

Monitoring Global Supply Chains

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with

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What influences social auditors?

- Companies hire supply chain auditors to learn about working conditions at their suppliers because knowing these facts on the ground is key to managing brand risk.
- But do auditors really find and document all the problems at these factories?

Our research investigates what influences auditors' ability to identify and report dangerous, illegal, and unethical behavior at factories.

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Data

Code-of-conduct audits from one anonymous major social auditor (100s of employees)

16,795 audits of 5,819 factories in 66 countries conducted in 2004 -2009

- ✓ Factory identifier & country
- ✓ Audit date (thus sequence), number of auditors, who paid
- ✓ Auditors' age, training, tenure, gender
- ✓ Labor violations recorded

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Number of code of conduct violations

Coded by the social auditor

- Child labor (8)
- Forced or compulsory labor (5)
- Working hours (7)
- Occupational health & safety (31)
- Minimum wage (15)
- Disciplinary practices (6)
- Treatment of foreign workers and subcontractors (4)
- Subcontracting (3)

We exclude: canteen, dorms, freedom of association

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Number of code of conduct violations

Coded by the social auditor

- Child labor (8)
- Forced or compulsory labor (5)
- Working hours (7)
- Occupational health & safety (31)
 - emergency preparedness (7 items)
 - fire safety items (5)
 - toilets items (8)
 - work floor items (8)
 1. improper chemical storage
 2. improper waste disposal
 3. inadequate lighting
 4. inadequate ventilation
 5. lack of PPE
 6. no chem. safety data sheets
 7. unsafe electrical
 8. unsafe machinery
- Minimum wage (15)
- Disciplinary practices (6)
- Treatment of foreign workers and subcontractors (4)
- Subcontracting (3)

We exclude: canteen, dorms, freedom of association

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Our sample: Audits by industry

Industry	Audits	
	Number	Percent
Garments	6,188	37%
Accessories	1,740	10%
Electronics	590	4%
Toys	463	3%
Furniture	383	2%
Footwear	356	2%
Building materials	260	2%
Paper, printing, publishing	183	1%
Metal products	156	1%
Food, agriculture, beverage	138	1%
Chemicals and plastics	97	1%
Services	50	0%
Other/unknown	6,191	37%
Total	16,795	100

Preliminary results

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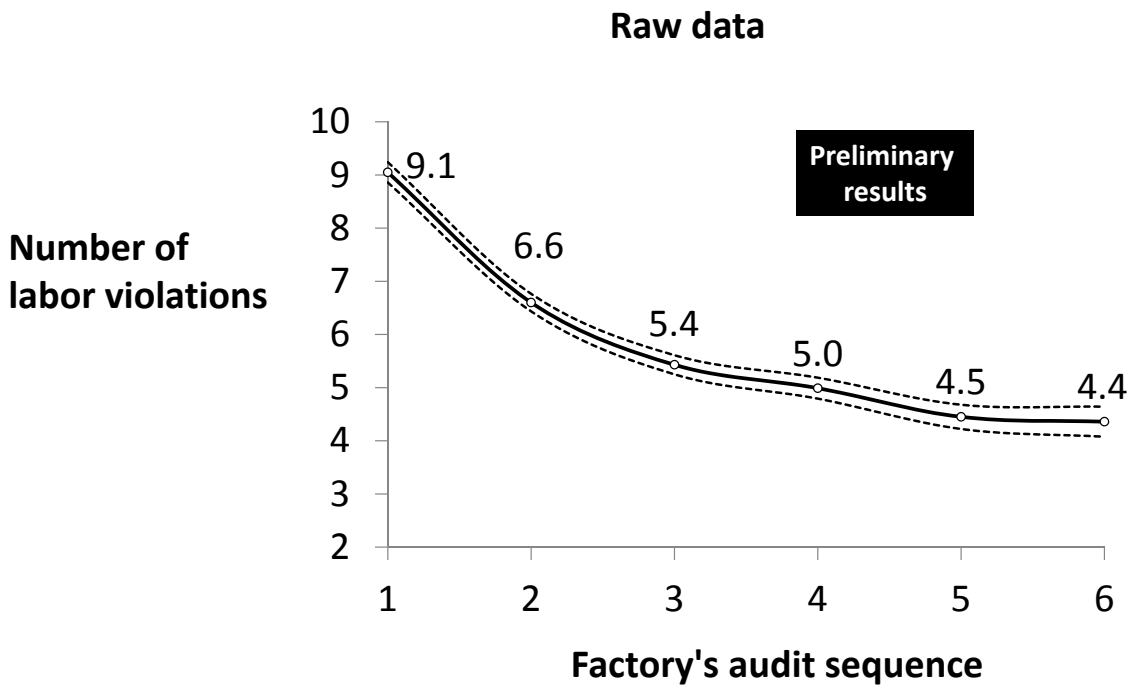
Our sample: Audits by country

	Number of audits	Percent
Africa	100	1%
Americas	1,509	9%
United States	949	
Mexico	172	
Brazil	84	
Elsewhere in Americas	304	
Asia and Australia	14,773	88%
China (incl. Macao and Hong Kong)	11,746	
India	708	
Vietnam	424	
Indonesia	377	
Bangladesh	321	
Philippines	270	
Pakistan	184	
Sri Lanka	159	
Taiwan	131	
Korea	120	
Elsewhere in Asia & Australia	333	
Europe	413	2%
Turkey	186	
Italy	88	
Elsewhere in Europe	139	
Total	16,795	100%

Preliminary results

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Labor violations recorded in audits decline over subsequent audits



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Does who pays matter?

Other studies have shown that economic conflicts-of-interest influence monitors

- Bond issuers pay → Higher bond ratings
- Auditors earn consultancy fees → Lax financial auditing
- Factory pays → Lax environmental inspections

✓ **Finding:** Audits yield fewer violations when the audit company was paid by the factory rather than the brand

Preliminary
results

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The role of ongoing relationships

Will auditors who return to the same factory cite fewer violations?

1. Socialization: sympathetic to company's perspective (go native)
2. Cognitive: bounded rationality vs. fresh eyes
3. Corruption: side payments?

✓ **Finding:** Audits yield fewer violations when conducted by an audit team containing a member of the factory's previous audit team.

Preliminary
results

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The role of auditor experience

Are more experienced auditors are better able to identify violations?

- Individual experience curve:
 - Learn tricks of the trade
 - Identify more violations
- Marginal gains decline over time
 - Only so many tricks
 - Battle fatigue

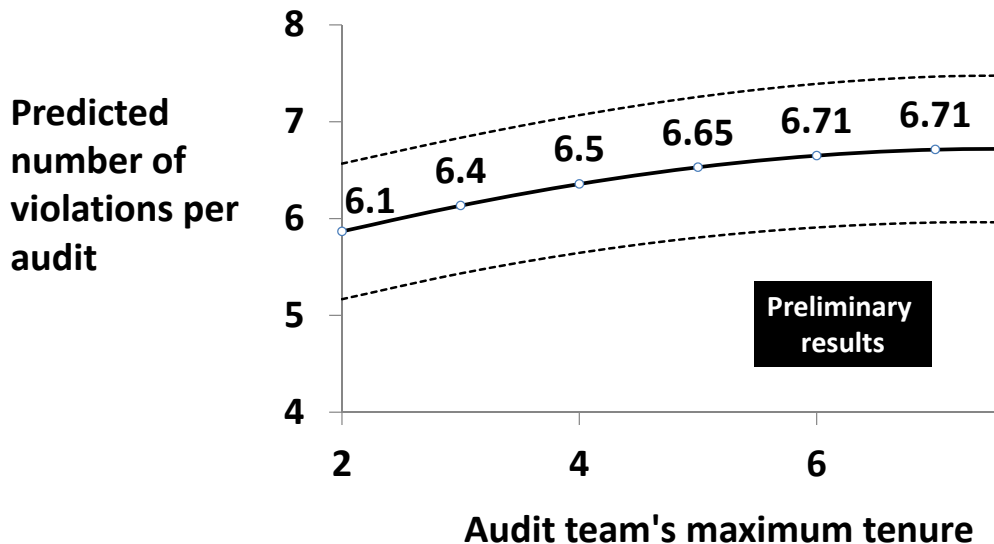
✓ **Finding:** Audits conducted by audit teams containing auditors with more experience yield more violations but at a decreasing rate.

Preliminary
results

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The role of auditor experience

As the audit team's maximum tenure increases, labor violations recorded increase at a decreasing rate.



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The role of professionalization

Will professionalism constrain auditor discretion and deter temptations to succumb to conflicts of interest?

- Education inculcates ethics and norms of the profession
- Professionalism an island of virtue
- Professionalism improves efficacy of government labor inspections

- ✓ **Finding A:** Audits conducted by auditors with more **in-house audit skills** training yield more violations but at a decreasing rate.
- ✗ **Finding B:** Audits conducted by auditors with a **graduate degree** yield no more violations than audits conducted by auditors with less formal education.

Preliminary
results

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The role of auditor gender

Prior literature on female (vs. male) work style & cognitive approach:

- ♀ more persistent at pursuing assigned tasks → diligence
- ♀ more perceptive of emotional content in expressions → detection
- ♀ more likely to be strict rule-followers → recording

Interpersonal dynamics of gender-diverse teams:

- Access more information from team members
- Consider a broader range of issues
- Studies show mix of male and female operating, decision-making and leadership styles led to better performance

Information access:

- ♀ better able to access information from female workers
- ♂ better able to access information from male factory managers

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Gender Findings: The Importance of Women on Audit Teams

- ✓ **All-female teams:** Audits conducted by **all-female teams** yield more violations than those conducted by all-male teams.
- ✓ **Mixed gender teams:** Audits conducted by **mixed gender teams** yield more violations than audits conducted by all-male teams.
- ❖ No difference between all-female teams and mixed-gender teams

In sum: the presence of 1+ female yields more violations

Preliminary
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Summary Stats (1 of 2)

Variable	Mean	SD	Min	Max
Number of violations	6.5	5.6	0	75
Previous auditor	0.15	0.36	0	1
Maximum tenure	5.4	2.0	1	15
Average tenure	4.9	1.9	0.5	15
Graduate education	0.13	0.34	0	1
Auditing skills training	2.3	1.7	0	12
All-male audit team	0.33	0.47	0	1
All-female audit team	0.50	0.50	0	1
Mixed-gender audit team	0.17	0.37	0	1
Certification training	0.50	0.42	0	1
Brand training	0.59	0.43	0	1

N=16,795 audits of 5,819 factories

Preliminary results

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Summary Stats (2 of 2)

Variable	Mean	SD	Min	Max
Average age	30.1	4.5	22.5	59
Maximum age	30.6	4.7	25	59
Third-party protocol	0.04	0.2	0	1
Unannounced audit	0.22	0.4	0	1
Audit paid by supplier or agent	0.56	0.50	0	1
Audit paid by brand	0.44	0.49	0	1
Re-audit	0.36	0.5	0	1
Number of auditors	1.8	0.6	1	5
Audit sequence	3.0	2.25	1	21
Per-capita GDP (log)	7.8	0.98	5.6	10.7
Regulatory quality	-0.04	0.54	-1.64	1.99
Press freedom	0.33	0.27	0.12	1.00

N=16,795 audits of 5,819 factories

Preliminary results

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The analysis (1)

Examines differences between audits of the same factories (within-factory).

- Thus sample has 2+ audits per factory

Auditors are assigned to audit teams based on:

1. Relevant language skills re management and workers
2. Availability
3. 1+ “senior auditor” (sufficient training)

Not based on repeated relationship, maximum tenure, graduate education, training count, gender

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The analysis (2)

We control for many other issues that might influence the number of code-of-conduct violations

- Factory vintage
- Factory industry
- Factory size
- Factory country attributes
- Factory's distance to capital
- Year audit conducted
- Audit paid for by factory or agent (vs. brand)
- Unannounced audit
- Full audit or re-audit
- Number of auditors
- Audit team's average age
- Factory's 1st, 2nd, 3rd... audit
- Buyer's country

Preliminary results

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	Supplier FE Poisson regression	Coef.	Robust SE	AME
H1	Previous auditor	-0.043*	[0.020]	-0.28
H2	Maximum tenure	0.065**	[0.014]	0.12
	Maximum tenure, squared	-0.004**	[0.001]	
H3	Graduate education	0.027	[0.024]	0.18
H3	Auditor skills training	0.021**	[0.007]	0.14
H4	All female audit team (vs. all male)	0.054**	[0.015]	0.35
H5	Mixed gender team (vs. all male)	0.067**	[0.021]	0.43
	Certification training	-0.021	[0.021]	-0.14
	Buyer training	-0.014	[0.021]	-0.09
	Average age	-0.026	[0.019]	-0.04
	Average age, squared	0.000	[0.000]	
	Third-party protocol	-0.080	[0.058]	-0.52
	Unannounced	0.029	[0.020]	0.19
	Audit paid by supplier or agent	-0.084**	[0.026]	-0.55
	Re-audit	-0.348**	[0.016]	-2.26
	Per capita GDP (log)	-0.623*	[0.262]	-4.04
	Regulatory quality	-0.180	[0.150]	-1.17
	Press freedom	0.510*	[0.22]	

N=16,795 audits, Robust SE; ** p < 0.01, * p < 0.05

Preliminary results

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Monitoring Global Supply Chains

Key results

Audits yield more violations when conducted by audit teams...

1. Paid by the brand (vs. factory)
2. New to the factory
3. With more auditing experience
4. With more in-house audit skills training
5. That include at least one female

Preliminary
results

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Study #2: When do audits *improve* working conditions?

When do audits lead to fewer future violations?

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Audits are also an opportunity for knowledge transfer

Supply chain audits are a potential opportunity for auditors to transfer expertise to suppliers, who can then improve working conditions

- This assumes some violations stem from lack of knowledge (rather than willfulness)
- Builds on prior research finding that randomized OSHA inspections lead to fewer injuries, suggesting inspectors' dual role of police and expert

Levine, Toffel, & Johnson, Randomized government safety inspections reduce worker injuries with no detectable job loss, *Science*, 2012

- A factory's prior audit provides the opportunity for knowledge transfer.

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Audits as knowledge transfer

The opportunity for auditors to transfer expertise to suppliers, who can then improve working conditions, is greater when...

There is more knowledge to transfer

- ✓ When the supplier's prior audit team was highly trained

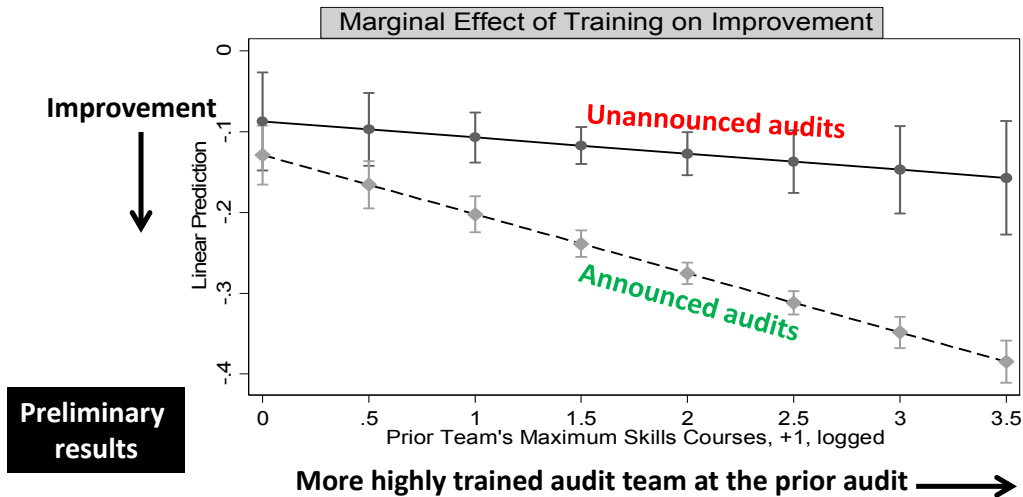
The conditions are more conducive to transfer knowledge

- ✓ When the supplier's prior audit was pre-announced (vs. unannounced)
- ✓ When the supplier's country had more press freedom, which increases the risk of poor results leaking

More nuanced results

More knowledge transfer occurs when knowledgeable auditors operate in conditions conducive for knowledge transfer

- ✓ We find more improvement when the prior audit team had more audit-skill training *especially* when the prior audit was announced.



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Your feedback please

On the two studies presented today:

- Which findings resonate with you?
- Which findings surprise you?

Future research ideas:

- What are the most critical questions about social auditing that we should research?

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For more information...

Social auditing

- Monitoring global supply chains. HBS Working Paper, 2015.
- Could more women auditors help prevent another Rana Plaza? *The Guardian*, 2014
- Auditing to improve compliance. HBS Working Paper, forthcoming
- Codes in context: How states, markets, and civil society shape adherence to global labor standards. *Regulation & Governance*, 2015

OSHA inspections

- Randomized government safety inspections reduce worker injuries with no detectable job loss. *Science*, 2012
- Why safety managers should welcome OSHA inspections: Results from a natural field experiment in California. *The Compass: Newsletter of the American Society of Safety Engineers*, 2014

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