& \theta \\ c(y^*) =& \alpha + \frac{\theta}{1+1/e} \\ \hat{c}^*(y^*) =& \alpha + \frac{\theta}{1+1/e} + \left(\frac{\tau}{B_i}\right)^\gamma \end{aligned}$$

From the first-order conditions of an interior optimum, θ is simply the vector of reported output, which in this model coincides with real output. We also know

the elasticity of output e, which we fix to be $e = 0.99$, the upper bound estimated for the pooled years. By using the upper bound of our elasticity estimate we are conservative in the case for using output taxation, since a higher elasticity will limit the potential benefit of the tax.

While we do not observe $c(y^*)$, the real costs, but only the reported costs $\hat{c}^*(y^*)$, we have estimated evasion as a share of profits using the 6% profit margin kink. Let that quantity be $\epsilon_{\hat{c}}$ .Using the fact that at the profit margin kink $(y - \hat{c})/y = \tau_y/\tau_\pi$ we can write:

$$\frac{(\hat{c} - c)}{y} = \frac{(\hat{c} - c)}{(y - \hat{c})} * \frac{(y - \hat{c})}{y} = \epsilon_{\hat{c}}(\tau_y/\tau_\pi) = \epsilon_{\hat{c}} * 0.06$$

Using the equations above, we have that

$$\frac{(\hat{c} - c)}{y} = \frac{\left(\frac{\tau}{B_i}\right)^\gamma}{\theta} = 0.06\epsilon_{\hat{c}}$$

In our setting, we do not have variation to identify γ, the elasticity of misreporting costs. Best et al. (2015) explore different profit tax rates for different subset of firms, while Bachas and Soto (2021) use estimates of cost elasticity in two different thresholds. We calibrate our model using the estimate from Best et al. (2015), which is approximately 1.5, which allows us to recover B_i as $B_i = \frac{\tau}{\left(\theta 0.06\epsilon_{\hat{c}}\right)^{1/\gamma}}$

Finally, given the previous we can just obtain the fixed cost vector α by computing

$$\alpha = \hat{c}^* - \frac{\theta}{1 + 1/e} + \left(\frac{\tau}{B_i}\right)^\gamma$$

F Social Contribution Tax and Net Asset Tax

Corporations face a 25% flat tax on yearly profits in Honduras. Three other provisions affect their potential tax liability. The first is the minimum tax studied in this paper, which was introduced in 2014 and started to phase out in 2018. Since 1994, corporations also face a net asset tax similar in nature to a minimum tax: if the tax liability under the asset tax is smaller than the profit tax liability, it can be used as a credit, meaning that in practice firms would only pay the profit tax. If the asset tax is larger, firms formally must pay the income tax and the additional difference between the two liabilities. In practice, the asset tax is also a tool to avoid that large corporations minimize their tax liability by inflating costs and driving down

taxable income. In the period under study, the net asset tax was 1% of the net assets above L3 million.

The last provision is the Social Contribution (AS for the spanish *Aportación Solidaria*) tax, a surcharge on income tax applying to large firms. Established for the first time as a temporary measure in 2003, the AS tax rate varied between 5-10% in the period of this study and applied to declared taxable income above L1 million (USD 40,000)[2].

In Table A6 we present the distribution of firms by their tax status in each year of the sample. Both the AS and the asset tax existed throughout the analysis period, while the minimum tax was established in 2014. In each year, approximately one-quarter of tax filing corporations pay no income tax - this is often the result of generating no revenue in the period or, more frequently, registering losses (and not having enough assets to pay the Net Asset tax). Before the introduction of the minimum tax, around 63% of corporations were liable for income tax and 9% for the net asset tax. With the introduction of the minimum tax in 2014, the share of firms liable for asset tax does not change, but the share paying income tax falls by 8 percentage points as firms start being liable for the minimum tax. Between 1,400 and 1,700 firms were paying the minimum tax before 2018, when the number falls drastically to only 135 once the exemption threshold increases from L10 million to L300 million. The Social Contribution tax was payed by 8-10% of corporations every year, and it is a surcharge on those paying either income or minimum tax, but not the asset tax[3].

[2]A tax reform in 2010 established the AS tax rate at 10% for the first two years and then progressively declined to zero by 2015. With the 2014 tax reform, nonetheless, the tax was made permanent and the tax rate fixed at 5%.

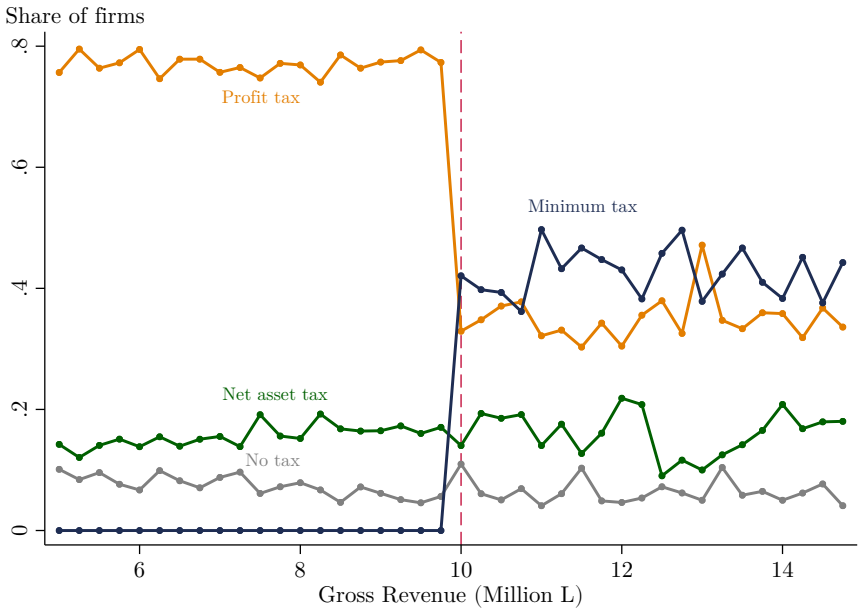
[3]In order to arrive at the final tax liability, the Tax Authority first calculates the maximum between the income tax and the minimum tax liabilities, and add the social contribution liability to that. This value is then compared to the asset tax liability, and the maximum of these two is the final tax liability.

Table A6: Taxpayer status by year

Year	Not taxed	Income Tax	Asset Tax	Minimum Tax	Total
2011	4,791	10,940	1,563	0	17,294
2012	4,763	11,548	1,798	0	18,109
2013	4,945	12,372	1,906	0	19,223
2014	5,397	11,566	1,891	1,610	20,464
2015	6,237	13,997	1,944	1,480	23,658
2016	6,641	15,553	2,057	1,478	25,729
2017	7,328	16,544	2,281	1,672	27,825
2018	7,946	19,080	2,783	135	29,944

Note: This table presents the distribution of corporate taxpayers each year, according to their tax liability status.

Figure A26: Share of firms liable for each type of tax (2014-2017)



Note: This figure presents the share of firms liable for each type of tax (profit, minimum, net asset or no tax), in each bin of gross revenue for the period 2014-2017 pooled. It shows that when crossing the L10 million exemption threshold the increase in the share of firms paying the minimum tax is mirrored by a decrease in the share of firms liable for profit tax, with little change observed in the share of firms paying the net asset tax or not paying any taxes. The sample excludes corporations exempt from the minimum tax due to sectoral exceptions and/or recent start of operations.

G Minimum taxes around the world

This section presents a summary of corporate minimum tax schemes across low and medium income countries. Table A7 lists several countries that adopted some type of minimum tax for corporations as of 2019, the minimum tax rate (applied to gross revenues, in the majority of cases), the profit tax rate and specific relevant provisions.

We highlight features that are common in several contexts. First, several countries exempt firms in the first 24-36 months of operations, a period where initial investment and set-up costs might legitimately generate low or negative profits (Holland and Vann 1998). Second, the tax rate applied to gross revenues often falls in the range of 0.5 - 2%, with reduced rates (or exemptions) applied to sectors such as pharmaceuticals, utilities and oil related industries. While this determines a floor for the effective tax rate (tax liability as share of gross revenues) corporations must pay, the implied minimum allowable profit margin (that is, the minimum profit margin reported such that firms are not paying the minimum tax rate) also depends on the corporate profit tax rate. In most countries the minimum allowable profit margin falls in the range of 1.5 - 5%, below the 6% level implied by the 1.5% gross revenue tax and 25% profit tax in place in Honduras in the period 2014-2017. Finally, in all but a few countries the minimum corporate tax provision apply to all firms, regardless of size.

Table A7: Summary of minimum tax provisions around the world

Country	**Minimum tax rate**	**Profit tax rate**	**Details**
Bangladesh	0.6%	25%/35%	Companies are exempt if gross revenues are below BDT 5 million. Reduced rates of 1% for tobacco related manufacturers, 0.75% for mobile phone companies and 0.1% for industrial sectors in first three years of operation. Profit tax rate is 25% for publicly traded companies and 35% for private limited companies.
Benin	1%	30%	Reduced rate of 0.75% for industrial companies.
Cambodia	1%	20%	
Cameroon	2%	30%	
Chad	1.5%	35%	Companies are exempt if gross revenues are below XAF 50 million. Minimum of XAF1 million for small companies and XAF2 million for large companies.
Republic of Congo	1.00%	30%	For firms below XAF 10 million the minimum tax is XAF 500,000.
Cote d'Ivoire	0.5%	25%	0.1% for utilities and 0.15% for financial companies. Minimum tax cannot be less than XOF3 million or more than XOF 35 million. Corporations are exempt in first fiscal year.
Dominican Republic	1%	27%	Tax base is gross assets.
Gabon	1%	30%	Minimum of XAF1 million. Newly incorporated companies are exempt for two years.
Guinea	1.5%	25%	Minimum of GNF15 million.
Guyana	2%	25%/40%	Profit tax rate is 25% for commercial companies and 40% for non-commercial companies
India	15%	30%	Tax base is book profits.
Madagascar	0.5%	20%	The minimum tax is calculated as MGA 320,000 (100,000 for some sectors) plus 0.5% of annual gross revenue.
Mauritania	2.5%	25%	Minimum of MRO 750,000.
Morocco	0.75%	10%/31%	Minimum of MAD3,000. Reduced rate of 0.25% petroleum, utilities and some food production sectors. New companies are exempt for three years. Corporate profit tax schedule is progressive with increasing marginal rates of 10, 17.5 and 31%.
Nicaragua	1-3%%	30%	Firms are exempt in first three years of operations.
Pakistan	1.25%	29%	Lower rates applies to oil (0.5%) and pharmaceutical (0.2%) sectors. An additional "alternative minimum tax" of 17% applies to accounting income.
Philippines	2%	30%	Corporations are exempt in the first three years of operation.
Senegal	0.5%	30%	Mininum of XOF500,000 and maximum of XOF5 million. Minimum tax rate applies to gross revenue in preceding fiscal year.

Note: This table provides a non-exhaustive list of countries that adopted some type of corporate minimum tax as of 2019. Tax base is gross revenues (turnover) unless stated otherwise. *Sources*: Ernest Young Worldwide Corporate Tax Guide 2019 and Deloitte Corporate Tax Rates 2020.

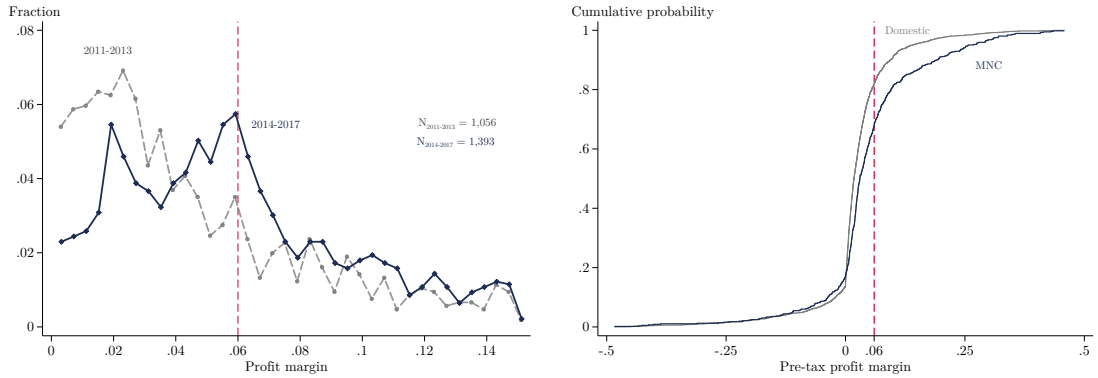
H How did multinational enterprises responded to the minimum tax?

Given the ongoing discussions on multinational taxation at the global level, we investigate whether the minimum tax in Honduras seem to have affected how multinational corporations (MNEs) use transfer pricing (i.e. transactions with related counterparts) costs to potentially reduce tax liability.

In Figure A27, panel a, below we present preliminary evidence that, as observed in the sample of all corporations, MNEs also increased their reported profit margins when the minimum tax policy was introduced in 2014. The extent of adjustment, nonetheless, is much more muted than for the full sample. This is partly explained by the fact that, previous to the policy introduction, large MNEs were already declaring higher profit margins than their domestic counterparts (panel b).

Even though the overall adjustment by MNEs is smaller than by domestic firms, it is possible that the nature of this adjustment happens through the mechanism of transfer pricing. That is, it is possible that MNEs were more aggressively pricing transactions with foreign related parts before the introduction of the policy, in order to book profits on lower-tax jurisdictions, and changed their behavior in response to the introduction of the minimum tax policy.

Figure A27: Profit margin of Multinationals



(a) Empirical density of profit margins for MNEs

(b) Pre-tax profit margin CDF - Domestic vs. Multinational corporations

Note: Panel A in figure presents the empirical density of positive reported profit margins for multinational corporations (MNEs), before (2011-2013) and during (2014-2017) the existence of the minimum tax. It restricts the sample to MNEs declaring gross revenue above L13 million, significantly above the policy revenue exemption threshold. Bins are 0.4 percentage points wide. Panel B presents the cumulative distribution functions (CDF) of pre-tax profit margins by domestic and multinational firms in 2013, before the introduction of the minimum tax. The CDF of MNCs is shifted to the right (for positive values), indicating higher declared profit margin across the distribution. MNCs are defined as taxpayers that present transfer pricing declarations at some point in 2014-2018.

We obtained transaction level data on transfer pricing operations for all corporations operating in Honduras. Here we highlight some features of the data. First, corporations file transfer pricing declarations not only for transaction with foreign counterparts, but also with domestic partners that are under joint control. Almost 45% of total costs declared in TP declarations are with domestic partners (we define MNEs as firms with at least one TP transaction with a *foreign partner*). Corporations in the country file transactions with 94 other countries, with the majority of total volume concentrated in the United States (14%), Panama (13%) and Guatemala (5%) - all other countries combined make up 25% of claimed costs but with very fragmented shares. Among the top 15 trading partners, however, we observe countries widely recognized for offering "low tax rates and favorable regulatory policies to foreign investors" (Hines Jr. 2010): British Virgin Islands, Cayman Islands, Bahamas and Bermuda.

In Table A9 below, we present descriptive statistics for the MNEs and domestic firms in 2017 and 2018. MNE are much larger than domestic firms both in terms of gross revenue and taxable income: over 80% of MNEs had revenue above the L10 million exemption threshold for minimum tax in place until 2017 and more than a quarter had revenue above L300 million, the new exemption threshold in 2018. We

also show that in 2017 over 80% of MNEs declared costs arising from a transaction with a related part[4] - 70% of them declared transactions with foreign partners and 45% with a domestic partner. Only a tiny share of domestic firms (2%) file a TP declaration informing of a transaction with a domestic related partner. Tax havens are also a popular source for foreign partners: 30% of MNEs declare at least one transaction with a related partner hosted in a tax haven (using the definition of Hines Jr. (2010)). We also show that, conditional on filing a TP declaration with a foreign partner, the (unweighted) average TP cost as a share of total costs is 32%, suggesting that costs arising from transactions with related parts are a meaningful share of the cost deductions used by MNEs. Finally, we should note that the number of MNEs filing income taxes every year is small (≈ 800).

Table A9: Descriptive statistics

	2017		2018	
	MNE	Domestic	MNE	Domestic
Revenue (Million L)	523.34	14.24	545.29	13.76
	(1502.42)	(180.09)	(1633.36)	(154.35)
Share firms with revenue over L10 million	0.84	0.15	0.84	0.16
	(0.36)	(0.36)	(0.36)	(0.37)
Share firms with revenue over L300 million	0.27	0.01	0.27	0.01
	(0.44)	(0.08)	(0.45)	(0.08)
Pre-tax profits (Million L)	45.09	0.24	46.09	0.03
	(218.43)	(40.09)	(244.65)	(41.74)
Use of Transfer Pricing				
Share firms declaring TP cost	0.82	0.02	0.80	0.02
	(0.39)	(0.14)	(0.40)	(0.14)
Share firms declaring TP cost (foreign partner)	0.69	0.00	0.67	0.00
	(0.46)	(0.02)	(0.47)	(0.02)
Share firms declaring TP cost (domestic partner)	0.44	0.02	0.44	0.02
	(0.50)	(0.14)	(0.50)	(0.13)
Share firms declaring TP cost (tax havens)	0.30	0.00	0.27	0.00
	(0.46)	(0.01)	(0.45)	(0.01)
Share of costs from foreign TP transactions	0.32	0.00	0.32	0.00
	(0.36)	(0.04)	(0.37)	(0.04)
N	769	27,056	772	29,172

Note: This table reports descriptive statistics for the sample of corporations filing income taxes in Honduras in the period 2017 and 2018, separately for multinational enterprises (MNE) and domestic firms. MNEs are identified as firms presenting a transfer price declaration with a foreign related party in the period 2014-2018.

[4]Our definition of MNEs is that the taxpayer filed at least one TP declaration in the period 2014-2018, so in any given year some MNEs might not be filing any TP costs.

One key limitation of the transfer pricing data for our exercise should be noted. That data is only available for the 2014-2018 period, meaning we cannot observe changes in behavior before and after the introduction of the minimum tax in 2014. As we document above, the sample of multinationals is rather small so in any case we cannot perform exercises relying on local variation around specific thresholds (e.g. there are only $\approx$ 120 firms with revenue between L8 - L12 million when pooling the entire 2014-2017 period).

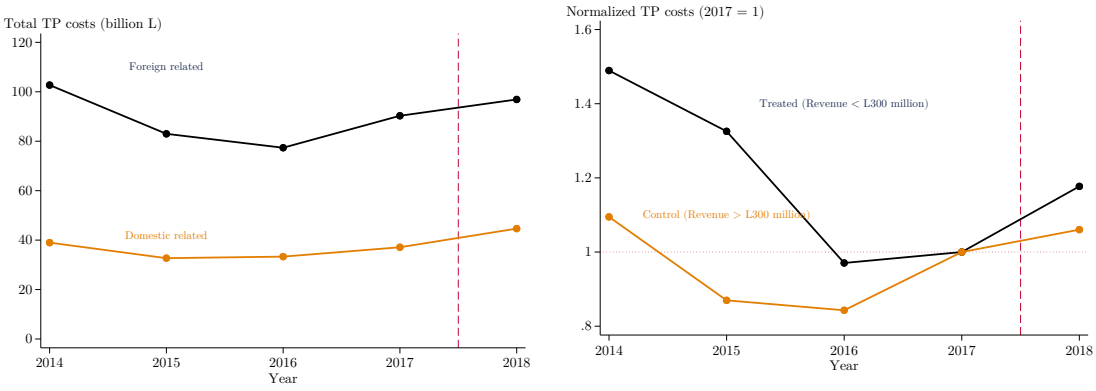
For those reasons, we take a different approach to evaluate whether MNCs responded to the minimum tax policy. First, instead of considering the introduction of the policy in 2014, we will explore the variation generated by the phasing out of the policy in 2018. For that year, the revenue exemption threshold increased from L10 million to L300 million. According to Table A9 above, approximately 60% of MNEs ($\approx$ 450 firms) declared revenue in that interval in 2017 and therefore were not exempt from the minimum tax that year but would be exempt in the following year if declaring the same revenue. Conversely, firms declaring revenue above L300 million in 2017 ($\approx$ 200) were not affected by the increase in the exemption threshold in 2018, since they were still liable for the minimum tax. If, in the absence of the change in policy, the use of transfer pricing costs would have been similar among these two groups of firms, any differential behavior observed in 2018 could be attributed to the impact of the minimum tax.

We start our analysis by presenting simple aggregate costs claimed through transfer pricing operations in each year (Figure A28, panel a), separately for domestic and foreign counterparts. Costs claimed from transactions with foreign counterparts are 2 - 2.5 larger than those with domestic partners, but over time the pattern of aggregate costs is similar: they decreased in the period 2014 - 2016 then increased back to initial levels by 2018.

In panel (b) we present in graphical form the "differences-in-differences" approach we propose. We compare the amount of TP costs claimed from transactions with foreign parties for firms with revenue above L300 million in 2017 (186 firms) and those with revenue between L10 and L300 million (374 firms). We normalize the amount to one in 2017, so the graph presents the percentage change from that baseline year for each group. If affected MNEs reacted to the withdrawn of the minimum tax by significantly increasing their costs (since now they would be taxed on profits), we should see a substantial increase in TP costs for that group in 2018, but not for those with revenue above L300 million. We do see that the total amount of TP costs claimed by the firms likely to be affected increased more (18%) when compared to those less likely to be affected (6%). However, the pre-trends of TP

costs usage in these two groups are widely different. For those with revenue below L300 million, the total costs claimed were almost 50% higher in 2014 than 2017, and then increase again in 2018. For those with revenue above L300 million, costs were about 10% higher in 2014 when compared to 2017, then fell 10 - 20% below 2017 levels before recovering.

Figure A28: Transfer-pricing costs by multinationals



(a) Total TP costs - foreign vs domestic

(b) Normalized foreign TP costs - above vs. below L300 million

Note: This figure presents trends in the use of costs through transfer pricing operations by MNEs in the period 2014-2018. Panel (a) presents aggregate costs, separately for foreign and domestic partners, while panel (b) presents costs normalized to one in 2017, separately for firms with revenue above L300 million in 2017 and those below. In both figures we restrict the sample to a balanced panel of MNEs filing every year in the period and declaring revenue above L10 million.

The figure above is suggestive that any DiD approach will likely fail the pre-trends test. We formally estimate the following DiD regression for the same sample of MNEs:

$$log(1 + costs_{fy}) = \sum_{y=2014}^{2018} \beta_y \mathbb{1}\{treat = 1\} * \mathbb{1}\{year = y\} + \gamma_f + \delta_y + \epsilon_{yf} \quad (1)$$

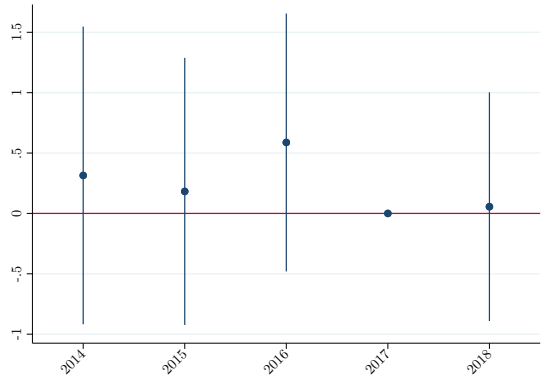
where the outcome variable is $log(1+costs)$ for firm f in year y; we include firm and year fixed effects; and our coefficients of interest are β_y, the differential use of TP costs by treated and control firms for every year.

We plot the resulting coefficients of interest in Figure A29 below, where the outcome is the log of TP costs with foreign partners. The first feature of the results is that they are extremely noisy: in the pre-2017 period, we cannot reject that deviations of TP cost usage is similar among the two groups, but the 95% CI often cover the interval [-1,1.5] log-points, with point estimates of approximately [0.3,

0.5]. The point estimate for the difference in 2018 is much closer to zero, but still with very wide confidence intervals. That is likely partly driven by our sample size: we only have 450 multinationals in the balanced sample, so our sample size in the regression is 2,250 observations. We also present results in table format in Table A10, where we additionally estimate a similar regression using costs with domestic partners and costs with partners in tax havens as outcomes of interest. The same pattern emerges: coefficients are very imprecisely estimated, and while all our estimates are not statistically different than zero we cannot rule out very large effects both before and after the 2017 phase-out of the minimum tax.

Our main takeway from these exercises is that while the effects of the minimum tax in Honduras on MNC are of much interest, we might not be able to precisely estimate them. That is in part because there are just not that many MNCs operating in the country, and also because our data has a limited time coverage and the phase out in 2018 only left out an even smaller number of very large MNCs unaffected by the change.

Figure A29: Differences-in-differences estimates of TP costs



Note: This figure presents the point estimates and 95% CI of the coefficients of interest in Equation 1. Standard errors were computed clustered at the taxpayer level.

Table A10: Differences-in-differences - Use of Transfer Pricing costs

	(1) Domestic partners	(2) All foreign partners	(3) Tax havens
Treated * 2014	-0.640	0.315	-0.466
	(-0.95)	(0.50)	(-0.74)
Treated * 2015	-0.327	0.182	-0.495
	(-0.53)	(0.32)	(-0.84)
Treated * 2016	-0.474	0.588	-1.121**
	(-0.91)	(1.08)	(-2.04)
Treated * 2018	-0.125	0.0559	-0.415
	(-0.31)	(0.12)	(-0.90)
Observations	2250	2250	2250
R-Squared	0.739	0.814	0.774

Note: This table reports results from estimation of Equation 1 above. The sample consists of a balanced panel of MNEs filing every year between 2014 - 2018. Treated firms are those reporting gross revenue between L10 and L300 million in 2017, while non-treated firms are those reporting revenue above L300 million in 2017. Standard-errors clustered at the taxpayer level are reported in parentheses.

I Did the minimum tax lead to firm exit?

One key concern about minimum taxes specifically, and other distortive taxes in general, is that they might lead to firm exit. Some activities that might be worth pursuing when the tax base is profits – since the tax burden will be limited when profits are low or negative – become economically unfeasible if taxes are assessed on gross revenue. Here we provide more details on the exercises we perform to assess whether the introduction of the minimum tax in Honduras caused higher exit by affected firms.

We note the following. First, precisely because we show that firms manipulate their gross revenue in order to avoid the minimum tax threshold, we cannot use a regression discontinuity design to assess the policy impact, comparing firms just below and just above the exemption threshold. Second, both the behavioral response in terms of reported revenue and the fact that costs were overreported before the reform suggest that evasion responses might dampen any real economic responses.

The intuition behind our exercises is as follows. We determine groups of firms that were likely to be affected by the 2014 minimum tax based on **pre-reform characteristics**. Since the minimum tax only affected firms that would have declared gross revenue above L10 million and profit margins below 6% after its introductions, we use these thresholds to assign firms to the "treatment group": firms with revenue

above L10 million and profit margin below 6% before the reform are more likely to be affected and potentially exit in response to the higher tax rate they will face.

We first define those groups by their characteristics in 2011, the first year in our panel dataset, and then follow firms until 2016 - we stop measuring firm exit before the end of our panel so we can assign firm exit only to those corporations that did not file in any subsequent period in the future. In Figure A30, starting from the universe of filing firms, we construct four groups based on their revenue & profit margins in 2011 and follow their survival throughout the period. As we should expect, large firms (with revenue above L10 million in 2011) are more likely to survive over the entire period in comparison with smaller firms. Conditional on size, high-profit firms (declaring profits above 6% in 2011) are also more likely to survive than low-profit ones. But the figure does not suggest any **differential exit** by firms likely to be affected (high revenue & low profit) when compared to the other groups.

We implement a more formal testing of those differential exit rates in regression form. We consider a differences-in-differences setting, comparing the exit rate after the reform between firms with high- vs. low-revenue and those with high- vs. low-profitability. Formally, we estimate the following model using a cross-section of firms that file taxes in 2013:

$$Exit_{i,Y} = \alpha_i + \gamma_1 Above L10_{i,before} + \gamma_2 Below 6\%_{i,before} + \beta Above L10_{i,before} * Below 6\%_{i,before} + \epsilon_i \quad (2)$$

We are interested in the coefficient β, that presents the differential exit rate for firms likely to be affected by the reform: those with revenue above the L10 million threshold and profit margins below 6%. Since the reform was introduced in 2014, we present results for exit in different horizons: one, two and three-years after the reform. In our baseline specification[5], we define the groups by their declared revenue and profit margins in 2013, the year before the reform.

In Table A11, we present our results for the three exit horizons and considering two different samples. In columns (1)-(3), we use firms declaring gross revenue between L4 and L20 million in 2013, therefore restricting the sample to firms that were not too different in size but in both sizes of the minimum tax revenue threshold. In columns (1) and (2), the differential exit by 2014 and 2015 is very close to zero and not statistically different from zero. The estimate for differential exit by 2016, in column (3), is 2 percentage points - a larger effect in economic terms, considering

[5]We control for economic sector of taxpayers in all regressions.

the 10% general exit rate, but it is not statistically different from zero. Of course, our key results show that firms that would have declared revenue slighlty above L10 million after 2014 decide to bunch, so that is an important response margin that might mitigate any exit decisions.

For that reason, in columns (4) - (6) we lift the sample restriction and include all firms declaring income taxes in 2013. The sample increases five-fold (since most firms in 2013 declare revenue below L4 million), but now the comparison group includes firms vastly different in size. While the estimate for the first year is similar in size to the restricted sample, results for exit by 2015 (1.6 p.p.) and 2016 (3.6) are much larger in magnitude and statistically different than zero. They suggest that large firms with low profit margins were more likely to stop filing income taxes after the reform, which we use to proxy for firm exit.

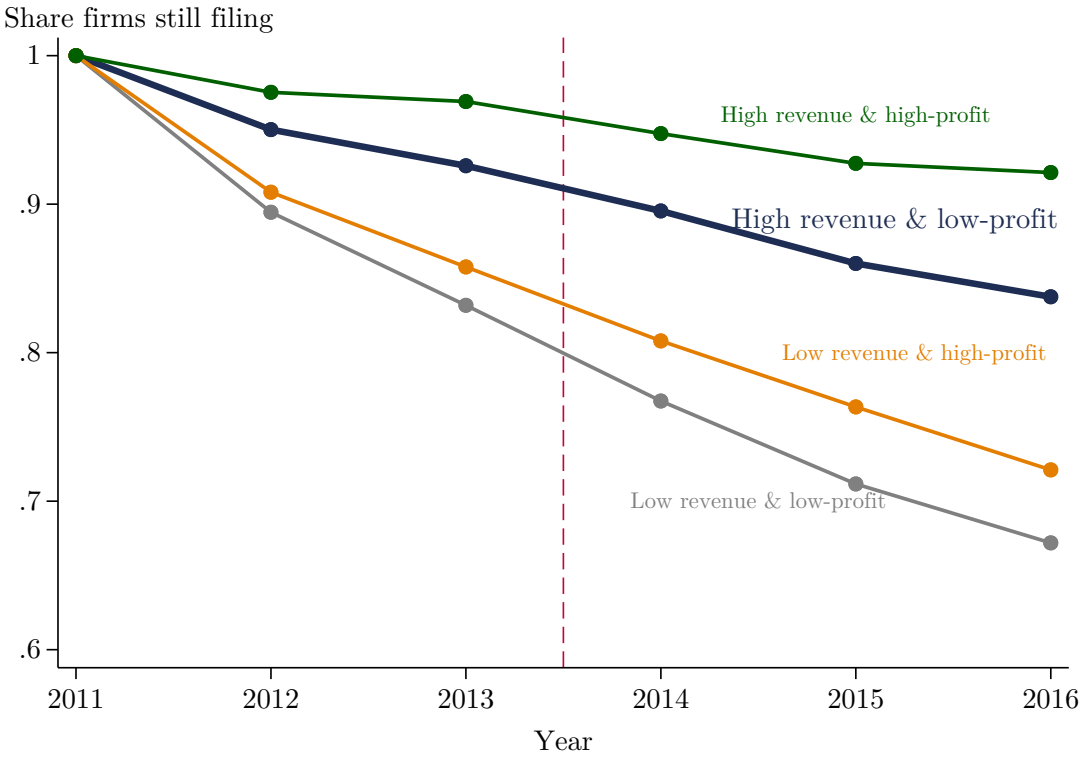
Since sample restrictions meaningfully affect the results, we provide a host of robustness tests in Figure A31, where we plot the interaction coefficients for the regression considering exit by 2016, using different sample restrictions based on declared revenue in the base year. Here we show that restricting the sample to firms in a narrow band around the L10 million threshold in 2013 leads to small coefficients in magnitude but wide confidence intervals. As we expand the sample around the threshold, the coefficients increase from less than 1 p.p. to the range 2.5 - 3.5 p.p., with some estimates being significantly different from zero.

Under the assumption that we can attribute any changes in exit for high-revenue, low- profit-margin firms to the minimum tax, the previous result are suggestive that the reform might have increased firm exit by as much as 3.5 p.p. in the years following it.

Since our results are not quite robust across specifications and to stress our empirical specification, we also conduct a series of placebo tests. We implement the same specification used across samples in Figure A31, but instead consider the base-year as 2011 and measure exit rates by 2013 - **before the introduction of the minimum tax**. We are not aware of any policies that might have affected the same group of firms, so our prior is that we should obtain null estimates. As we present in Figure A32, nonetheless, for a range of samples we estimate negative coefficients that are economically and statistically significant: the group of firms with revenue above L10 million and low profit margins in 2011 were 3 - 5 p.p. less likely to exit by 2013.

Given the sensitivity of our estimates to specification and the significant results estimated in the placebo regression, we avoid making claims about the impact of the introduction of a minimum tax on firm exit in our setting.

Figure A30: Firm survival using panel data



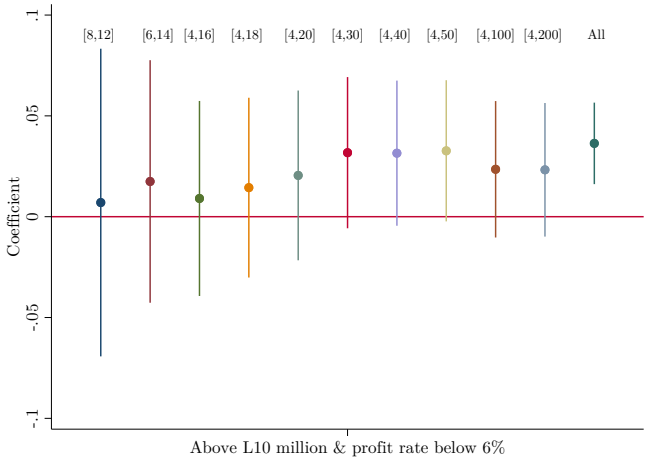
Note: These figures present the share of firms, in each year, that existed in 2011 and still file in each year. In both panels the sample is restricted to firms that presented a declaration in 2011. In panel A we restrict the sample to firms with gross revenue above L10 million in 2011 (and therefore likely to be affected by the minimum tax in the future) and present results separately for firms with low (below 6%) and high (above 6%) profit margins in 2011. In panel B, we restrict the sample to firms with low profit margins and present results for firms with low (below L10 million) and high (above L10 million) revenue in 2011.

Table A11: Regression: probability of exit by revenue & profit margin

	(1) Exit by 2014	(2) Exit by 2015	(3) Exit by 2016	(4) Exit by 2014	(5) Exit by 2015	(6) Exit by 2016
Revenue above L10 million	-0.00543	-0.0236	-0.0371**	-0.0364***	-0.0684***	-0.104***
	(-0.47)	(-1.43)	(-2.07)	(-6.54)	(-9.24)	(-12.46)
Profit below 6%	0.0138	0.0192	0.0329**	0.0112***	0.0177***	0.0101
	(1.58)	(1.47)	(2.22)	(2.66)	(3.22)	(1.60)
Interaction	-0.00543	0.00705	0.0205	0.00942	0.0163*	0.0364***
	(-0.40)	(0.36)	(0.95)	(1.35)	(1.78)	(3.53)
Observations	3725	3725	3725	19223	19223	19223
R-Squared	0.00965	0.0134	0.0182	0.00954	0.0157	0.0197
Dep var mean	0.0368	0.0738	0.102	0.0588	0.105	0.140
Revenue restriction?	L4 - L20 MM	L4 - L20 MM	L4 - L20 MM	None	None	None

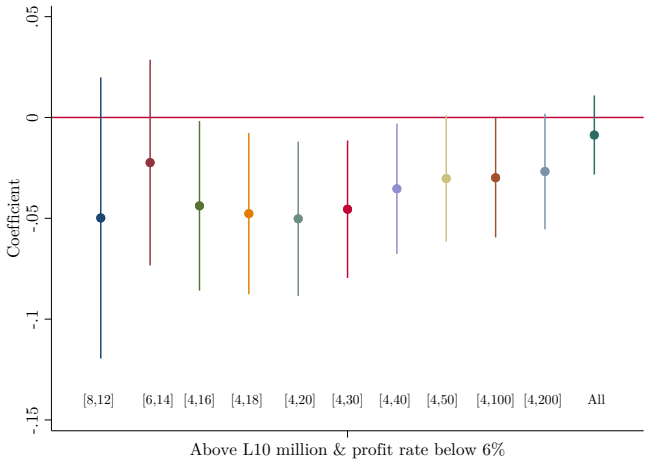
Note: This tables presents the coefficients of a regression using an indicator for exit by each year as dependent variable. The sample is restricted to corporations filing income taxes in 2013, the year used to calculate groups based on gross revenue and profitability. Robust standard errors in parentheses.

Figure A31: Coefficients on exit (different revenue windows)



Note: This figure presents the coefficients on the interaction term for firms with revenue above L10 million and profit margin below 6% in 2013, as in the regressions estimated in Table A11. The intervals indicated above each coefficient refer to the sample restriction related to declared gross revenue in 2013, the year before the introduction of the Minimum Tax. The first coefficient, for example, is estimated in a regression restricting the sample to firms with gross revenue between L8 - 12 million in 2013, while the last coefficient refers to a regression using all firms in 2013, regardless of revenue.

Figure A32: Coefficients on exit (different revenue windows) - Placebo test



Note: This figure presents placebo tests, where the coefficients on the interaction term for firms with revenue above L10 million and profit margin below 6% in 2011, as in the regressions estimated in Table A11. The intervals indicated above each coefficient refer to the sample restriction related to declared gross revenue in 2011, while the dependent variable is exit by 2013, the year before the introduction of the minimum tax.