

Using Movement of Exemption Cutoff to Estimate Tax Evasion: Evidence from Pakistan

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April 2016

Introduction

- How large is tax evasion in developing economies?
- Extremely limited evidence because evasion is not observed
- Approaches that uncover evasion credibly are costly

Existing Approaches

- Randomized audit programme
 - Used by IRS and academic researchers (Kleven *et al.* 2011; Slemrod *et al.* 2001)
 - Problems
 - Not all tax evasion can be detected by audit
 - Political and administrative costs
- Natural experiments
 - Used by Marion & Muehlegger (2008); Gorodnichenko *et al.* (2009)
 - Problems
 - Needs *special* tax variation or institutional features

This Paper

- Contributes a simple approach to estimate evasion from behavioural responses to tax reforms
- Estimates that at least 70% of self-employment and 1% of wage income is evaded in Pakistan

Outline

Introduction

Conceptual Framework

Institutional Background

Testing Predictions of the Model

Estimating Tax Evasion

Robustness and Heterogeneity

Conclusions

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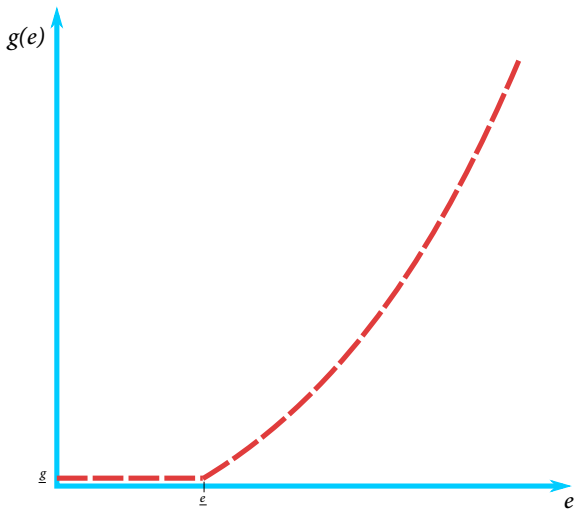
Estimating Tax Evasion

- Two main challenges in estimating tax evasion from behavioural responses to tax changes
 - ① Real and evasion margins are conflated
 - ② Even if evasion margin can be separated only changes and not *levels* can be identified
- I tackle these challenges by exploiting the asymmetry of effort and evasion costs

Effort and Evasion Costs

- Disutility of effort is a smooth continuous function of effort
- Costs of evasion are reverse-L-shaped: extremely low up to a given threshold and then rise sharply with evasion
 - The probability a government can detect evasion is low if income is self-reported and close to one if it is third-party reported
 - it is rarely feasible to evade completely even if all income is self-reported

Evasion Costs



Model Setup

- Standard model of labour supply and tax compliance
- Agents work l hours at fixed wage rate w
- Can evade e units of income at resource costs

$$\Gamma(e) = \begin{cases} \underline{g} & \text{if } e \leq \underline{e} \\ g(e) & \text{if } e > \underline{e}. \end{cases}$$

- Choose l and e to solve

$$\begin{aligned} \max_{l,e} \quad & u(c, l, e) = c - \psi(l) - \Gamma(e) \\ \text{s.t.} \quad & c = (1 - \tau)(wl - e) + e \end{aligned}$$

Optimal Evasion

- Assume threshold \underline{e} is large relative to fixed cost \underline{g}

$$\underline{g} \leq \tau \underline{e}$$

- Utility maximization

$$\psi'(l) = w(1 - \tau)$$

$$g'(e) \geq \tau$$

- Optimal Evasion

$$e(\tau) = \begin{cases} 0 & \text{if } \tau = 0 \\ \underline{e} + \kappa(\tau) & \text{if } \tau > 0 \end{cases}$$

Predictions

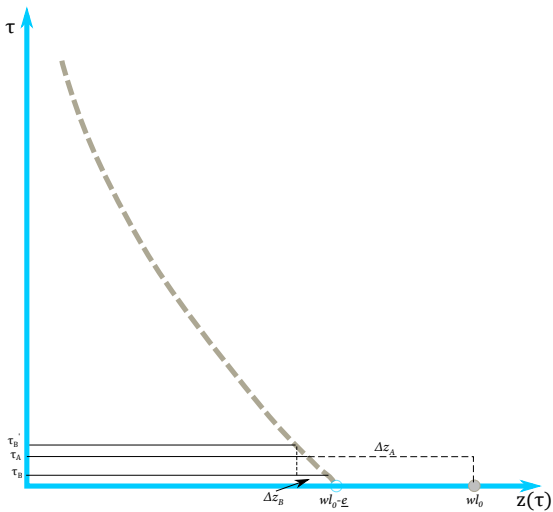
- ① *Reported earnings will be a discontinuous function of tax rate*

$$z(\tau) = \begin{cases} wl_0 & \text{if } \tau = 0 \\ wl(\tau) - \underline{e} - \kappa(\tau) & \text{if } \tau > 0 \end{cases}$$

- ② *Evasion will be high even when tax rate is fairly close to zero*

$$e(\tau = \epsilon) = \underline{e} \quad \epsilon > 0$$

Predictions



Estimating Tax Evasion

- Consider two discrete tax reforms $\Delta\tau_A(\tau_A \rightarrow 0)$ and $\Delta\tau_B(\tau_B \rightarrow \tau'_B)$
- Earnings responses induced by these reforms are given by

$$\begin{aligned}\Delta z_A(\tau_A \rightarrow 0) &= w\Delta l(\tau_A \rightarrow 0) - \Delta e(\tau_A \rightarrow 0) \\ \Delta z_B(\tau_B \rightarrow \tau'_B) &= w\Delta l(\tau_B \rightarrow \tau'_B) - \Delta e(\tau_B \rightarrow \tau'_B)\end{aligned}$$

Estimating Tax Evasion

- If the two tax reforms are
 - similar-sized $\Delta\tau_A = \Delta\tau_B = \Delta\tau$
 - small $\Delta\tau \approx 0$
 - sufficiently close to each other $\tau'_A \approx \tau'_B$

- Then

$$\Delta l(\tau_A \rightarrow 0) \approx \Delta l(\tau_B \rightarrow \tau'_B)$$

$$\Delta \kappa(\tau_A \rightarrow 0) \approx \Delta \kappa(\tau_B \rightarrow \tau'_B)$$

- And

$$\Delta z_A(\tau_A \rightarrow 0) - \Delta z_B(\tau_B \rightarrow \tau'_B) \approx \underline{e}$$

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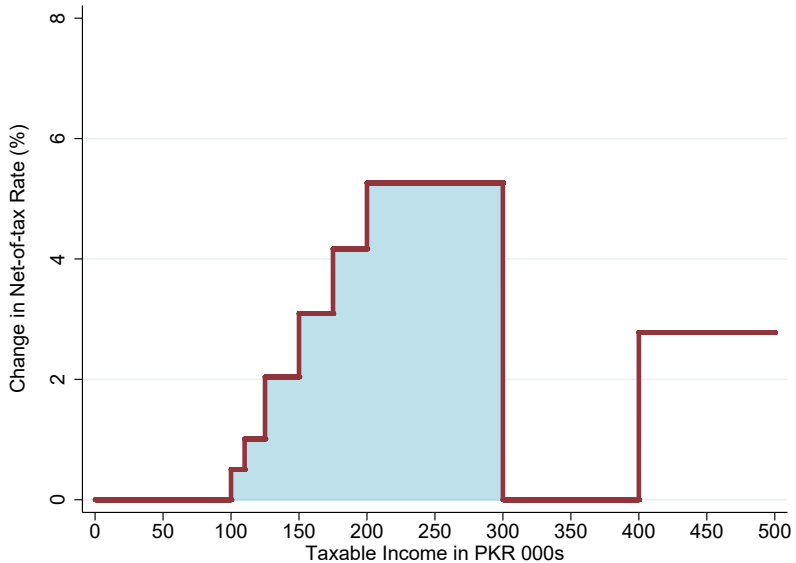
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Personal Income Tax in Pakistan

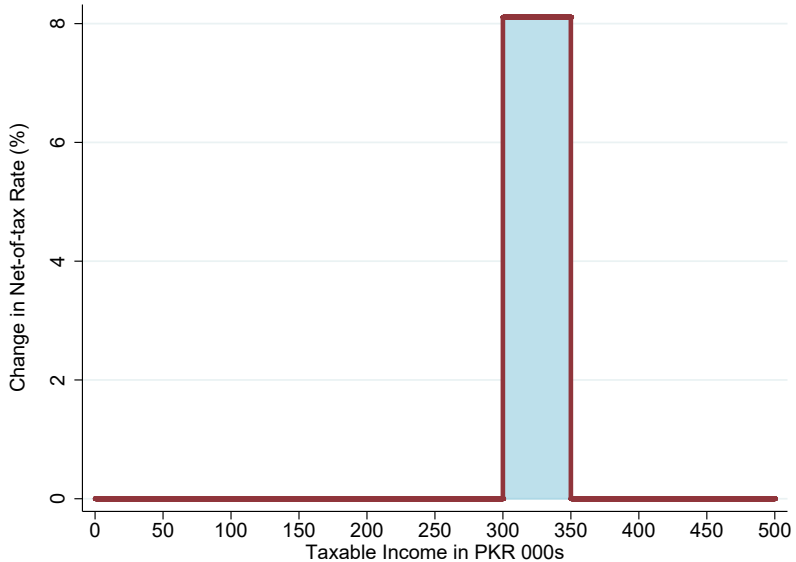
- Two income tax schedules one each for self-employed and wage earners
- Schedules not indexed to inflation and bracket boundaries are moved every two to three years to avoid bracket creep
- Between 2006 and 2011
 - Both schedules were comprehensively revised once
 - Exemption cutoff for self-employed was moved twice
 - Exemption cutoff for wage-earners was moved four times
- Schedule assignment rule

Wage Income $>$ $0.5 \times$ Taxable Income \implies Wage Earner

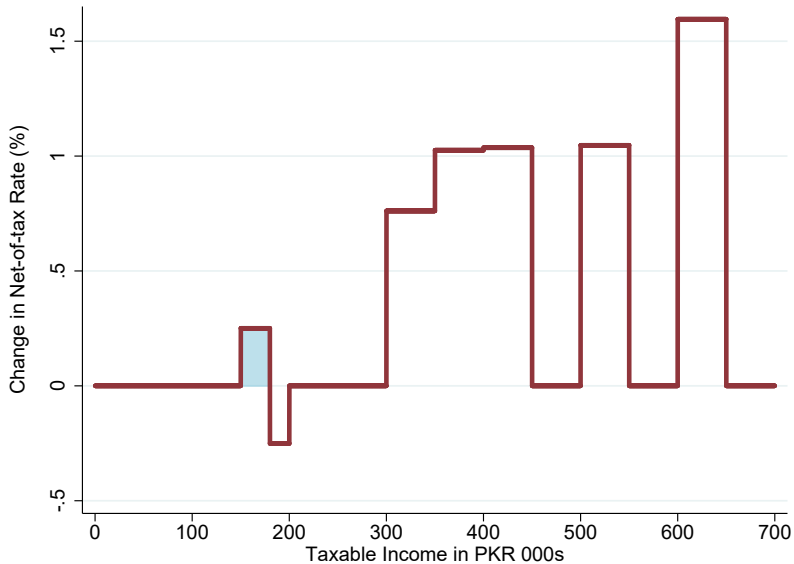
Tax Changes – Self-employed 2009–10



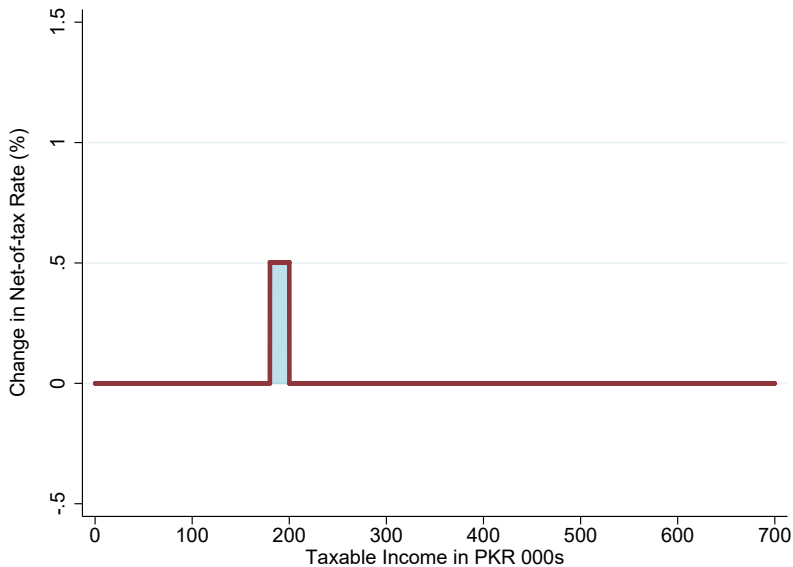
Tax Changes – Self-employed 2010–11



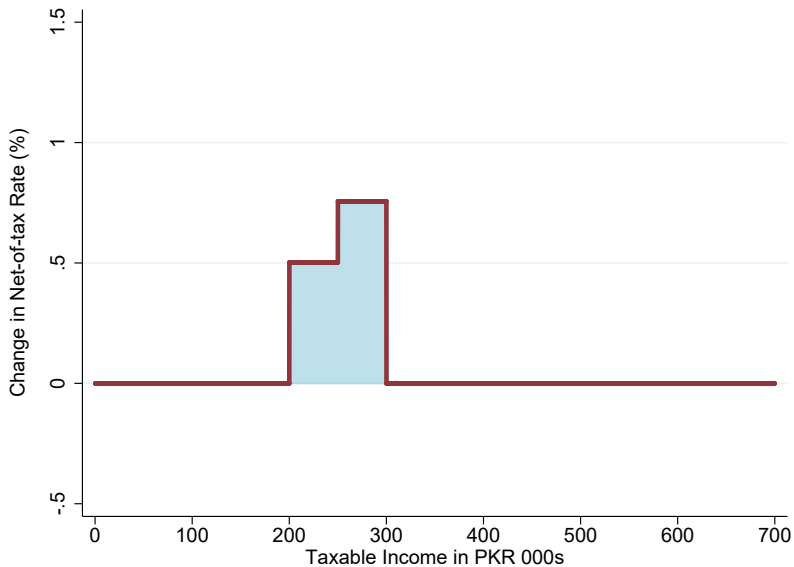
Tax Changes – Wage Earners 2007–08



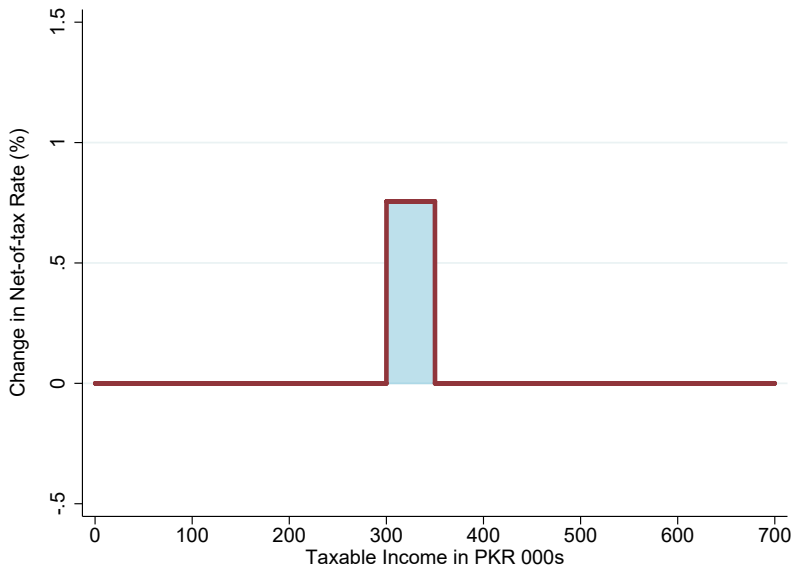
Tax Changes – Wage Earners 2008–09



Tax Changes – Wage Earners 2009–10



Tax Changes – Wage Earners 2010–11



Data

- Population of income tax return filed by self-employed and wage earners in 2006–11
- All registered taxpayers required to file return → earnings reported at zero tax rate are observed
- Primary focus: taxpayers around the exemption cutoff

Summary Statistics

	Full Sample		Analysis Sample	
	Self-Employed	Wage Earners	Self-Employed	Wage Earners
	(1)	(2)	(3)	(4)
<u>Observations</u>				
1. Self-Employment Income > 0	100	4.30	100	6.40
2. Wage Income > 0	0.60	100	0.40	100
3. Partnership Income > 0	3.50	1.10	1.80	1.20
4. Switchers	0.90	1.30	0.90	2.70
<u>Characteristics</u>				
5. Years Registered	7.04 (4.95)	7.80 (5.19)	7.39 (4.83)	7.79 (4.99)
6. Location	0.39 (0.49)	0.52 (0.50)	0.38 (0.49)	0.47 (0.50)
7. Male	0.98 (0.12)	0.97 (0.18)	0.99 (0.11)	0.97 (0.18)
8. Age	39.55 (15.48)	43.41 (12.23)	40.39 (15.22)	43.27 (13.08)

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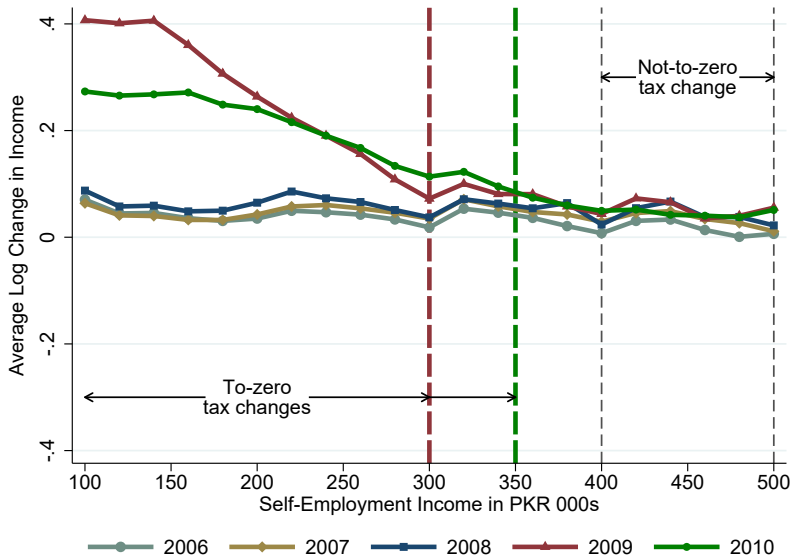
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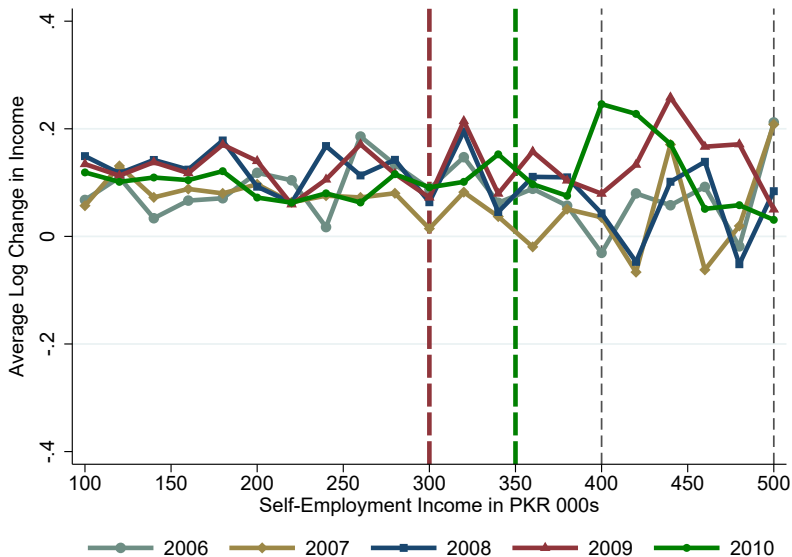
Nonparametric Evidence

- Earnings responses to to-zero tax changes are an order of magnitude larger than those to similar-sized, not-to-zero tax changes
- Difference between the two set of responses reflects tax evasion
- Tax evasion is large even at extremely low tax rates

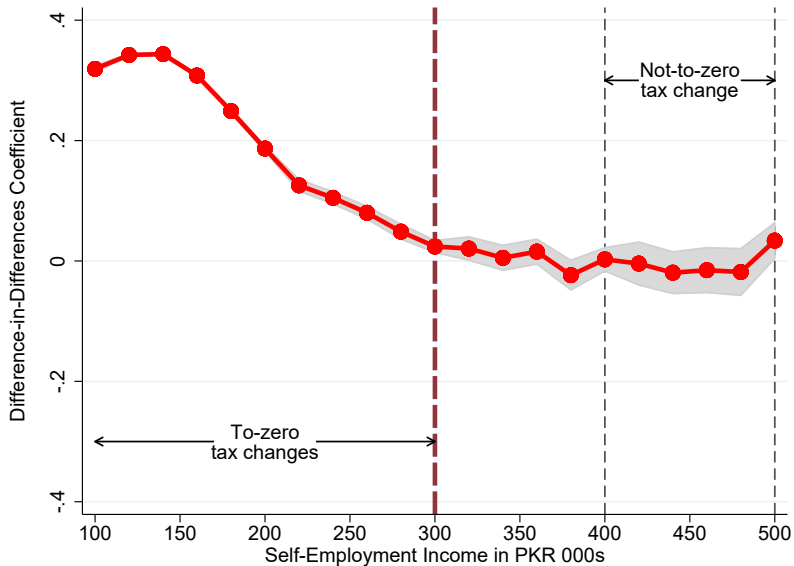
Self-Employment Income – Treatment



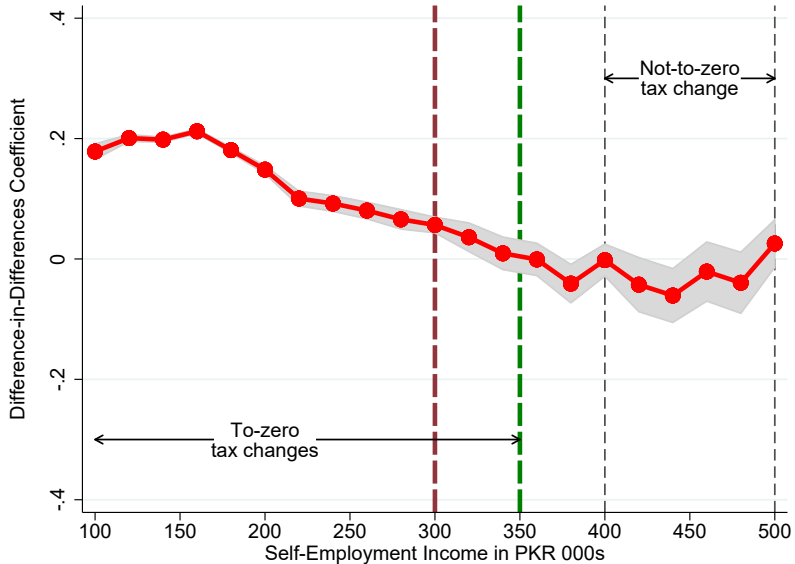
Self-Employment Income – Control



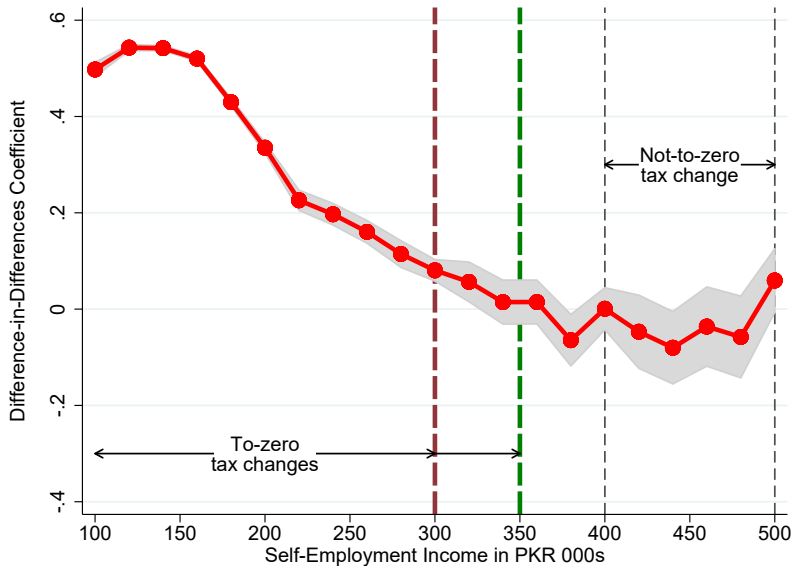
Difference-in-differences ($SE \times 2009$)



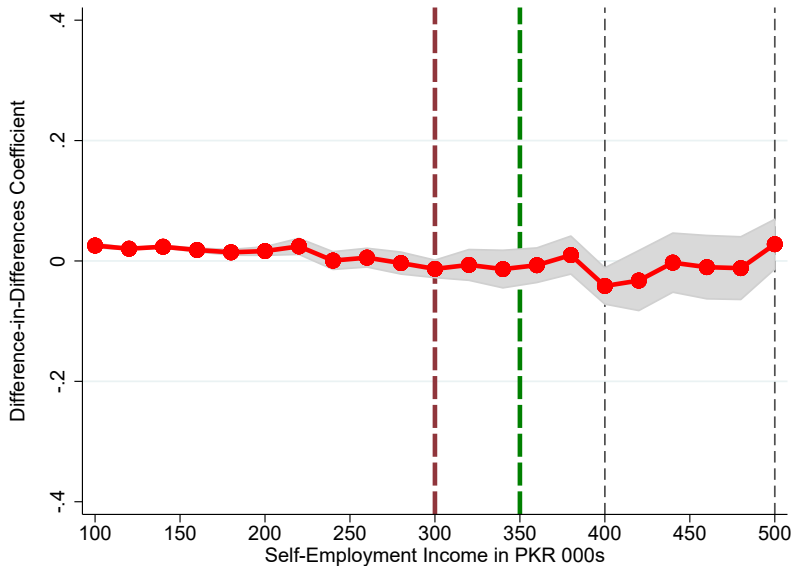
Difference-in-differences ($SE \times 2010$)



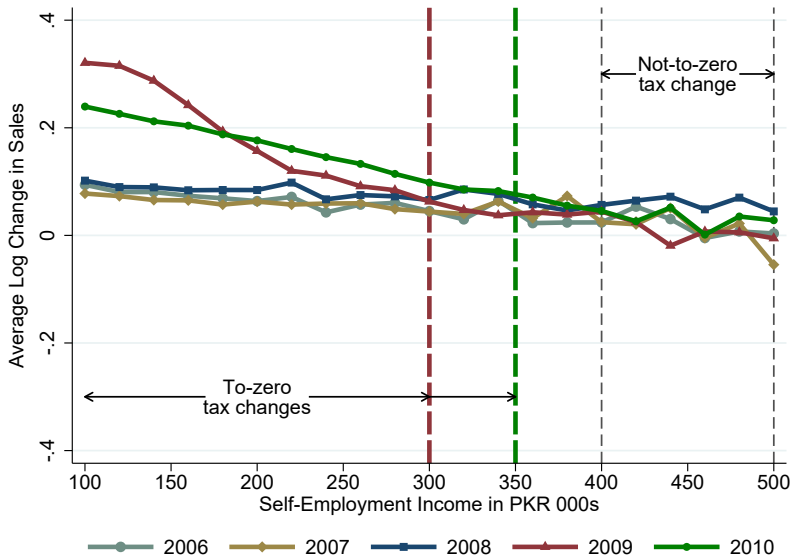
Difference-in-differences ($SE \times 2009-10$)



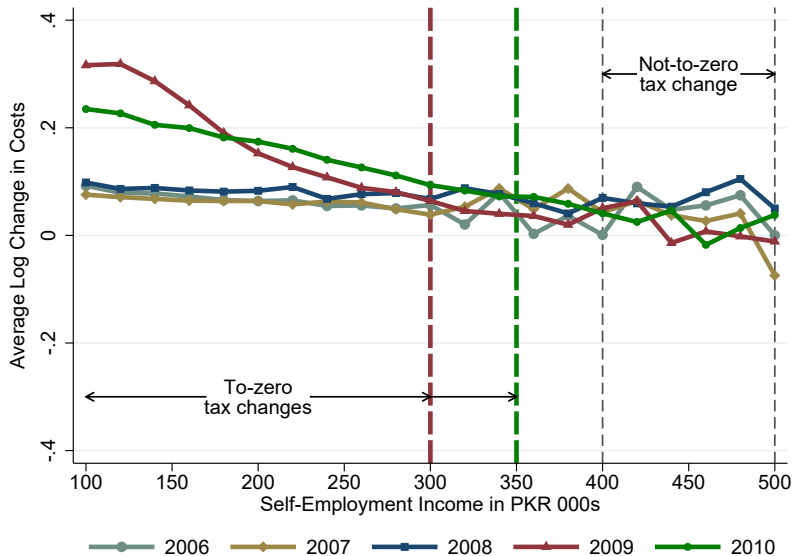
Difference-in-differences ($SE \times 2008$)



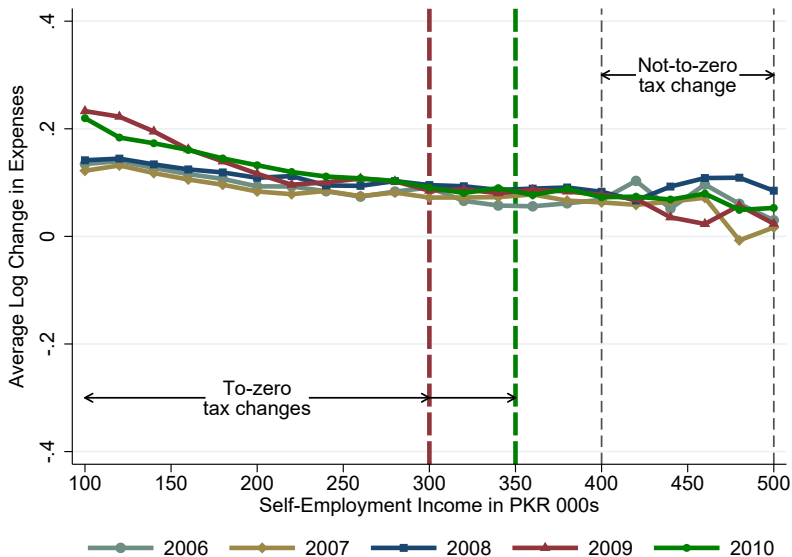
Line Items – Sales



Line Items – Costs



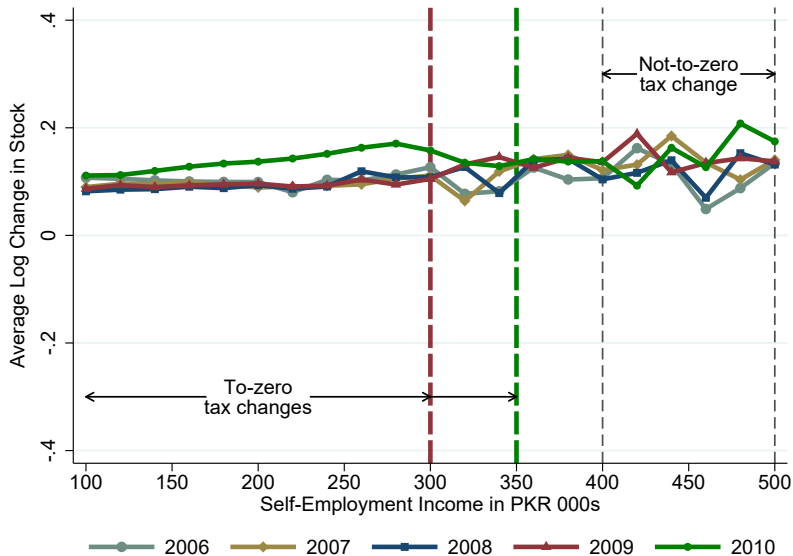
Line Items – Profit and Loss Expenses



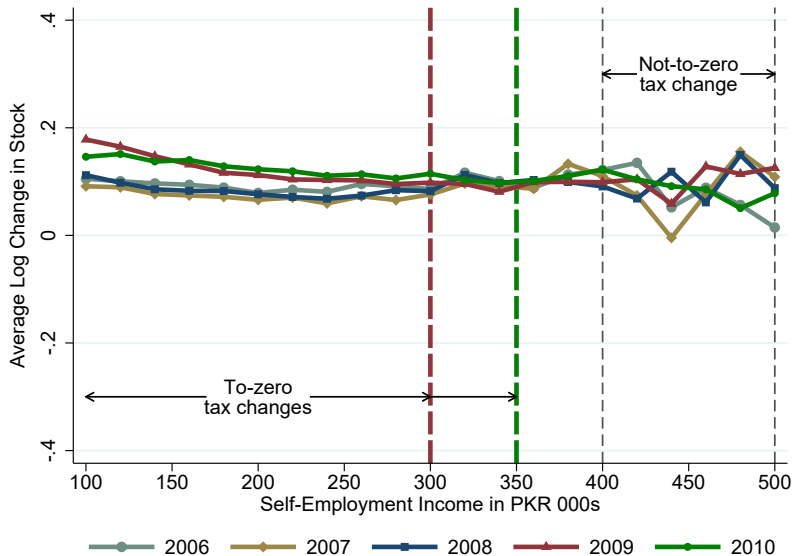
Line Items – Imports



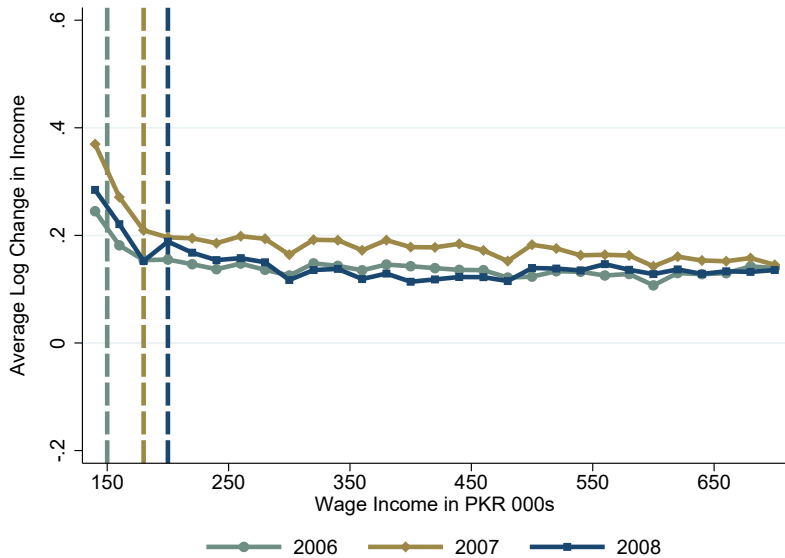
Line Items – Opening Stock



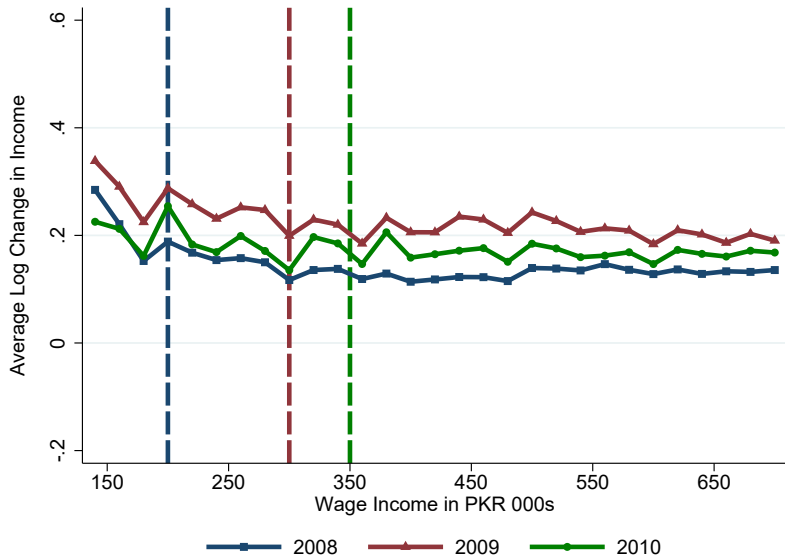
Line Items – Closing Stock



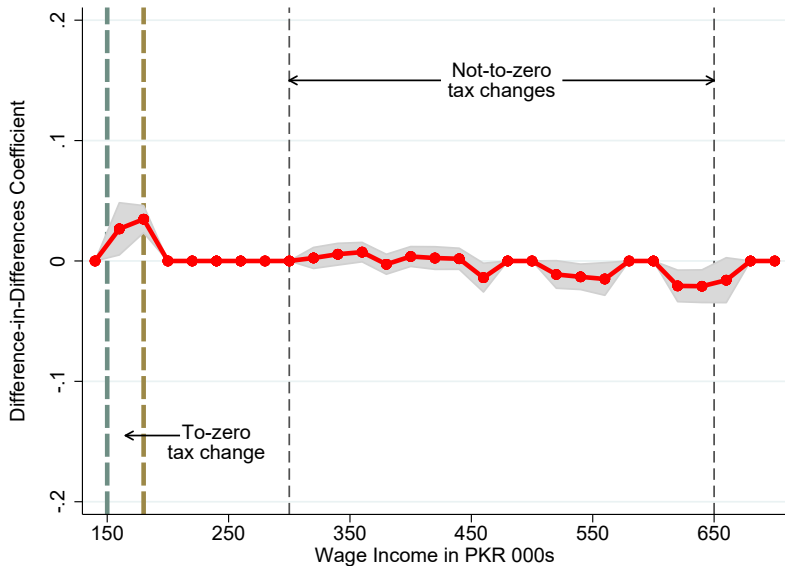
Wage Income (2006–09)



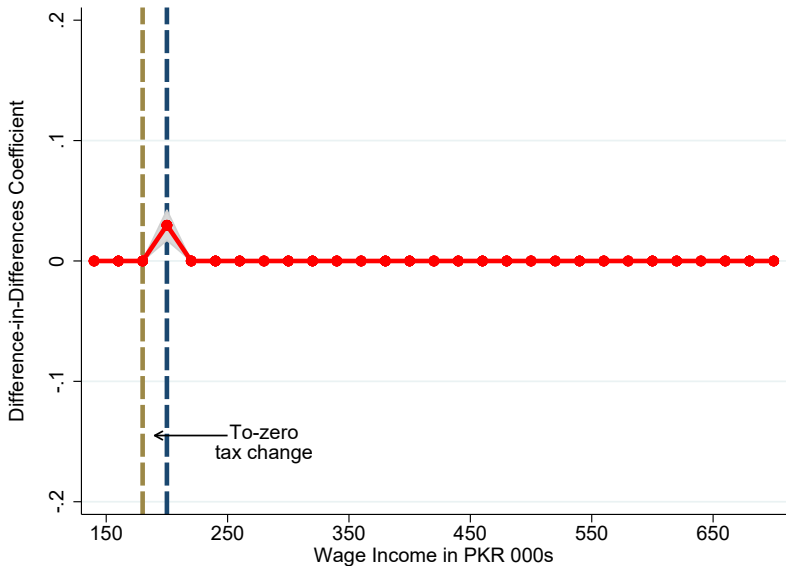
Wage Income (2008–11)



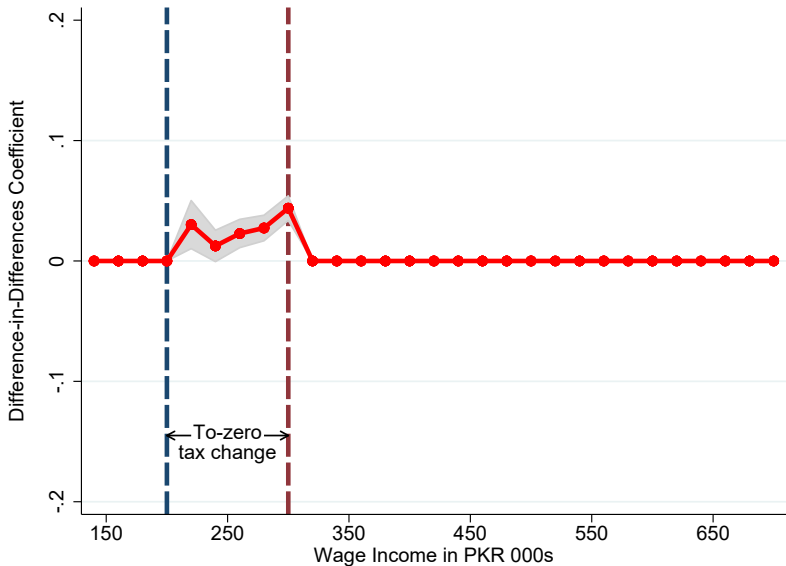
Difference-in-differences ($treat \times 2007$)



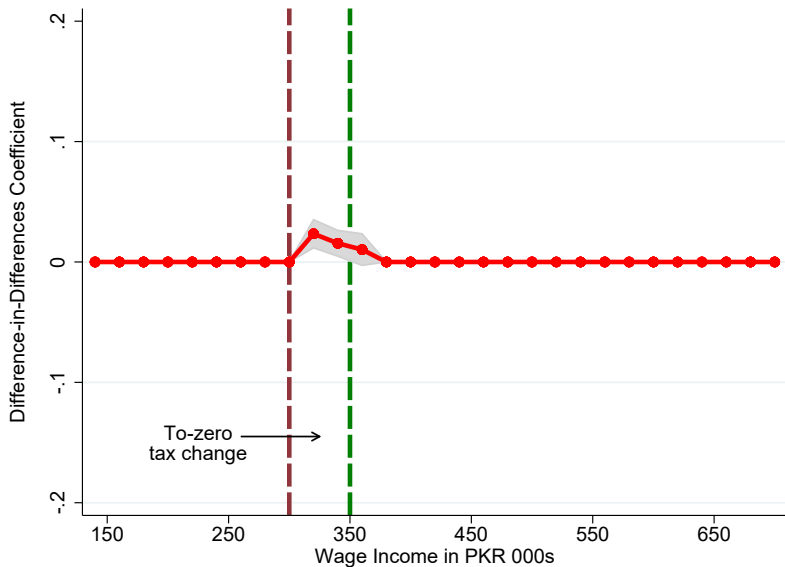
Difference-in-differences ($treat \times 2008$)



Difference-in-differences ($treat \times 2009$)



Difference-in-differences ($treat \times 2010$)



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Self-Employment Income

- Difference-in-differences Estimator exploits across-schedule variation only

$$\Delta \log z_{it}^S = \alpha + \beta SE_i + \text{year}_t \gamma + \mathbf{SE}_i \times \mathbf{post}_t \delta + \mathbf{X}_{it} \boldsymbol{\mu} + u_{it}$$

- $\mathbf{SE}_i \times \mathbf{post}_t$ is a vector of four dummies
 - 1 $SE \times cutoff \times 2009$
 - 2 $SE \times cutoff \times 2010$
 - 3 $SE \times not-to-zero \times 2009$
 - 4 $SE \times post$

Self-Employment Income

- Triple-difference Estimator exploits both across-schedule and within-schedule variation

$$\begin{aligned}\Delta \log z_{it}^S &= \alpha_0 + \alpha_1 \text{cutoff}_i + \alpha_2 SE_i + \mathbf{year}_t \gamma \\ &\quad + \beta_1 \text{cutoff}_i \times \text{post}_t + \beta_2 SE_i \times \text{post}_t + \beta_3 \text{cutoff}_i \times SE_i \\ &\quad + \mathbf{cutoff}_i \times \mathbf{SE}_i \times \mathbf{post}_t \delta + \mathbf{X}_{it} \boldsymbol{\mu} + u_{it}\end{aligned}$$

- Double-interaction terms here provide a direct test of identification assumptions

Wage Income

- Difference-in-differences Estimator exploits both across-schedule and within-schedule variation

$$\Delta \log z_{it}^W = \alpha + \mathbf{year}_t \boldsymbol{\gamma} + \mathbf{treat}_{it} \boldsymbol{\delta} + \mathbf{X}_{it} \boldsymbol{\mu} + u_{it},$$

- \mathbf{treat}_{it} is a vector of two dummies $cutoff_{it}$ and $not-to-zero_{it}$
- Controls include log base period income and ten-piece splines of log base period income to deal with mean-reversion

Self-Employment Income (DD)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>cutoff</i> × <i>SE</i> × 2009	0.281 (0.003)	0.281 (0.003)	0.297 (0.002)	0.297 (0.002)	0.297 (0.002)	0.297 (0.002)	0.261 (0.004)	0.260 (0.004)
<i>cutoff</i> × <i>SE</i> × 2010	0.156 (0.002)	0.156 (0.002)	0.145 (0.002)	0.144 (0.002)	0.145 (0.002)	0.144 (0.002)	0.142 (0.003)	0.142 (0.003)
<i>not-to-zero</i> × <i>SE</i> × 2009	-0.017 (0.005)	-0.017 (0.005)	-0.001 (0.005)	-0.001 (0.005)	-0.001 (0.005)	-0.001 (0.005)	-0.021 (0.007)	-0.021 (0.007)
<i>SE</i> × <i>post</i>	-0.012 (0.006)	-0.010 (0.007)	-0.005 (0.002)	-0.005 (0.002)	-0.005 (0.002)	-0.005 (0.002)	-0.007 (0.008)	-0.006 (0.008)
Time Trend	Flexible	Flexible	Linear	Linear	Separate Linear	Separate Linear	Industry- Specific	Industry- Specific
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1,221,164	1,220,215	1,221,164	1,220,215	1,221,164	1,220,215	260,717	260,078

Self-Employment Income – (DDD)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>cutoff</i> × <i>SE</i> × 2009	0.313 (0.025)	0.314 (0.026)	0.279 (0.007)	0.280 (0.008)	0.297 (0.012)	0.303 (0.014)	0.270 (0.026)	0.270 (0.027)
<i>cutoff</i> × <i>SE</i> × 2010	0.176 (0.025)	0.177 (0.026)	0.130 (0.007)	0.131 (0.008)	0.148 (0.012)	0.155 (0.014)	0.144 (0.026)	0.145 (0.027)
<i>cutoff</i> × <i>post</i>	-0.036 (0.025)	-0.038 (0.026)	0.005 (0.006)	0.004 (0.007)	-0.013 (0.012)	-0.020 (0.013)	-0.040 (0.026)	-0.041 (0.026)
<i>SE</i> × <i>post</i>	-0.037 (0.024)	-0.037 (0.025)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	-0.015 (0.025)	-0.015 (0.026)
<i>cutoff</i> × <i>SE</i>	-0.009 (0.020)	-0.016 (0.020)	0.021 (0.013)	0.014 (0.014)	0.007 (0.015)	-0.003 (0.015)	0.008 (0.020)	0.003 (0.021)
Time Trend	Flexible	Flexible	Linear	Linear	Separate Linear	Separate Linear	Industry- Specific No	Industry- Specific Yes
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1,221,164	1,220,215	1,221,164	1,220,215	1,221,164	1,220,215	260,717	260,078

Self-Employment Income – Placebo

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>cutoff</i> × <i>SE</i> × 2008	0.009 (0.002)	0.009 (0.002)	0.009 (0.002)	0.009 (0.002)	0.009 (0.002)	0.009 (0.002)	0.018 (0.004)	0.018 (0.004)
<i>not-to-zero</i> × <i>SE</i> × 2008	-0.021 (0.005)	-0.021 (0.005)	-0.021 (0.005)	-0.021 (0.005)	-0.021 (0.005)	-0.021 (0.005)	-0.030 (0.006)	-0.030 (0.006)
<i>SE</i> × <i>post</i>	-0.031 (0.008)	-0.035 (0.009)	0.011 (0.002)	0.011 (0.002)	0.012 (0.002)	0.012 (0.002)	-0.036 (0.009)	-0.038 (0.010)
Time Trend	Flexible	Flexible	Linear	Linear	Separate Linear	Separate Linear	Industry- Specific No	Industry- Specific Yes
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	757,024	756,631	757,024	756,631	757,024	756,631	138,588	138,336

Self-Employment Income – Evasion Estimates

Income	Earnings Response ($t \rightarrow 0$)	Earnings Response ($t \neq 0$)	Difference	Evasion Rate (%)
(1)	(2)	(3)	(4)	(5)
80-100K	72,187 (1,256)	334 (189)	71,853 (1,271)	74.6 (1.3)
100-150K	92,880 (792)	604 (342)	92,276 (862)	72.4 (0.7)
150-200K	93,003 (948)	573 (209)	92,430 (970)	52.5 (0.6)
200-250K	71,203 (1,126)	762 (278)	70,441 (1,160)	31.0 (0.5)
250-300K	29,469 (1,183)	689 (251)	28,780 (1,209)	10.2 (0.4)
300-350K	20,404 (912)	429 (156)	19,975 (925)	6.1 (0.3)

Wage Income – DD

	(1)	(2)	(3)	(4)	(5)	(6)
<u>A: Tax-Driven Response</u>						
<i>cutoff</i>	0.019 (0.002)	0.018 (0.002)	0.018 (0.002)	0.016 (0.002)	0.037 (0.002)	0.041 (0.002)
<i>not-to-zero</i>	0.004 (0.002)	0.003 (0.002)	0.002 (0.002)	0.004 (0.002)	0.028 (0.001)	0.027 (0.001)
<u>B: Placebo</u>						
<i>cutoff</i>	0.009 (0.001)	0.007 (0.001)	0.008 (0.001)	-0.000 (0.002)	-0.001 (0.001)	-0.001 (0.001)
<i>not-to-zero</i>	0.008 (0.001)	0.005 (0.002)	0.007 (0.002)	0.003 (0.002)	-0.003 (0.001)	-0.004 (0.001)
Time Trend	F	F	F	F	L	SL
Observations	240,804	236,630	227,039	310,716	240,804	240,804

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Robustness and Heterogeneity

- Convincing graphical evidence that pre-reform trends are parallel
- Results robust to
 - Restricting the sample to a balanced panel of taxpayers
 - Replacing year fixed effects with alternative time trends
 - Adding additional controls
 - Increasing the range of data
- No heterogeneity in response once position of a taxpayer in income distribution is controlled for

▶ Robustness

▶ Heterogeneity

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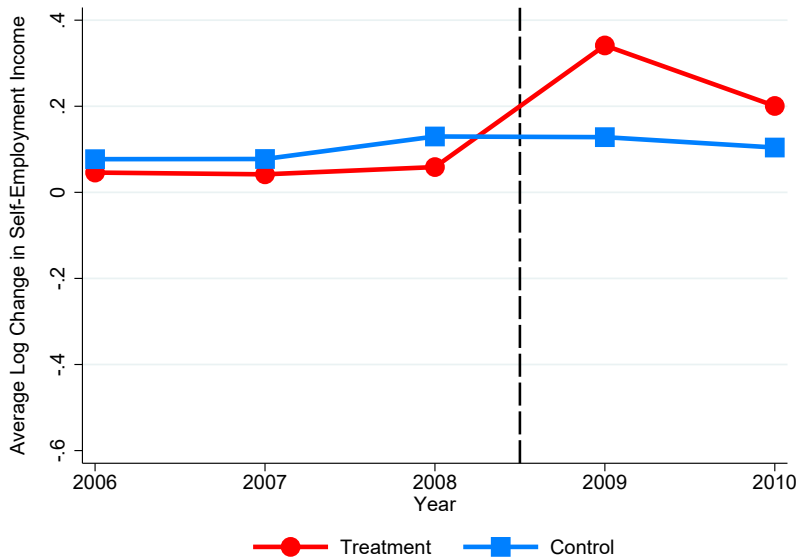
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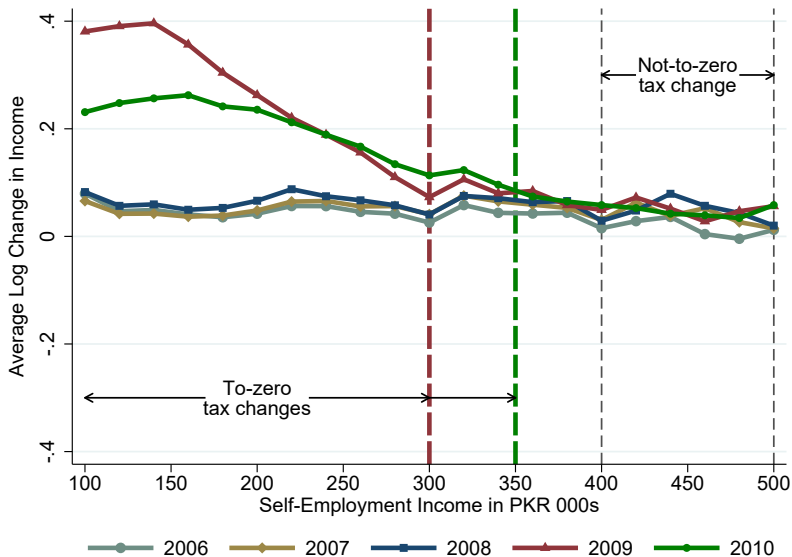
Conclusions

- Contributes a simple methodology to estimate tax evasion accurately
- Approach can be replicated easily to other contexts
- Two key empirical findings
 - Tax evasion of self-reported income is seventy-fold larger than that of third-party-reported income
 - Earnings supply function is extremely elastic at the bottom

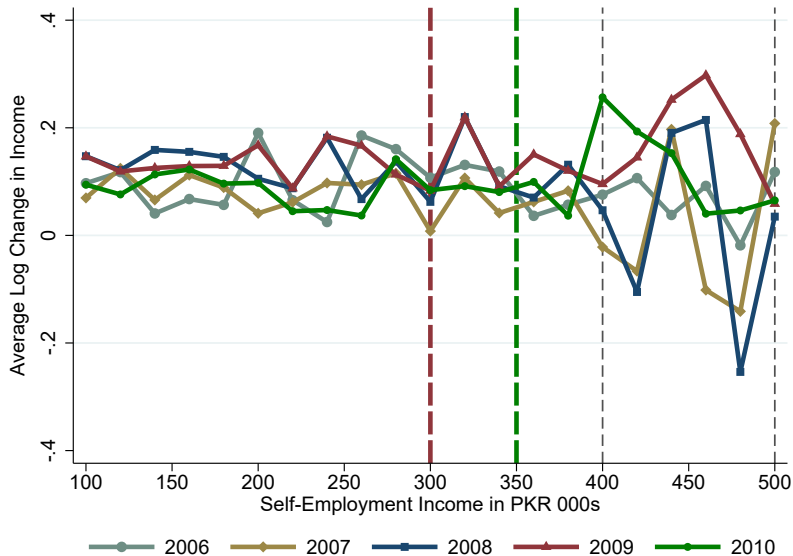
Self-Employment Income – Parallel Trends



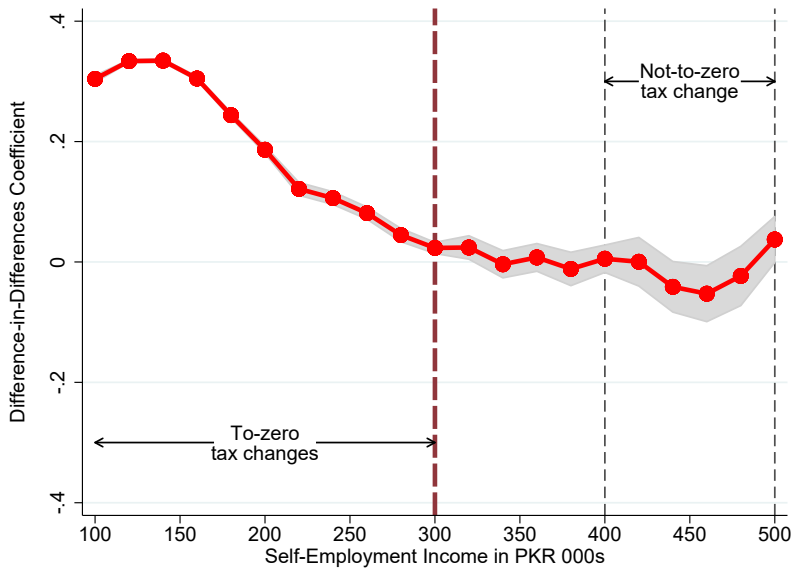
Self-Employment Income (BP) – Treatment



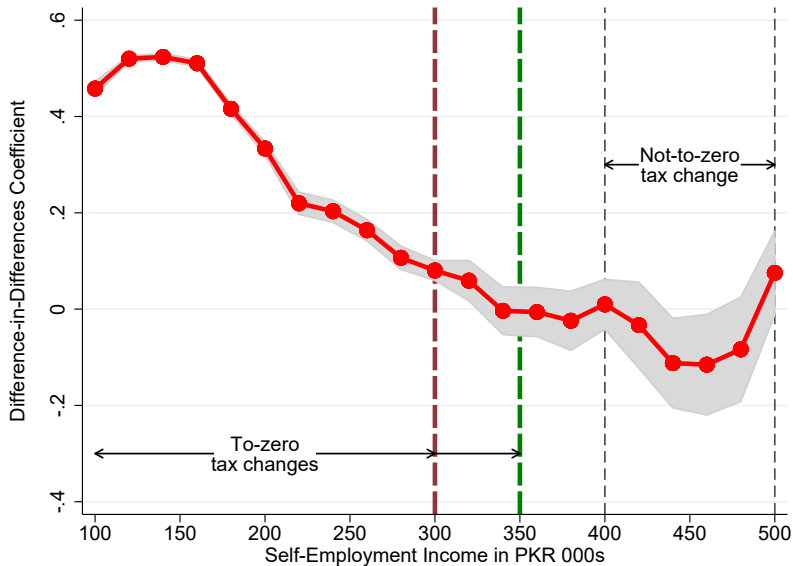
Self-Employment Income (BP) – Control



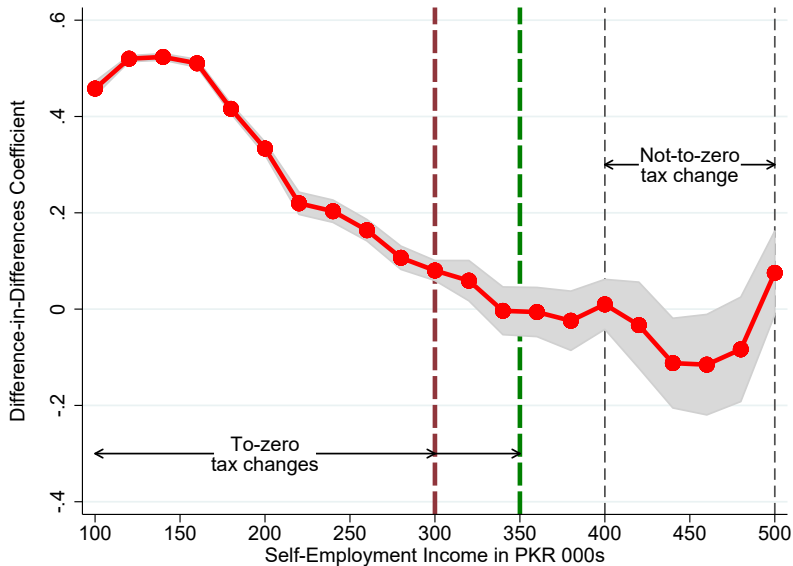
Balanced Panel DD ($SE \times 2009$)



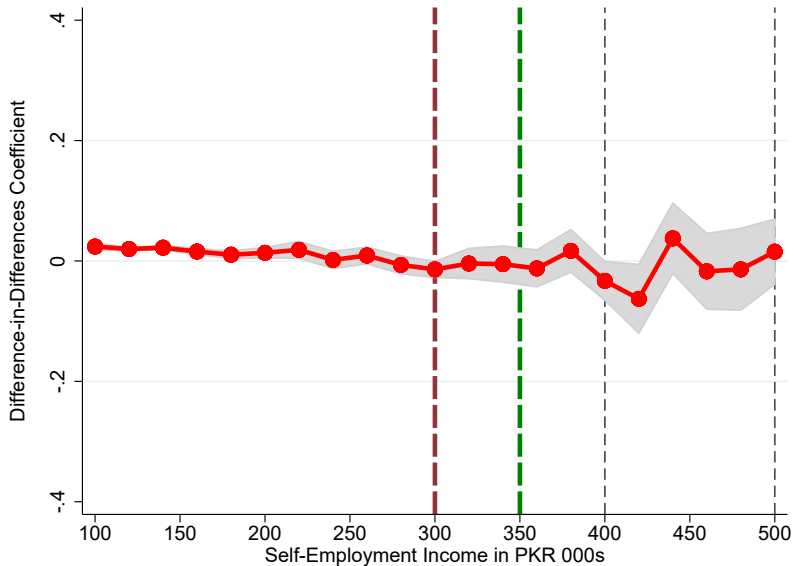
Balanced Panel DD ($SE \times 2010$)



Balanced Panel DD ($SE \times 2009-10$)



Balanced Panel DD ($SE \times 2008$)



Self-Employment Income DD – Balanced Panel

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>cutoff</i> × <i>SE</i> × 2009	0.290 (0.003)	0.290 (0.003)	0.318 (0.002)	0.318 (0.002)	0.319 (0.002)	0.318 (0.002)	0.264 (0.005)	0.264 (0.005)
<i>cutoff</i> × <i>SE</i> × 2010	0.191 (0.003)	0.191 (0.003)	0.168 (0.002)	0.168 (0.002)	0.168 (0.002)	0.168 (0.002)	0.187 (0.004)	0.187 (0.004)
<i>not-to-zero</i> × <i>SE</i> × 2009	-0.085 (0.007)	-0.086 (0.007)	-0.057 (0.007)	-0.057 (0.007)	-0.057 (0.007)	-0.057 (0.007)	-0.097 (0.010)	-0.097 (0.010)
<i>SE</i> × <i>post</i>	0.007 (0.012)	0.005 (0.013)	-0.029 (0.002)	-0.029 (0.002)	-0.029 (0.002)	-0.029 (0.002)	0.009 (0.013)	0.008 (0.014)
Time Trend	Flexible	Flexible	Linear	Linear	Separate Linear	Separate Linear	Industry- Specific	Industry- Specific
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	527,835	527,595	527,835	527,595	527,835	527,595	94,700	94,570

Self-Employment Income DDD – Balanced Panel

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>cutoff</i> × <i>SE</i> × 2009	0.321 (0.041)	0.318 (0.041)	0.315 (0.012)	0.312 (0.013)	0.308 (0.021)	0.296 (0.022)	0.269 (0.043)	0.266 (0.043)
<i>cutoff</i> × <i>SE</i> × 2010	0.183 (0.041)	0.180 (0.041)	0.168 (0.012)	0.165 (0.013)	0.161 (0.021)	0.149 (0.022)	0.154 (0.043)	0.151 (0.043)
<i>cutoff</i> × <i>post</i>	-0.042 (0.041)	-0.039 (0.041)	-0.030 (0.011)	-0.027 (0.013)	-0.023 (0.020)	-0.011 (0.022)	-0.047 (0.042)	-0.044 (0.042)
<i>SE</i> × <i>post</i>	-0.092 (0.033)	-0.093 (0.033)	-0.085 (0.026)	-0.085 (0.026)	-0.080 (0.028)	-0.074 (0.029)	-0.064 (0.034)	-0.064 (0.034)
<i>cutoff</i> × <i>SE</i>	-0.011 (0.040)	-0.011 (0.040)	-0.001 (0.004)	-0.001 (0.004)	-0.001 (0.004)	-0.001 (0.004)	0.014 (0.042)	0.014 (0.042)
Time Trend	Flexible	Flexible	Linear	Linear	Separate Linear	Separate Linear	Industry- Specific	Industry- Specific
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	527,835	527,595	527,835	527,595	527,835	527,595	94,700	94,570

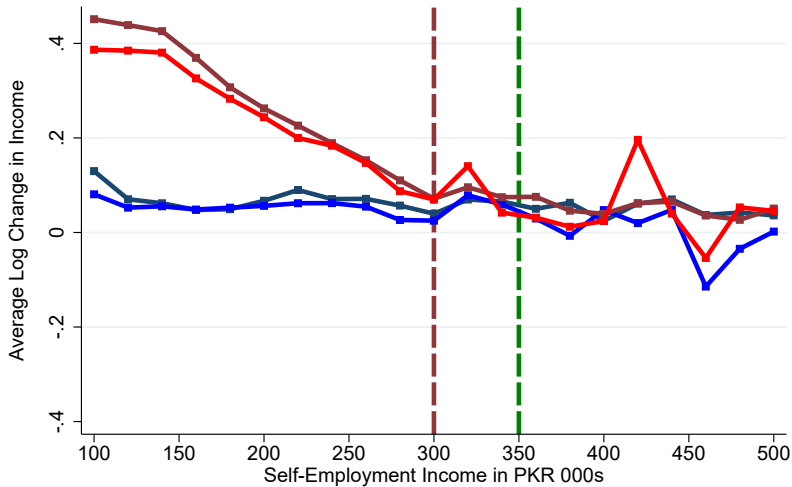
Self-Employment Income – Robustness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>cutoff</i> × <i>SE</i> × 2009	0.281 (0.003)	0.251 (0.003)	0.297 (0.003)	0.297 (0.003)	0.277 (0.003)	0.277 (0.003)	0.276 (0.004)	0.273 (0.004)
<i>cutoff</i> × <i>SE</i> × 2010	0.156 (0.002)	0.149 (0.003)	0.162 (0.002)	0.165 (0.002)	0.152 (0.002)	0.152 (0.002)	0.152 (0.003)	0.147 (0.003)
<i>not-to-zero</i> × <i>SE</i> × 2009	-0.017 (0.005)	-0.024 (0.006)	-0.017 (0.006)	-0.009 (0.005)	-0.017 (0.005)	-0.016 (0.005)	-0.022 (0.007)	-0.020 (0.007)
<i>SE</i> × <i>post</i>	-0.010 (0.007)	-0.010 (0.007)	-0.010 (0.006)	-0.007 (0.006)	-0.006 (0.007)	-0.005 (0.007)	-0.022 (0.008)	-0.019 (0.008)
Time Trend	Flexible	Flexible	Flexible	Flexible	Flexible	Flexible	Flexible	Flexible
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,220,214	776,447	1,271,215	1,282,101	1,157,927	1,220,203	260,070	260,063

Wage Income – DD

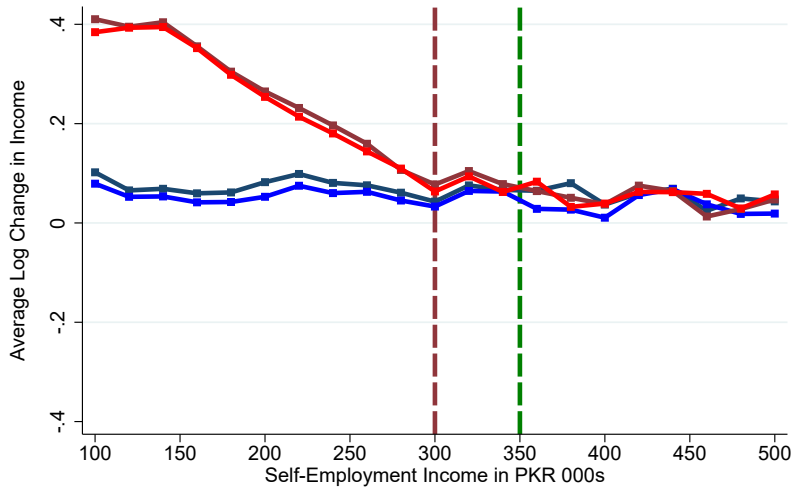
	(1)	(2)	(3)	(4)	(5)	(6)
<u>A: Tax-Driven Response</u>						
<i>cutoff</i>	0.022 (0.002)	0.020 (0.002)	0.021 (0.002)	0.018 (0.002)	0.040 (0.002)	0.045 (0.002)
<i>not-to-zero</i>	0.007 (0.002)	0.007 (0.002)	0.004 (0.002)	0.013 (0.002)	0.031 (0.001)	0.032 (0.001)
<u>B: Placebo</u>						
<i>cutoff</i>	0.010 (0.002)	0.007 (0.002)	0.009 (0.002)	-0.001 (0.002)	0.000 (0.001)	-0.000 (0.001)
<i>not-to-zero</i>	0.014 (0.002)	0.012 (0.002)	0.012 (0.002)	0.013 (0.002)	-0.002 (0.001)	0.001 (0.001)
Time Trend	F	F	F	F	L	SL
Observations	240,804	236,630	227,039	310,716	240,804	240,804

Above-median Vs. Below-median



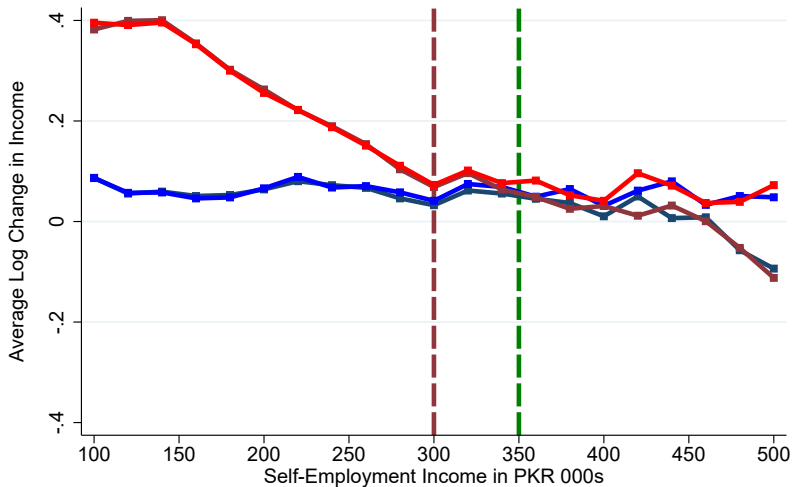
- Above Median (2008)
- Below Median (2008)
- Above Median (2009)
- Below Median (2009)

Manufacturers Vs. Non-manufacturers



Manufacturers (2008) Non-Manufacturers (2008)
Manufacturers (2009) Non-Manufacturers (2009)

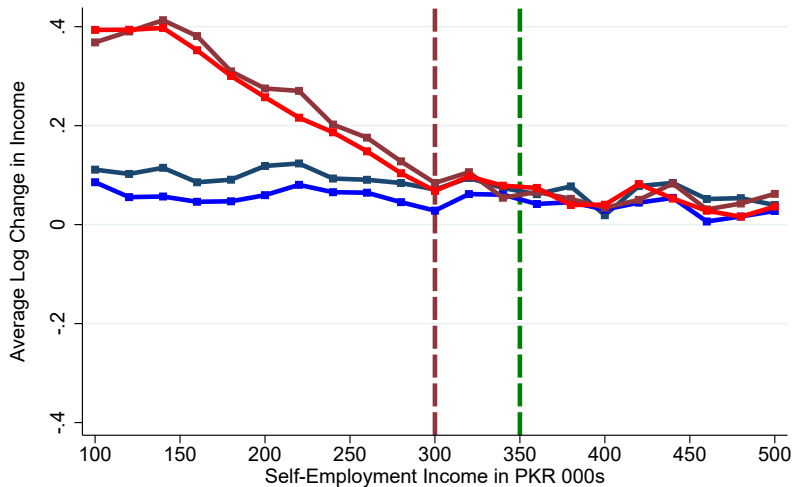
Regular Tax Filers Vs. Irregular Tax Filers



Legend:

- Regular Tax Filers (2008)
- Others (2008)
- Regular Tax Filers (2009)
- Others (2009)

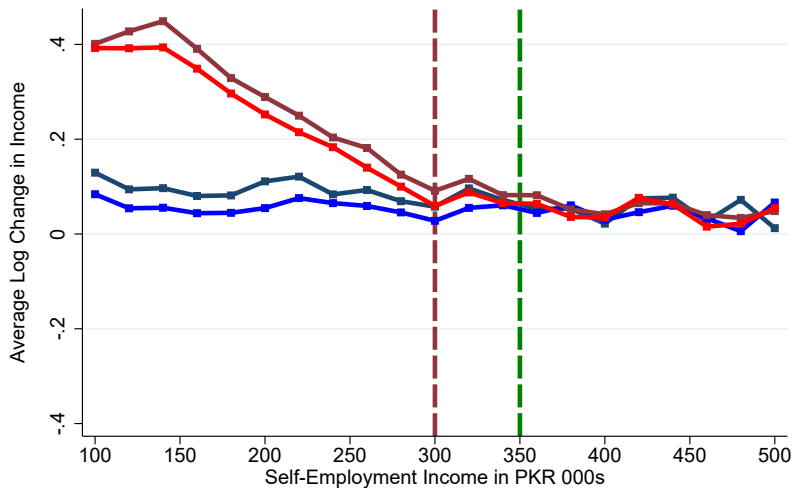
VAT-Registered Vs. Others



Legend:

- VAT-Registered (2008)
- VAT-Registered (2009)
- Others (2008)
- Others (2009)

Electronic Return Filers Vs. Others



- Electronic Return Filers (2008)
- Others (2008)
- Electronic Return Filers (2009)
- Others (2009)

Self-Employment Income – Heterogeneity

	(1)	(2)	(3)	(4)	(5)	(6)
<i>cutoff</i> × 2009	0.299 (0.010)	0.279 (0.025)	0.296 (0.011)	0.272 (0.025)	0.298 (0.013)	0.256 (0.025)
<i>cutoff</i> × 2010	0.162 (0.009)	0.156 (0.026)	0.170 (0.010)	0.140 (0.025)	0.164 (0.013)	0.107 (0.026)
<i>cutoff</i> × <i>trait</i> × 2009	-0.040 (0.010)	0.095 (0.052)	-0.079 (0.011)	0.094 (0.056)	-0.123 (0.014)	0.105 (0.063)
<i>cutoff</i> × <i>trait</i> × 2010	-0.045 (0.010)	0.042 (0.052)	-0.074 (0.011)	-0.010 (0.057)	-0.084 (0.014)	0.077 (0.059)
<i>cutoff</i> × <i>trait</i>	0.011 (0.007)	-0.017 (0.021)	0.028 (0.007)	-0.024 (0.023)	0.044 (0.010)	-0.084 (0.026)
<i>trait</i> × <i>post</i>	-0.000 (0.010)	-0.060 (0.045)	0.010 (0.011)	-0.037 (0.050)	0.013 (0.013)	-0.104 (0.056)
Trait = Size	Above Vs. Below Median		Top Vs. Bottom Quartile		Top Vs. Bottom Decile	
Controls for Base Period Income	No	Yes	No	Yes	No	Yes
Observations	823,258	823,258	414,015	414,015	165,046	165,046

Self-Employment Income – Heterogeneity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>cutoff</i> × 2009	0.281 (0.004)	0.270 (0.011)	0.271 (0.004)	0.261 (0.012)	0.283 (0.004)	0.267 (0.011)	0.290 (0.004)	0.216 (0.024)
<i>cutoff</i> × 2010	0.141 (0.003)	0.164 (0.012)	0.131 (0.004)	0.154 (0.014)	0.147 (0.003)	0.162 (0.012)	0.154 (0.004)	0.175 (0.032)
<i>cutoff</i> × <i>trait</i> × 2009	-0.018 (0.005)	0.020 (0.035)	0.026 (0.005)	0.003 (0.019)	-0.100 (0.007)	0.030 (0.046)	-0.066 (0.005)	0.049 (0.023)
<i>cutoff</i> × <i>trait</i> × 2010	-0.000 (0.005)	-0.024 (0.036)	0.026 (0.005)	0.006 (0.021)	-0.075 (0.007)	-0.017 (0.038)	-0.063 (0.005)	-0.015 (0.033)
<i>cutoff</i> × <i>trait</i>	0.020 (0.004)	0.060 (0.024)	0.032 (0.004)	-0.005 (0.010)	0.048 (0.004)	0.039 (0.037)	0.026 (0.004)	-0.003 (0.014)
<i>trait</i> × <i>post</i>	-0.012 (0.005)	-0.012 (0.032)	-0.034 (0.005)	-0.009 (0.017)	0.006 (0.006)	-0.028 (0.040)	0.010 (0.005)	-0.018 (0.026)
Trait	Manufacturers		Regular Tax Filers		VAT-Registered		Electronic Filers	
Percent with Trait	24.1		41.8		4.9		11.7	
Controls for Base								
Period Income	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1,220,218	1,220,218	1,220,218	1,220,218	1,220,218	1,220,218	1,220,218	1,220,218