The Effect of Taxation on Informal Employment
Evidence from the Russian Flat Tax Reform

Fabián Slonimczyk

ICEF-Higher School of Economics, Moscow

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Informality and Taxes

- In developing countries, 50% or more of employment is informal: self-employed, unregistered workers
- Critical issue: relationship between informality and the level of taxation
  1. Challenge 1: Identification
  2. Challenge 2: Measurement
- Related Literatures
  - Shadow economy: government regulation, taxation, and informal work.
  - Segmented markets vs. excessive regulation

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The 'Flat' Tax Reform

- In 2001, Russia introduced a tax reform that drastically reduced taxation levels

- But lower income brackets were mostly unaffected: control group

- The effect of the reform estimated using a differences-in-differences strategy

- Other aspects of the reform make it a good quasi-experiment

  - Little or no room for anticipation effects
  - No specific incentives to misreport income around the threshold

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Outline

- The Russian Longitudinal Monitoring Survey
  - Rounds VIII–XVIII (1998–2009)
  - In typical round, 10,000 individuals in 4,000 household
  - The adult questionnaire contains information on up to three 'jobs': main job, second job, irregular remunerated activities
- Special supplement on informal work (round XVIII)

The Data

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  - Production for exchange
  - Small scale (<5 employees)
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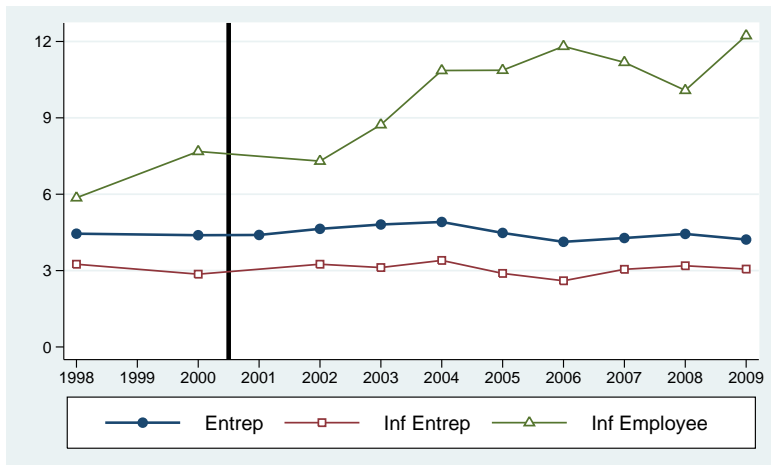
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Working Definition

| Employed				
	Main Job	Entrepreneur	Firm Owners	Formal Informal
			Individual Entrepreneur	Informal
		Employee	For Firm	Formal Informal
			For Individual Entrepreneur	Informal
	Second Job			Formal Informal
	Irregular Activities			Formal Informal

Informality at Main Job

Notes: RLMS, rounds VIII–XVIII (1998–2009). The series are defined as a percentage of those with a main job.

Informality at 2nd Job and Irreg Activ
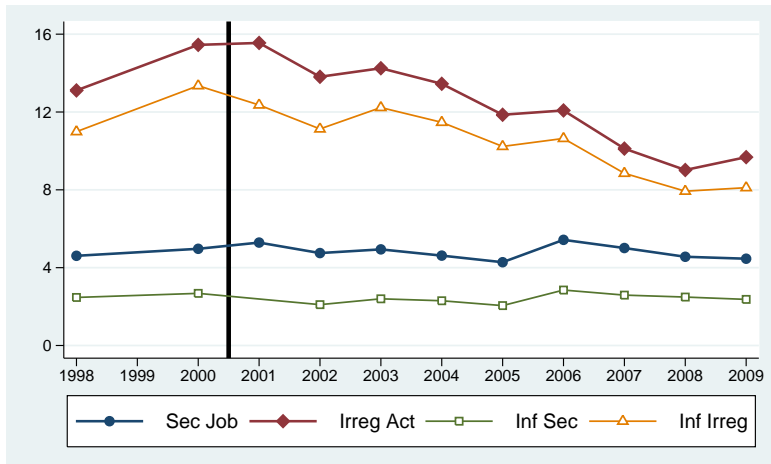
Notes: RLMS, rounds VIII–XVIII (1998–2009). The series for the second job are defined as a percentage of those with a main job. For the irregular activities, the base are all those employed.

Real Hourly Earnings
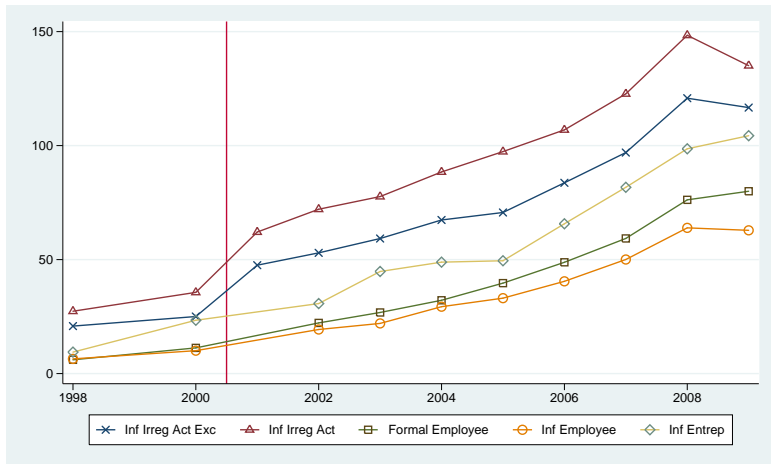
Notes: RLMS, rounds VIII–XVIII (1998–2009). Real hourly earnings are monthly receipts divided by usual hours and deflated by the CPI. Informal irregular activities exclusive means that the individual held no other job.

Compliance with the Law

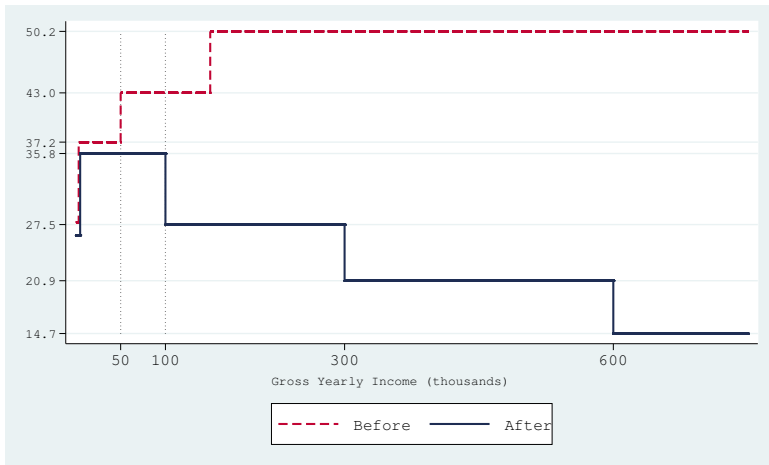| Sup for employees	All Employed	Informal Employee	Informal Sec. Job	Inf. Irreg. Activ
Under oral agreement	0.11	0.69	0.81$^\natural$	0.96$^\sharp$
% Labor Law Compliace	83.1	52.9	NA	53.2$^\sharp$
% Contract Compliance	86.1	64.3	NA	65.5$^\sharp$
% of Inc Declared for SS	87.6	31.2	NA	10.5$^\sharp$
Obs	6453	777	80	186
Sup for entrepreneurs	All Employed	Formal Entrep	Informal Entrepr.	Inf. Irreg. Activ
Unregistered	0.48	0.03	0.27	0.98$^\sharp$
% Labor Law Compliance	64.4	85.9	53.6	21.3$^\sharp$
% Contract Compliance	66.3	87.5	55.5	27.5$^\sharp$
% Formal Employees	64.0	85.7	53.4	8.3$^\sharp$
Contributes to SS fund	0.47	0.95	0.60	0.06$^\sharp$
Obs	397	64	194	126

Notes: The data sources are RLMS round XVIII and the supplementary questionnaire on informality by the Center of Labor Market Studies, Higher School of Economics (2009). $^\natural$ Based on job-B answers by individuals who do not perform irregular activities. $^\sharp$ Based on job-A answers by individuals who do not have a main job.

The Russian Flat Tax Reform

Gross Yearly Income (r.)	Before (2000)			After (2001)		
	PIT	ST Employee	Employer	PIT	ST Employee	Employer
<3,168[♯]	0			0		
3,168–4,800[♯]	12	1	38.5	0	0	35.6
4,800-50,000	12			13		
50,000–100,000	20					35.6
100,000–150,000	20					20
150,000–300,000	30	1	38.5	13	0	20
300,000–600,000	30					10
>600,000	30					2[♭]

Notes: The data source is Russian Tax Code, part 2 (2001-2). [♯]The tax allowance in 2001 was only available to those with income below 20,000 rubles. [♭]Rate initially set to 5% and lowered to 2% in 2002.

Combined Tax Burden

Differences in Differences

- The design of the reform created a natural experiment
- Individuals earning less than 50,000 rubles a year constitute the *control group*
- People with higher incomes faced lower tax rates and are therefore considered *treated*
- Problems in practice:
    1. Income misreporting → Use post-reform income → Identify lower bound
    2. Income volatility → Considered treated if ever in upper brackets
    3. The control group comprises the un-treated individuals who were employed

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Summary Statistics by Treatment

|	Control	Treated	All Employed
Female	0.61	0.52	0.54
Age	42.29	37.18	38.21
Medium Ed Comp	0.76	0.87	0.85
College Ed Comp	0.12	0.23	0.21
Schooling (Yrs)	11.07	12.16	11.94
Work Experience	20.12	16.26	17.04
Married	0.47	0.59	0.57
Urban Location	0.63	0.78	0.75
Russian National	0.63	0.73	0.71
Russian Born	0.92	0.92	0.92
Size HH	3.32	3.54	3.50
# Fem HH	1.77	1.86	1.84
# Youth HH	0.72	0.84	0.81
# Elderly HH	0.29	0.18	0.20
Obs	17,404	68,475	85,879
Indiv	3,545	11,487	15,032

Informal Employees by Treatment
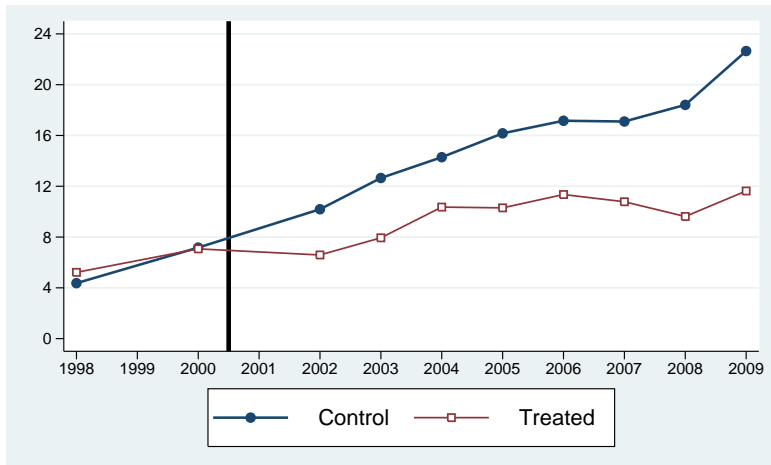
Informal Entrepreneurs by Treatment
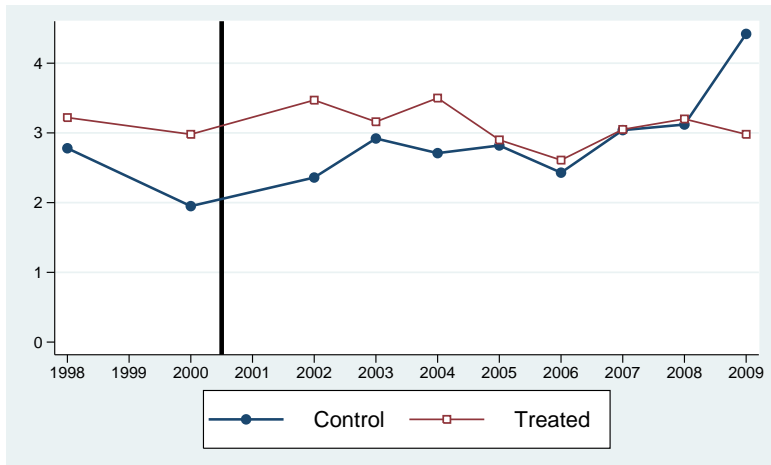
Informal 2nd Job by Treatment
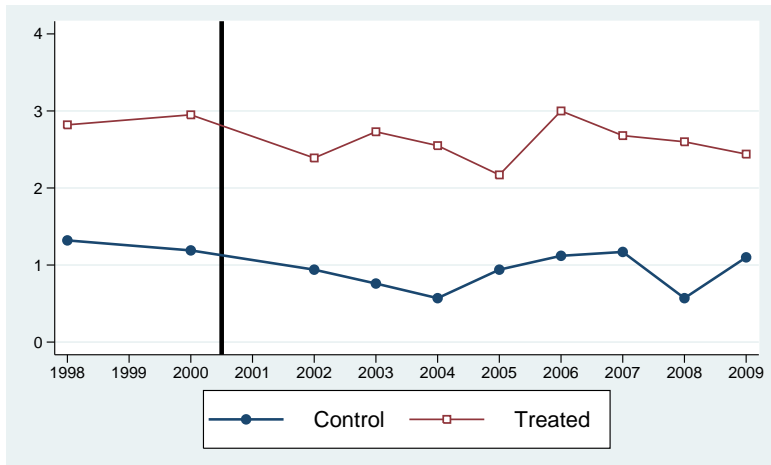
Informal Irreg Act by Treatment
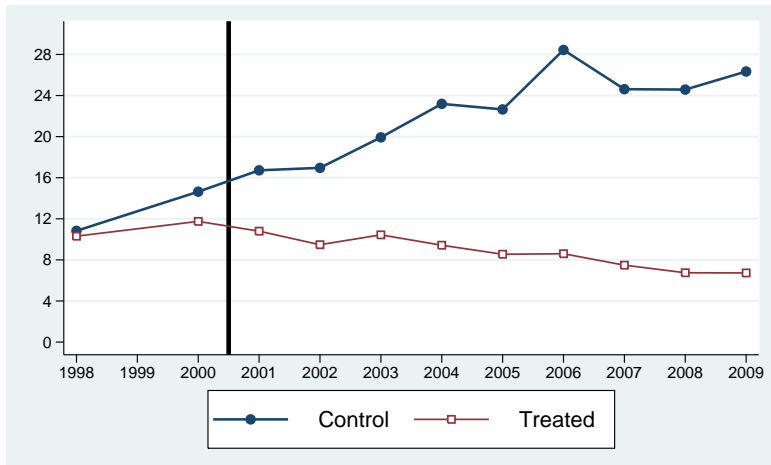
$$INF_{it} = \theta_t + X_{it}\beta + Z_i\gamma + \psi Post_t + \mu Treat_i + \alpha(Treat_i \times Post_t) + c_i + \epsilon_{it}$$

	Informal Employee	Informal Irregular Activities	Any Informal Employment
Household Characteristics	YES	YES	YES
Individual Characteristics	YES	YES	YES
Year Dummies[♭]	YES	YES	YES
DID Estimates			
$Post$	0.0495	0.0350	-0.0315
	(0.099)	(0.075)	(0.119)
$Treat \times Post$	-0.0250**	-0.0403***	-0.0584***
	(0.010)	(0.010)	(0.014)
Constant	0.2799	0.4481*	0.2996
	(0.306)	(0.232)	(0.365)
Obs	44,452	53,769	47,718
# of Indiv	11,263	12,411	11,969
R^2 Overall	0.04	0.03	0.01

Notes: RLMS, rounds VIII–XVIII (1998–2009). [♭]Nine year dummies were included but not reported. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Some Robustness Checks

	Informal Employee	Informal Irreg Activ	Any Informal Employment	All Irregular Activ	Informal Irreg Activ as Main Job
Baseline	-0.0250**	-0.0403***	-0.0584***	-0.0421***	-0.0343***
	(0.010)	(0.010)	(0.014)	(0.010)	(0.009)
Including interactions $District \times Year$	-0.0246**	-0.0337***	-0.0467***	-0.0373***	-0.0295***
	(0.011)	(0.010)	(0.015)	(0.011)	(0.009)
Control group excludes unreported income	-0.0256**	-0.0408***	-0.0588***	-0.0427***	-0.0350***
	(0.010)	(0.010)	(0.014)	(0.011)	(0.009)
Treatment defined using income from all sources	-0.0363**	-0.0219**	-0.0708***	-0.0339**	-0.0219**
	(0.014)	(0.011)	(0.019)	(0.013)	(0.011)
Treatment defined using 2001 labor income only†	-0.0183	-0.0455***	-0.0637***	-0.0514***	-0.0365***
	(0.012)	(0.014)	(0.019)	(0.015)	(0.010)
Treatment defined using 2001–4 labor income†	-0.0223**	-0.0421***	-0.0517***	-0.0429***	-0.0346***
	(0.011)	(0.010)	(0.015)	(0.011)	(0.009)
$Treat \times Trend^{\flat}$	-0.0063**	-0.0148***	-0.0187***	-0.0159***	-0.0137***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
$Placebo\ Reform^{\sharp}$	-0.0008	0.0128	0.0251	0.0055	-0.0074
	(0.012)	(0.015)	(0.019)	(0.016)	(0.010)

Notes: RLMS, rounds VIII–XVIII (1998–2009). $^{\flat}$ Includes a post-reform time trend ($2000 = 1$) instead of the post-reform dummy. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

ATT Semi-parametric Estimation

$$\hat{M_{DID}} = \sum_{i \in T} \frac{1}{N_{T,t}} [(INF_{i,t} - INF_{i,2000}) - \sum_{j \in C} W(i,j)(INF_{j,t} - INF_{j,2000})]$$
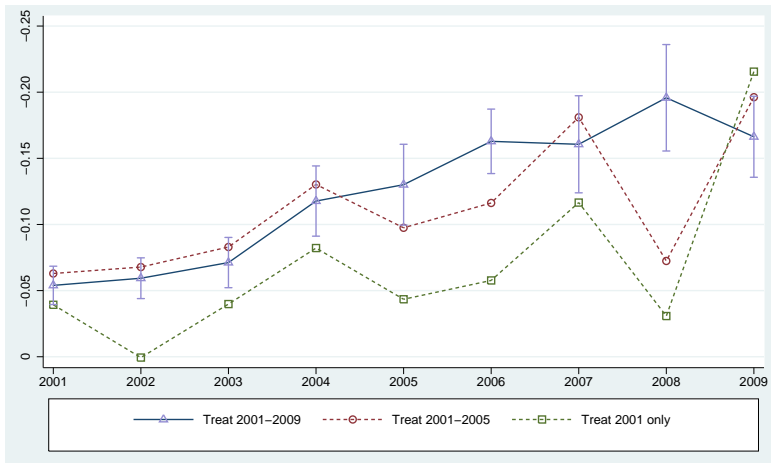
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Figure: Informal Irregular Activities
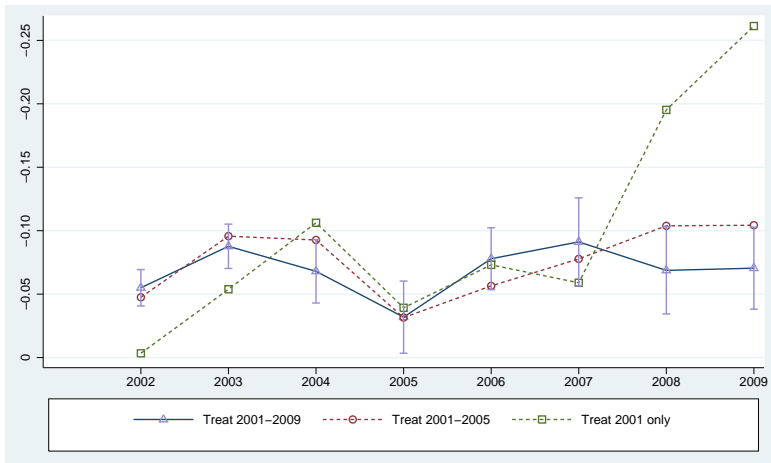
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Figure: Informal Employees

Detailed Treatment Groups

$$INF_{it} = \theta_t + X_{it}\beta + Z_i\gamma + \psi Post_t + \sum_{h=1}^{4} \mu_h Treat_i^h + \sum_{h=1}^{4} \alpha_h(Treat_i^h \times Post_t) + u_{it}$$

	Informal Employee	Informal Irregular Activities	Any Informal Employment
$Post$	0.0494	0.0358	-0.0298
	(0.099)	(0.075)	(0.120)
$Treat^1 \times Post$	-0.0172	-0.0209*	-0.0310*
	(0.012)	(0.012)	(0.017)
$Treat^2 \times Post$	-0.0235*	-0.0601***	-0.0768***
	(0.013)	(0.013)	(0.018)
$Treat^3 \times Post$	-0.0267**	-0.0501***	-0.0793***
	(0.011)	(0.012)	(0.016)
$Treat^4 \times Post$	-0.0388***	-0.0276*	-0.0390*
	(0.014)	(0.015)	(0.020)
Obs	44,452	53,769	47,718
# of Indiv	11,263	12,411	11,969
R^2 Overall	0.04	0.03	0.01

Notes: RLMS, rounds VIII–XVIII (1998–2009). ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Weighted DID

$$M = \sum_{i=1}^{n} \omega_i \left[INF_{it} - \theta_t - X_{it}\beta - \psi Post_t - \alpha(Treat_i \times Post_t) - u_{it}\right]^2$$

$$\omega_i = K\left(\frac{Y_{it} - 3625}{h}\right) / \sum_{i=1}^{n} K\left(\frac{Y_{it} - 3625}{h}\right)$$

	Informal Employee	Informal Irregular Activities	Any Informal Employment
$Post$	-0.0658	0.0245	-0.1852
	(0.121)	(0.063)	(0.141)
$Treat \times Post$	-0.0178	-0.0329*	-0.0546**
	(0.019)	(0.019)	(0.027)
Obs	41,930	50,914	45,134
R^2 Overall	0.005	0.03	0.001
# of Indiv	10,180	11,220	10,856

Notes: RLMS, rounds VIII–XVIII (1998–2009). Treatment effect estimated by a weighted fixed effects regression. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Extensive Margin

	Informal Employee	Informal Irreg Activ	Any Informal Employment
A. Baseline			
$Post$	0.2740***	0.4429***	0.5704***
	(0.093)	(0.058)	(0.114)
$Treat \times Post$	-0.0146	-0.1433***	-0.1355***
	(0.025)	(0.023)	(0.027)
Obs	21,224	24,924	22,899
# of Indiv	7,339	8,080	7,709
R^2 Overall	0.027	0.016	0.054
B. Robustness Tests			
Including interactions $District \times Year$	-0.0111	-0.1467***	-0.1357***
	(0.025)	(0.023)	(0.028)
Treatment defined using income from all sources	-0.0314	-0.0948***	-0.1242***
	(0.029)	(0.026)	(0.031)
Control group excludes unreported income	-0.0121	-0.1387***	-0.1310***
	(0.025)	(0.023)	(0.027)
$Treat \times Trend^{\flat}$	-0.0007	-0.0212***	-0.0197***
	(0.004)	(0.004)	(0.005)

Notes: RLMS, rounds VIII–XVIII (1998–2009). Sample restricted to those unemployed just before the reform and who were employed at least once in the post-reform period. The dependent variable is set to zero in round 9. Round 8 is excluded. $^{\flat}$ Includes a post-reform time trend $(2000 = 1)$ instead of the post-reform dummy. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Summary of Findings

- There is evidence that the tax reform reduced participation in informal employment

- The effect was significant economically and statistically for informal employees (-2.5%) and for irregular activities (-4.0%).

- Semi-parametric DID estimates are higher. The reform had permanent effects.

- No evidence of an effect on informal entrepreneurs or on the second job

- Robust to different specifications. Stronger effect on higher income brackets

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- No extensive margin effect for informal employees
- These findings are consistent with recent literature on the economics of taxation: high behavioral elasticity but low labor supply elasticity
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Summary of Findings

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Background Characteristics

	All Employed	Informal Employee	Informal Entrepr.	Informal Sec. Job	Informal Irreg. Activ
Female	0.54	0.49	0.42	0.56	0.45
Age	39.5	36.4	40.1	38.9	38.6
College Degree	0.27	0.12	0.23	0.28	0.15
Schooling (Yrs)	12.3	11.5	12.1	12.5	11.4
Work Experience	14.3	9.2	14.4	14.8	11.3
Married	0.51	0.42	0.66	0.48	0.42
Urban Location	0.77	0.76	0.80	0.88	0.63
Russian National	0.87	0.86	0.77	0.86	0.81
Russian Born	0.91	0.88	0.82	0.87	0.92
Size HH	3.4	3.5	3.6	3.0	3.4
"After Tax" Income					
This Job (rubles)	13,194	11,043	18,661	7,142	7,043
% Reported for Tax	86.6	32.0	62.9	NA	NA
All Jobs (rubles)	13,446	11,132	18,878	17,024	12,470
Obs	7192	815	204	158	583

Job Characteristics

	All Employed	Informal Employee	Informal Entrepr.	Informal Sec. Job
Tenure (Yrs)	7.3	2.8	7.2	2.5$^\natural$
Changed Jobs	0.16	0.35	0.13	NA
Changed Occupation	0.11	0.21	0.06	NA
Has Subordinates	0.20	0.08	0.38	0.10$^\flat$
Firm Characteristics[‡]				
Ent Size (# of Emp)	584.4	61.8	-	76.2
State Owns Share	0.50	0.06	-	0.20
Russian Indiv Owns Share	0.56	0.91	-	0.70
Firm from Soviet times	0.59	0.09	-	0.40
Firm owes money	0.07	0.13	-	0.19$^\natural$
Firm pays in kind	0.01	0.03	-	0.02$^\natural$
Job Benefits[‡]				
Paid Vacation	0.90	0.17	-	0.19
Paid Sick Leave	0.87	0.11	-	NA
Paid Maternity Leave	0.79	0.07	-	0.17
Paid Health Care	0.24	0.01	-	0.05
Paid Trips to Sanatoria	0.28	0.01	-	0.03
Paid Child Care	0.05	0.01	-	0.01
Obs	7192	815	204	158

Informality in the last 12 months

	All Employed	Informal Employee	Informal Entrepr.	Informal Sec. Job	Inf. Irreg. Activ
Worked extra job	0.09	0.08	0.08	0.96	0.33
Raised cattle for sale	0.04	0.03	0.04	0.03	0.14
Agric. on own plot for sale	0.04	0.02	0.03	0.04	0.14
Performed services for pay	0.08	0.08	0.06	0.11	0.61
Obs	7192	815	204	158	583

Distribution by Occupation

1-digit ISCO Occup	All Employed Main Job	Inf Emp Main Job	Inf Entrep Main Job	Inf Sec Job	Inf Irreg Act
Legislators, Sen Manag, Officials	5.2	1.0	**30.9**	5.8	0.7
Professionals	**17.1**	2.8	3.9	**18.8**	9.3
Technicians, Assoc Prof	**17.4**	10.2	4.9	9.7	6.2
Clerks	5.8	2.2	0.0	1.3	1.9
Service and Market Workers	13.0	**28.0**	**26.5**	14.9	18.9
Skilled Agric-Fishery	0.3	0.1	2.0	0.0	1.5
Craft and Related Trades	13.1	17.3	21.1	**18.8**	**32.6**
Plant-Machine Oper-Assemblers	14.8	15.2	9.8	11.0	8.2
Unskilled Occupations	13.3	**23.1**	1.0	**19.5**	**20.8**
Obs	6659	814	204	154	583

Distribution by Industry

1-digit Industry	All Employed		Inf Emp	Inf Entrep	Inf Sec Job
	Main Job	Sec Job	Main Job	Main Job	
Food and Other Light Industry	6.3	2.6	6.7	4.2	3.5
Civil Machine Construction	3.3	1.1	0.7	0.0	0.7
Military Industrial Complex	1.8	0.4	0.0	1.0	0.0
Oil and Gas Industry	2.8	2.2	0.8	0.0	2.1
Other Heavy Industry	3.1	1.5	0.4	0.0	1.4
Construction	9.5	10.6	**19.1**	**13.0**	**14.0**
Transportation, Communication	9.5	7.3	11.7	9.4	10.5
Agriculture	5.1	2.6	5.8	3.1	2.8
Government and Public Adm	2.3	1.1	0.4	0.0	0.0
Education	**10.5**	**20.5**	0.8	2.1	12.6
Science, Culture	3.2	5.9	1.2	1.6	4.2
Public Health	7.9	9.2	1.6	0.5	2.8
Army, Security Services	5.5	0.7	1.2	1.0	0.0
Trade, Consumer Services	**20.8**	**26.0**	**45.7**	**61.5**	**37.1**
Finances	2.3	1.1	0.9	0.5	1.4
Energy (Power) Industry	1.9	1.5	0.7	0.0	2.8
Housing and Communal Services	4.3	5.9	2.4	2.1	4.2
Obs	6422	273	758	192	143

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Fabián Slonimczyk

ICEF-Higher School of Economics, Moscow

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