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Structural estimation of the impact of the COVID-19 pandemic on the labor market in China

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ABSTRACT

This paper estimates the impact of the COVID-19 pandemic on the labor market in China using a structural model. The model is estimated using data from the Chinese Household Income Project (CHIP) and the China Labor Market Survey (CLMS). The results show that the pandemic has led to a significant increase in the unemployment rate, particularly for young workers and those in the manufacturing sector. The model also estimates the impact of the pandemic on the wage rate, which has decreased for most workers. The results suggest that the pandemic has led to a significant increase in the labor market's slack, which may have long-term implications for the economy.

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1. Introduction

The COVID-19 pandemic has led to a significant increase in the unemployment rate in China, particularly for young workers and those in the manufacturing sector. This paper estimates the impact of the pandemic on the labor market using a structural model. The model is estimated using data from the Chinese Household Income Project (CHIP) and the China Labor Market Survey (CLMS). The results show that the pandemic has led to a significant increase in the unemployment rate, particularly for young workers and those in the manufacturing sector. The model also estimates the impact of the pandemic on the wage rate, which has decreased for most workers. The results suggest that the pandemic has led to a significant increase in the labor market's slack, which may have long-term implications for the economy.

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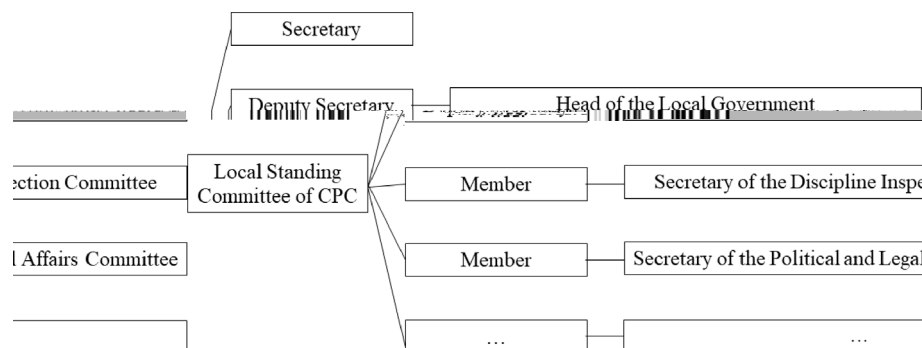


Fig. 1. O a₁ a₂ a₃ a₄ a₅ a₆ a₇ a₈ a₉ a₁₀ a₁₁ a₁₂ a₁₃ a₁₄ a₁₅ a₁₆ a₁₇ a₁₈ a₁₉ a₂₀ a₂₁ a₂₂ a₂₃ a₂₄ a₂₅ a₂₆ a₂₇ a₂₈ a₂₉ a₃₀ a₃₁ a₃₂ a₃₃ a₃₄ a₃₅ a₃₆ a₃₇ a₃₈ a₃₉ a₄₀ a₄₁ a₄₂ a₄₃ a₄₄ a₄₅ a₄₆ a₄₇ a₄₈ a₄₉ a₅₀ a₅₁ a₅₂ a₅₃ a₅₄ a₅₅ a₅₆ a₅₇ a₅₈ a₅₉ a₆₀ a₆₁ a₆₂ a₆₃ a₆₄ a₆₅ a₆₆ a₆₇ a₆₈ a₆₉ a₇₀ a₇₁ a₇₂ a₇₃ a₇₄ a₇₅ a₇₆ a₇₇ a₇₈ a₇₉ a₈₀ a₈₁ a₈₂ a₈₃ a₈₄ a₈₅ a₈₆ a₈₇ a₈₈ a₈₉ a₉₀ a₉₁ a₉₂ a₉₃ a₉₄ a₉₅ a₉₆ a₉₇ a₉₈ a₉₉ a₁₀₀ a₁₀₁ a₁₀₂ a₁₀₃ a₁₀₄ a₁₀₅ a₁₀₆ a₁₀₇ a₁₀₈ a₁₀₉ a₁₁₀ a₁₁₁ a₁₁₂ a₁₁₃ a₁₁₄ a₁₁₅ a₁₁₆ a₁₁₇ a₁₁₈ a₁₁₉ a₁₂₀ a₁₂₁ a₁₂₂ a₁₂₃ a₁₂₄ a₁₂₅ a₁₂₆ a₁₂₇ a₁₂₈ a₁₂₉ a₁₃₀ a₁₃₁ a₁₃₂ a₁₃₃ a₁₃₄ a₁₃₅ a₁₃₆ a₁₃₇ a₁₃₈ a₁₃₉ a₁₄₀ a₁₄₁ a₁₄₂ a₁₄₃ a₁₄₄ a₁₄₅ a₁₄₆ a₁₄₇ a₁₄₈ a₁₄₉ a₁₅₀ a₁₅₁ a₁₅₂ a₁₅₃ a₁₅₄ a₁₅₅ a₁₅₆ a₁₅₇ a₁₅₈ a₁₅₉ a₁₆₀ a₁₆₁ a₁₆₂ a₁₆₃ a₁₆₄ a₁₆₅ a₁₆₆ a₁₆₇ a₁₆₈ a₁₆₉ a₁₇₀ a₁₇₁ a₁₇₂ a₁₇₃ a₁₇₄ a₁₇₅ a₁₇₆ a₁₇₇ a₁₇₈ a₁₇₉ a₁₈₀ a₁₈₁ a₁₈₂ a₁₈₃ a₁₈₄ a₁₈₅ a₁₈₆ a₁₈₇ a₁₈₈ a₁₈₉ a₁₉₀ a₁₉₁ a₁₉₂ a₁₉₃ a₁₉₄ a₁₉₅ a₁₉₆ a₁₉₇ a₁₉₈ a₁₉₉ a₂₀₀ a₂₀₁ a₂₀₂ a₂₀₃ a₂₀₄ a₂₀₅ a₂₀₆ a₂₀₇ a₂₀₈ a₂₀₉ a₂₁₀ a₂₁₁ a₂₁₂ a₂₁₃ a₂₁₄ a₂₁₅ a₂₁₆ a₂₁₇ a₂₁₈ a₂₁₉ a₂₂₀ a₂₂₁ a₂₂₂ a₂₂₃ a₂₂₄ a₂₂₅ a₂₂₆ a₂₂₇ a₂₂₈ a₂₂₉ a₂₃₀ a₂₃₁ a₂₃₂ a₂₃₃ a₂₃₄ a₂₃₅ a₂₃₆ a₂₃₇ a₂₃₈ a₂₃₉ a₂₄₀ a₂₄₁ a₂₄₂ a₂₄₃ a₂₄₄ a₂₄₅ a₂₄₆ a₂₄₇ a₂₄₈ a₂₄₉ a₂₅₀ a₂₅₁ a₂₅₂ a₂₅₃ a₂₅₄ a₂₅₅ a₂₅₆ a₂₅₇ a₂₅₈ a₂₅₉ a₂₆₀ a₂₆₁ a₂₆₂ a₂₆₃ a₂₆₄ a₂₆₅ a₂₆₆ a₂₆₇ a₂₆₈ a₂₆₉ a₂₇₀ a₂₇₁ a₂₇₂ a₂₇₃ a₂₇₄ a₂₇₅ a₂₇₆ a₂₇₇ a₂₇₈ a₂₇₉ a₂₈₀ a₂₈₁ a₂₈₂ a₂₈₃ a₂₈₄ a₂₈₅ a₂₈₆ a₂₈₇ a₂₈₈ a₂₈₉ a₂₉₀ a₂₉₁ a₂₉₂ a₂₉₃ a₂₉₄ a₂₉₅ a₂₉₆ a₂₉₇ a₂₉₈ a₂₉₉ a₃₀₀ a₃₀₁ a₃₀₂ a₃₀₃ a₃₀₄ a₃₀₅ a₃₀₆ a₃₀₇ a₃₀₈ a₃₀₉ a₃₁₀ a₃₁₁ a₃₁₂ a₃₁₃ a₃₁₄ a₃₁₅ a₃₁₆ a₃₁₇ a₃₁₈ a₃₁₉ a₃₂₀ a₃₂₁ a₃₂₂ a₃₂₃ a₃₂₄ a₃₂₅ a₃₂₆ a₃₂₇ a₃₂₈ a₃₂₉ a₃₃₀ a₃₃₁ a₃₃₂ a₃₃₃ a₃₃₄ a₃₃₅ a₃₃₆ a₃₃₇ a₃₃₈ a₃₃₉ a₃₄₀ a₃₄₁ a₃₄₂ a₃₄₃ a₃₄₄ a₃₄₅ a₃₄₆ a₃₄₇ a₃₄₈ a₃₄₉ a₃₅₀ a₃₅₁ a₃₅₂ a₃₅₃ a₃₅₄ a₃₅₅ a₃₅₆ a₃₅₇ a₃₅₈ a₃₅₉ a₃₆₀ a₃₆₁ a₃₆₂ a₃₆₃ a₃₆₄ a₃₆₅ a₃₆₆ a₃₆₇ a₃₆₈ a₃₆₉ a₃₇₀ a₃₇₁ a₃₇₂ a₃₇₃ a₃₇₄ a₃₇₅ a₃₇₆ a₃₇₇ a₃₇₈ a₃₇₉ a₃₈₀ a₃₈₁ a₃₈₂ a₃₈₃ a₃₈₄ a₃₈₅ a₃₈₆ a₃₈₇ a₃₈₈ a₃₈₉ a₃₉₀ a₃₉₁ a₃₉₂ a₃₉₃ a₃₉₄ a₃₉₅ a₃₉₆ a₃₉₇ a₃₉₈ a₃₉₉ a₄₀₀ a₄₀₁ a₄₀₂ a₄₀₃ a₄₀₄ a₄₀₅ a₄₀₆ a₄₀₇ a₄₀₈ a₄₀₉ a₄₁₀ a₄₁₁ a₄₁₂ a₄₁₃ a₄₁₄ a₄₁₅ a₄₁₆ a₄₁₇ a₄₁₈ a₄₁₉ a₄₂

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2.3. The trans-regional jurisdiction reform

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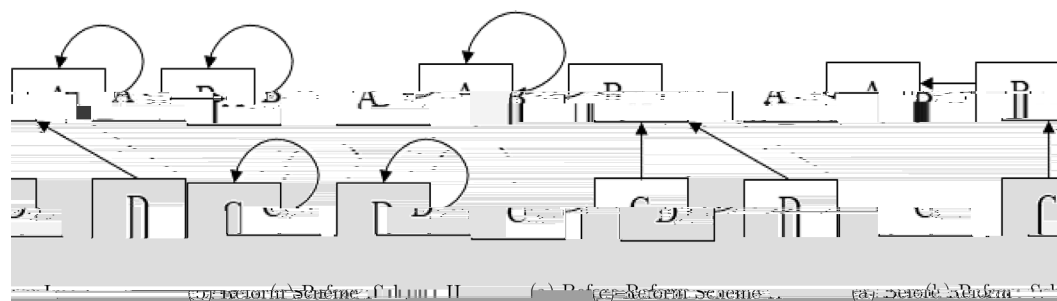


Fig. 2. Ga

[illegible][illegible]

3. Data and sample construction

3.1. Judgment documents in China

[illegible]

¹² S. [tfl](#), P. [tfl](#), I. [tfl](#), J. [tfl](#), L. [tfl](#), P. [tfl](#), C. [tfl](#), SPC, 2014, a.

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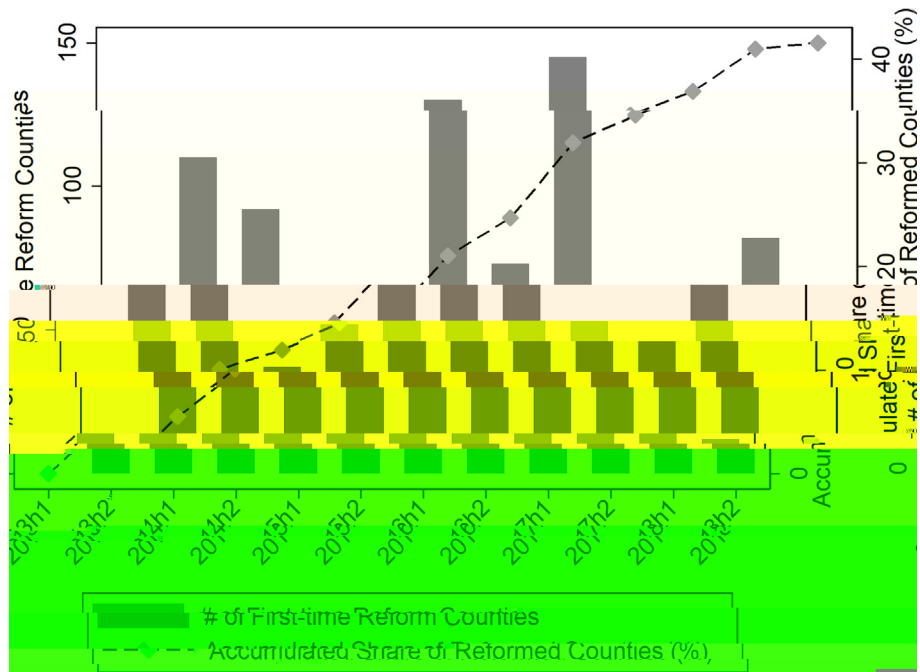


Fig. 3. The number of reform counties and the accumulated share of reform counties. Note: The number of reform counties is shown in the left y-axis, and the accumulated share of reform counties is shown in the right y-axis. The x-axis represents the time period from 2013h1 to 2019h2. The legend indicates that the grey bars represent the number of reform counties, and the dashed line with diamond markers represents the accumulated share of reform counties.

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4.2. Identifying assumption

The DID model is used to identify the causal effect of the reform. The model is defined as follows:
$$Y_{it} = \alpha + \beta TRJ_{it} + \gamma_i + \gamma_t + \epsilon_{it}$$
 where Y_{it} is the outcome variable, TRJ_{it} is the treatment variable, α is the intercept, β is the coefficient of the treatment variable, γ_i is the individual fixed effect, γ_t is the time fixed effect, and ϵ_{it} is the error term.

²³ The DID model is used to identify the causal effect of the reform. The model is defined as follows:
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Pa	A: T	P		P		O	
		Nr	PtL	Nr	PtL	Nr	PtL
D							
G		5,413	12.49	1,804	9.48	7,217	11.57
G		5,807	13.39	3,071	16.13	8,878	14.23
P		8,153	18.81	3,007	15.80	11,160	17.89
H		354	0.82	104	0.55	458	0.73
la		6,543	15.09	3,162	16.61	9,705	15.55
Ma		2,554	5.89	1,260	6.62	3,814	6.11
M		6,648	15.33	3,194	16.78	9,842	15.77
Ta		1,042	2.40	450	2.36	1,492	2.39
Mr		3,398	7.84	1,599	8.40	4,997	8.01
Ql		3,443	7.94	1,386	7.28	4,829	7.74
Total		43,355	100.00	19,037	100.00	62,392	100.00
Pa							
I		36,538	84.28	15,676	82.34	52,214	83.69
E		6,260	14.44	3,168	16.64	9,428	15.11
Mr		120	0.28	24	0.13	144	0.23
Ql		437	1.01	169	0.89	606	0.97
Total		43,355	100.00	19,037	100.00	62,392	100.00
Pa	B: Ql	M	S.D.	M	M	M	O
Or							
G		0.41	0.49	0.00	0.00	1.00	62,392
G		0.32	0.47	0.00	0.00	1.00	62,392
J		0.11	0.32	0.00	0.00	1.00	62,392
T		4.56	0.55	4.52	3.04	6.78	62,392
D		0.52	0.26	0.51	0.08	1.00	5,740
G		1.49	1.01	1.39	0.00	6.10	9,460
T							
P		0.31	0.46	0.00	0.00	1.00	62,392
P		0.02	0.13	0.00	0.00	1.00	62,392
C		0.25	0.44	0.00	0.00	1.00	62,392
C							
D		8.34	0.47	8.34	6.46	9.89	62,392
L		2.18	1.11	2.13	0.00	4.16	62,392
P		1.63	1.01	1.49	0.00	5.45	62,392
A		4.86	1.68	5.11	0.09	8.48	62,392
A		9.51	6.12	8.07	0.85	33.78	62,392
D		3.57	0.70	3.67	0.00	5.98	62,392
C		0.22	0.42	0.00	0.00	1.00	62,392
D		0.33	0.47	0.00	0.00	1.00	62,392
S		0.09	0.29	0.00	0.00	1.00	2,248
P		0.88	0.33	1.00	0.00	1.00	2,248
GDP		10.44	0.57	10.38	8.95	12.10	2,248

[illegible]

$$Y_{ict} = \beta \text{PostReform}_{ct} + \psi \text{Treat}_c \cdot \tau_t + \mathbf{S}_c \times \gamma_t + \mathbf{Controls}_i + \alpha_c + \gamma_t + \varepsilon_{ict}. \quad (2)$$

$$Y_{ict} = \sum_{k=-6}^{18} \beta_k \cdot D_{ick} + \psi \text{Treat}_c \cdot \tau_t + \mathbf{S}_c \times \gamma_t + \mathbf{Controls}_i + \alpha_c + \gamma_t + \varepsilon_{ict}, \quad (3)$$

Table 3

Dữ liệu		(1)	(2)	(3)	(4)	(5)	(6)
P	tiLR	0.035** (0.017)	0.042** (0.020)	0.039** (0.020)	0.039* (0.023)	0.041** (0.020)	0.043** (0.021)
C	tiLR	✓ ES	✓ ES	✓ ES	✓ ES	✓ ES	✓ ES
C	a	✓ ES	✓ ES	✓ ES	✓ ES	✓ ES	✓ ES
G	tiLR	✓ ES	✓ ES	✓ ES	✓ ES	✓ ES	✓ ES
T	tiLR		✓ ES	✓ ES	✓ ES	✓ ES	✓ ES
C	tiLR			✓ ES	✓ ES	✓ ES	✓ ES
O	tiLR				✓ ES	✓ ES	✓ ES
P	tiLR					✓ ES	
A	tiLR	0.252	0.252	0.252	0.252	0.273	0.260
Nr		2,000	2,000	2,000	285	824	1,342
Nr		62,392	62,392	62,392	62,392	27,365	52,698

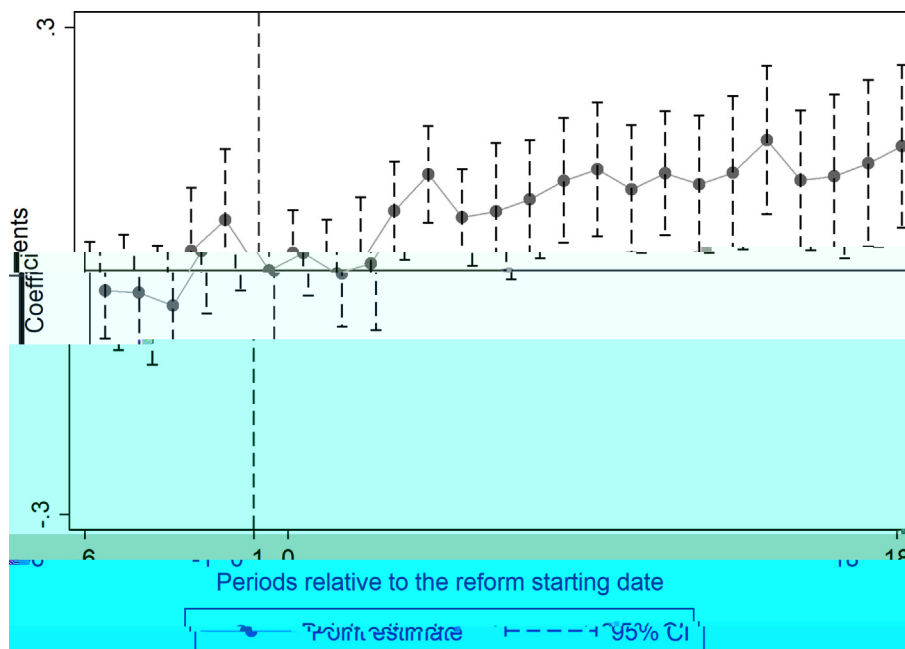
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Fig. 4. D. a t l t l T R J R . Note: T t l a t l a t l t l t l t l E (3), t l a t l a 1 a t l
3 a a t l t l T x a t l t l t l t l a t l t l a a a t l t l a 60 a k = -1 t l a t l a t l t l t l t l \beta_1 \equiv 0.

The following table shows the results of the regression analysis for the dependent variable $\ln Y$ (the natural logarithm of the dependent variable) and the independent variables $X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{12}, X_{13}, X_{14}, X_{15}, X_{16}, X_{17}, X_{18}, X_{19}, X_{20}, X_{21}, X_{22}, X_{23}, X_{24}, X_{25}, X_{26}, X_{27}, X_{28}, X_{29}, X_{30}, X_{31}, X_{32}, X_{33}, X_{34}, X_{35}, X_{36}, X_{37}, X_{38}, X_{39}, X_{40}, X_{41}, X_{42}, X_{43}, X_{44}, X_{45}, X_{46}, X_{47}, X_{48}, X_{49}, X_{50}, X_{51}, X_{52}, X_{53}, X_{54}, X_{55}, X_{56}, X_{57}, X_{58}, X_{59}, X_{60}, X_{61}, X_{62}, X_{63}, X_{64}, X_{65}, X_{66}, X_{67}, X_{68}, X_{69}, X_{70}, X_{71}, X_{72}, X_{73}, X_{74}, X_{75}, X_{76}, X_{77}, X_{78}, X_{79}, X_{80}, X_{81}, X_{82}, X_{83}, X_{84}, X_{85}, X_{86}, X_{87}, X_{88}, X_{89}, X_{90}, X_{91}, X_{92}, X_{93}, X_{94}, X_{95}, X_{96}, X_{97}, X_{98}, X_{99}, X_{100}$.

Table 5

Table 5

D. Variables	D. Variables	G. Variables	G. Variables
(1)	(2)	(3)	(4)
P tLR	-0.034 (0.022)	0.059* (0.033)	0.040* (0.022)
D. Variables			
P tLR			
C tLR			
G tLR			
T tLR			
C tLR			
H tLR			
M tLR			
A tLR			
Nr tLR			
Nr tLR			

Note: The variables are defined as follows: P tLR is the probability of a tax return being audited; D. Variables are the dummy variables for the different types of tax returns; C tLR is the control variable; G tLR is the group variable; T tLR is the time variable; C tLR is the control variable; H tLR is the household variable; M tLR is the marital status variable; A tLR is the age variable; Nr tLR is the number of returns variable. The variables are defined as follows: P tLR is the probability of a tax return being audited; D. Variables are the dummy variables for the different types of tax returns; C tLR is the control variable; G tLR is the group variable; T tLR is the time variable; C tLR is the control variable; H tLR is the household variable; M tLR is the marital status variable; A tLR is the age variable; Nr tLR is the number of returns variable.

Table 6

Table 6

D. Variables	G. Variables	G. Variables
(1)	(2)	(3)
P tLR		
G tLR		
G tLR		
P tLR		
H tLR		
Ia tLR		
Ma tLR		
M tLR		
Ta tLR		
Mr tLR		
Q tLR		
P tLR		
E tLR		
Mr tLR		
Q tLR		
C tLR		
G tLR		
T tLR		
C tLR		
G tLR		
A tLR		
Nr tLR		
Nr tLR		

Note: The variables are defined as follows: P tLR is the probability of a tax return being audited; D. Variables are the dummy variables for the different types of tax returns; C tLR is the control variable; G tLR is the group variable; T tLR is the time variable; C tLR is the control variable; H tLR is the household variable; M tLR is the marital status variable; A tLR is the age variable; Nr tLR is the number of returns variable.

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6.2. Effects on other judicial outcomes

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6.3. The reform's broader influences

(Cui et al., 2018a; Cui et al., 2018).³⁷

GWR 270 2011 2018. F 118

W 38

A U C 1 8

GWR 0.7%

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³⁷ GWR a a a ti ti tla tl a a a ti atl a
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38 *T* (Yifa), *a* (Xianfa), *(Falv)*, *(Fazhi)*, *(Zhifa)*.

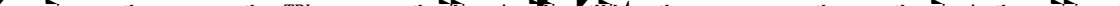
Table 8

D. Variables	Rule-of-law	tLR	tLR	tLR	GWR	Panel A			
						Judicial reform	Administrative litigation	Criminal litigation	Civil litigation
		(1)				(2)	(3)	(4)	(5)
Panel A									
P tLR		0.646***				0.183***	0.055*	0.017	0.043
		(0.222)				(0.062)	(0.030)	(0.027)	(0.035)
A tLR R ²		0.420				0.894	0.941	0.919	0.954
Panel B									
Spr		0.679***				0.190***	0.057*	0.013	0.030
		(0.242)				(0.066)	(0.033)	(0.031)	(0.038)
A tLR R ²		0.420				0.894	0.941	0.919	0.954
P tLR		ES				ES	ES	ES	ES
T a tLR		ES				ES	ES	ES	ES
T a tLR		ES				ES	ES	ES	ES
P tLR		ES				ES	ES	ES	ES
M a D		4.069				1.573	1.764	0.883	2.069
Nr		270				281	281	281	281
Nr		2,085				2,248	2,248	2,248	2,248

Note: The variables are defined as follows: TRJ = Trial Judgment Ratio; GWR = Government Work Report; C = Court; 2011 = 2011; 2018 = 2018; I = Index; 5 = 5; Baidu = Baidu; judicial reform, administrative litigation, criminal litigation, civil litigation; PostReform_{pt} = Post-Reform; GDP = Gross Domestic Product; 1% = 1%; 5% = 5%; 10% = 10%.

Table 9

D	Cit	L
T	(2010-2018)	(2010-2018)
	(1)	(2)
P tLR	-0.085** (0.033)	0.060** (0.026)
I _j	ES	
Sr _i	ES	
I _j	ES	
C _i		ES
f _i		ES
T _i		ES
C _i		ES
M _a	2.481	6.268
A _i	0.237	0.808
N _t	100	1,904
N _t	75,690	16,908

Note: 

2020, 3). Ta

7. Conclusion

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tl, a, I, tl, a, ra, a
C'a, tl, a, a, tlatl, atl, tl

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[illegible]

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