Technology, Taxation and Corruption

Evidence from the Introduction of Electronic Tax Filing

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December 19, 2019
PSE Annual Conferences on Global Issues
DIGITAL TRANSFORMATIONS

Motivation

- Technology is transforming the way governments deliver services and interact with citizens
- Many countries are moving towards using more technology in tax administration :
  - Electronic tax filing (E-filing) : Growing usage but limited evidence
- Idea : improve service delivery and efficiency and combat corruption by reducing discretion of tax officials

This Paper

- **Question :** *How does the introduction of electronic tax filing (to replace in-person submissions) affect firms' compliance costs, tax payments and unofficial payments ?*
- **Context** : Small and medium (formal) firms in Dushanbe, Tajikistan
- **Design :** Randomized encouragement of e-filing
  - 93% adoption in Treatment vs. 60% in Control

Main Results

- E-filing reduced tax compliance costs (5 hrs ↓ or 15% ↓).
- No average impacts on taxes and bribes
- Opposite patterns by firms' baseline likelihood of tax evasion (measured by a risk profile score)
  - Firms **more** likely to be evading taxes at baseline pay more taxes
  - Firms **less** likely, pay less taxes and reported lower bribe payments
- Conclusion
  - E-filing increased efficiency
  - E-filing changed the distribution of tax payments across firms in a way arguably more equitable

Outline

1. Context, Design, Data
2. Main Empirical Results
3. Mechanisms and Robustness Checks
4. Conclusion

Context : Tajikistan provides an interesting setting

- GDP per capita similar to Senegal
- Firms face high tax compliance costs
  - Monthly tax filing obligations
- Corruption is a major concern
  - 32% of firms expect to give gifts in meetings with tax officials (ES 2013)
- Tax officials have discretionary power
  - They have to "accept" tax receipts
  - They have objectives in term of total tax collected

- Tax e-filing available in 2012, but take-up was low among SMEs
  - Lack of awareness, lack of trust, complex registration, procrastination...

Experiment Design

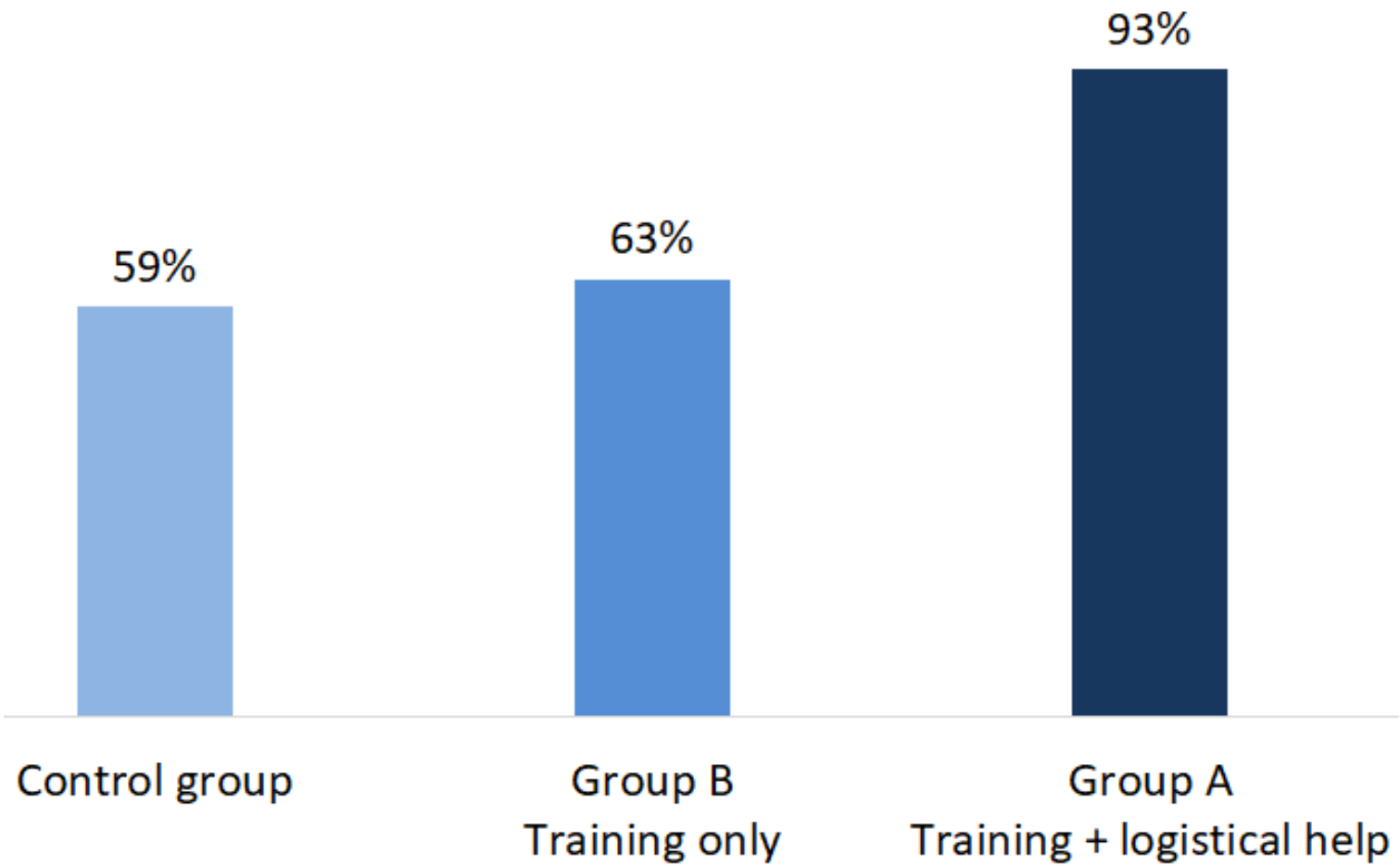
1500 firms randomly assigned to one control and two treatment groups

Group A (600 firms)	Group B (300 firms)	Group C (600 firms)
• General Training on Taxation • Information and Training on E-filing • Logistical Help for Registration	• General Training on Taxation • Information and Training on E-filing	• General Training on Taxation

Data

- Administrative data from Tax Authority
  - Monthly tax data on e-filing use, tax payments etc.
  - **Risk profile score** : our measure of baseline risk of tax evasion
- Baseline Survey Data : short and self-administered
- Endline survey : compliance costs, audits, list experiment
  - 97% completed the survey, 12% liquidated (balanced across groups)
- Randomization achieved balance on baseline characteristics (overall and within high and low-risk groups)

Impact on E-filing adoption



- Treatment A increased significantly adoption (+33pp)

Impact of E-filing

Impact on tax compliance costs

- Firms save 5 hours per month (= 15% of control mean)

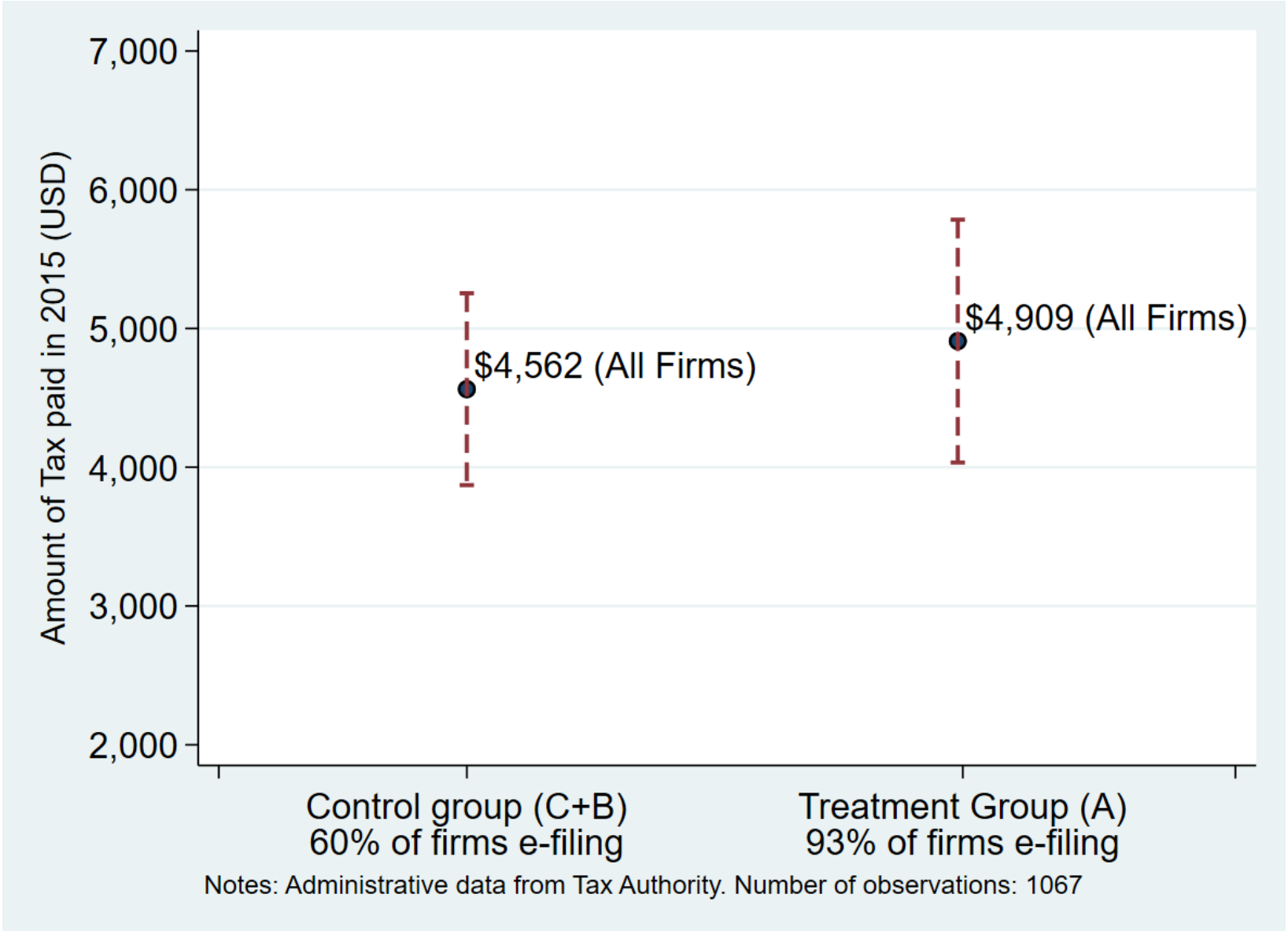
Impact on tax payments

- No significant impact on average
- High-risk firms pay more, low-risk firms pay less

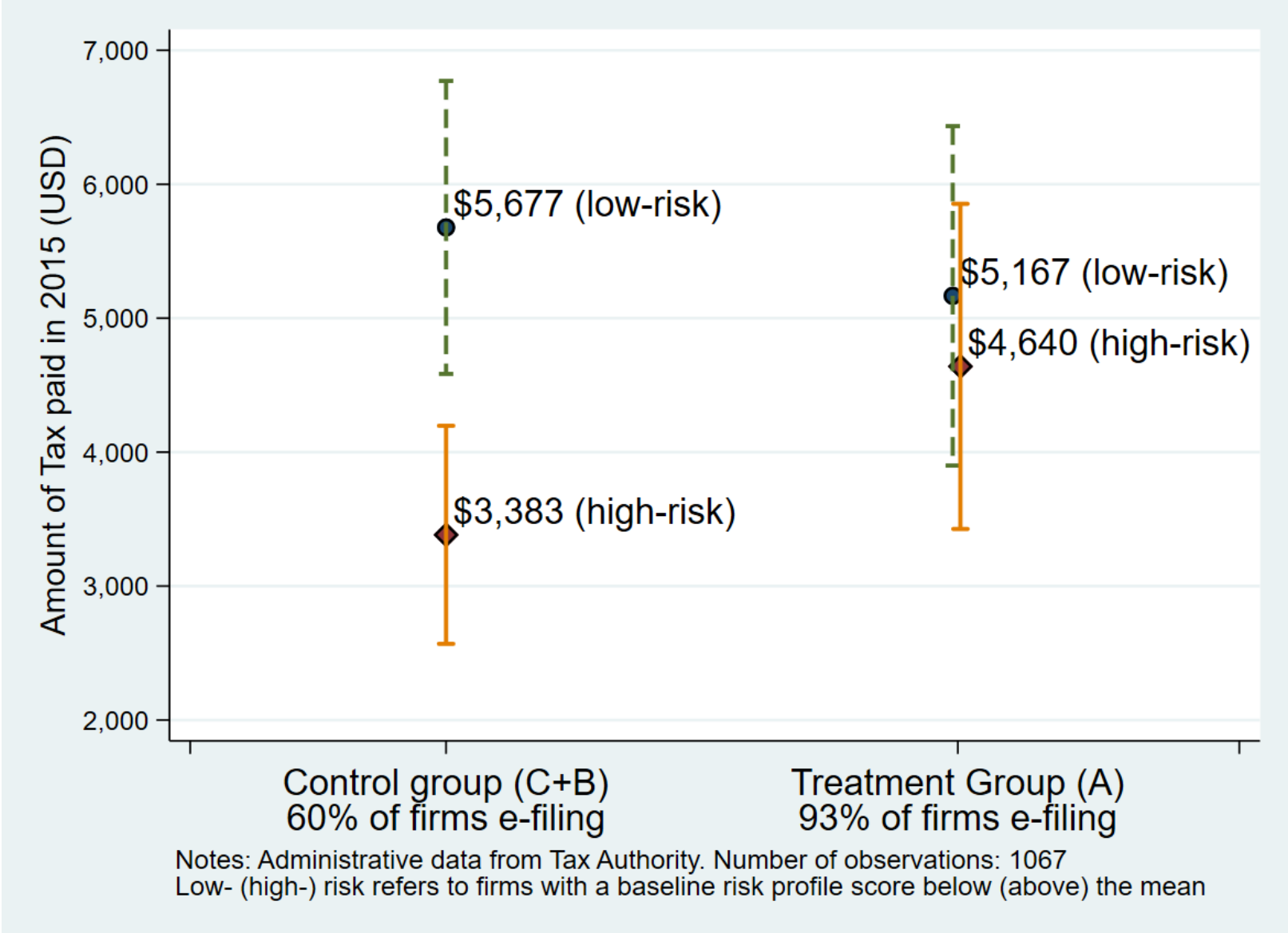
Impact on bribe payment using a list experiment

- No significant impact on average
- 18pp $\downarrow$ for low risk firms. No effect for high-risk firm

Key Result : Small insignificant impact on average tax paid



Key Result : E-filing closes the tax revenue gap between high and low risk firms



Is the Risk Profile Score a good measure of tax evasion ?

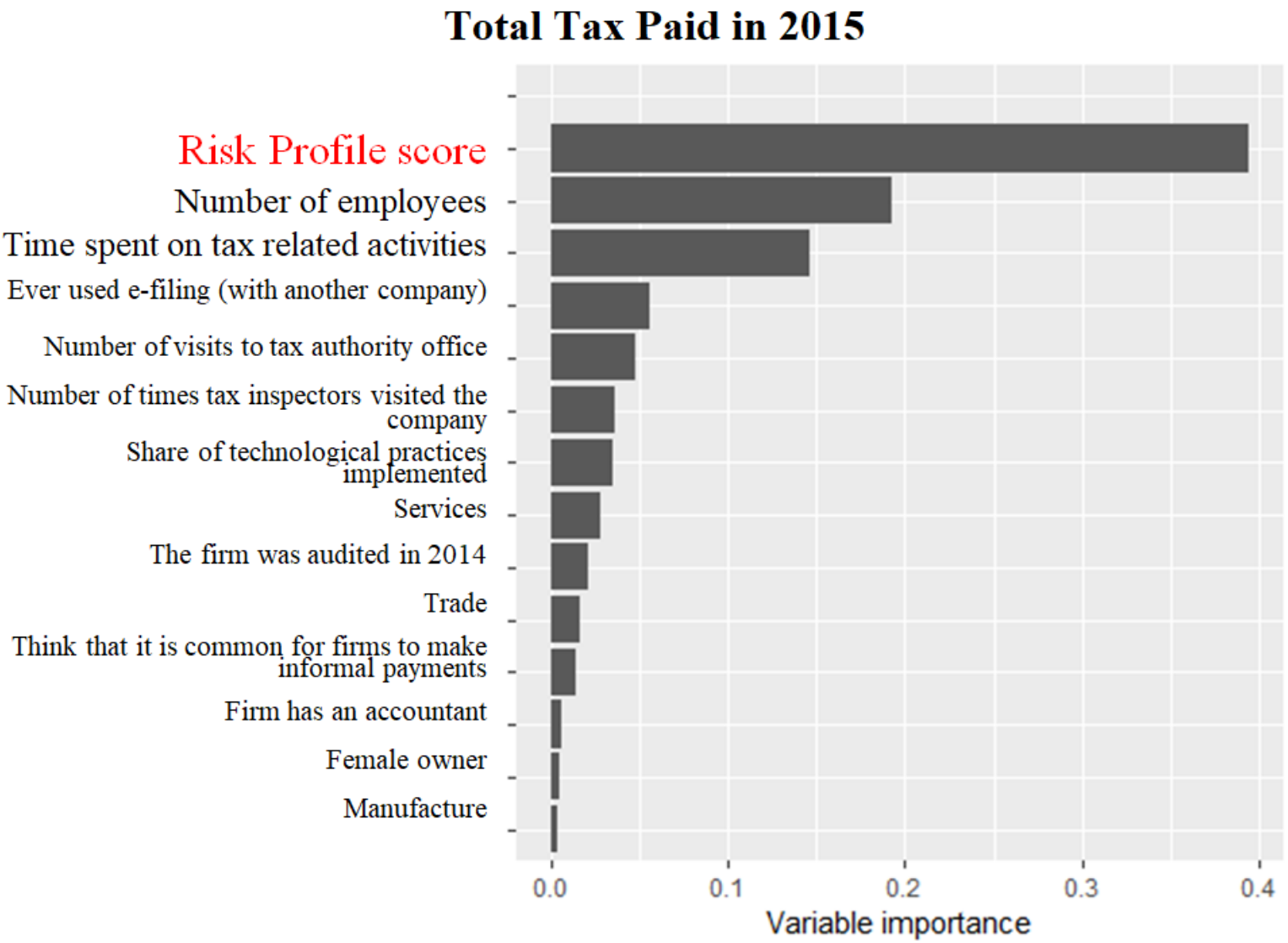
Some evidence that risk score is predictive of tax non-compliance

- Controlling for observables (incl. employees and turnover), high risk firms at baseline (in 2014) paid lower taxes in 2015
- Controlling for observables, high risk firms paid higher penalties in 2015 (conditional on an audit occurring)

Is this result robust ?

- Robust to different outcome definitions and transformations
  - Inverse hyperbolic sine transformation
  - Median of tax paid in 2015
  - Tax paid according to survey data
- Robust to controlling for heterogeneity of impact with observables
- Robust to correction of standard errors for multiple hypothesis testing
- Machine Learning analysis picks the risk score as the "most important" variable to explain program impact heterogeneity

"Variable Importance" using Machine Learning



This graph shows the frequency with which each variable is used as a splitting variable in the generalized random forest following Athey et al. (2018)

What are the mechanisms ?

For **high-risk firms** :

- E-filing reduces collusion between firms and tax officials
  - More time spent on tax preparation and records keeping
- High-risk firm more likely to drop out of e-filing in Treatment group

For **low-risk firms** :

- Evidence that e-filing reduces coercion
  - Tax inspector previously constrained the minimum amount of tax they could pay (on average two more months with zero declaration with e-filing)
  - Reduction of bribe payments (list experiment)
- Cannot say if firms are now evading or were previously paying excess

Conclusion

- Introducing E-filing increased efficiency
  - Private benefits from time saved covered program costs in 7 months
- E-filing changed the distribution of tax payments across firms in a way arguably more equitable
  - Evidence of higher baseline tax evasion among firms paying more
  - Reduction of unofficial payments among firms paying less
- When technology replaces human discretion, impact will depend on how this discretion was exercised

THANK YOU !

Impact on Bribes Using a List Experiment

"***How many of these actions*** *did your company take in 2015 to solve or prevent problems with the Tax Administration.*"

SHORT LIST (50% of sample)	LONG LIST (50% of sample)
1. Received help from trade associations	1. Received help from trade associations
	2. Made unofficial payments or provided free services/goods
2. Had detailed discussions with tax officials	3. Had detailed discussions with tax officials
3. Provided additional documents	4. Provided additional documents
4. Pursued court action	5. Pursued court action

Impact of e-filing (ITT) on share of firms that paid bribes

- Overall impact : -5.5% (0.056)
- Low risk firms : -18.2%** (0.092)
- High risk firms : +4.1% (0.093)

$\rightarrow$ Low risk firms less likely to pay bribes

Conceptual framework

Firms will adopt e-filing if expected benefits outweigh expected costs :

Δ Compl. costs + Δ Unof. payments + Δ Tax payments > Adoption Costs

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$$\underset{\downarrow}{\Delta \text{ Compl. costs}} + \underset{\downarrow}{\Delta \text{ Unof. payments}} + \underset{?}{\Delta \text{ Tax payments}} > \underset{\downarrow}{\text{Adoption Costs}}$$

Conceptual framework

Firms will adopt e-filing if expected benefits outweigh expected costs :

Δ Compl. costs $+$ Δ Unof. payments $+\Delta$ Tax payments $>$ Adoption Costs

$\downarrow$ $\downarrow$? $\downarrow$

	Expected Impact of E-filing on:		
	Compliance Costs	**Unofficial payments**	**Tax payments**
Collusive firms *Proxy: High risk scores*	↘	↘ (collusion)	↗ *Official and taxpayer have less opportunity to collude*
Non-collusive firms *Proxy: Low risk scores*	↘	↘ (coercion)	↘ *Official is less able to require taxpayer to increase tax paid*