

Off the books, on the hooks?

Employment, wages, and labor tax audits

Nicolas Gavoille ^{1 2} Anna Zasova ²

¹Stockholm School of Economics in Riga

²Baltic International Centre for Economic Policy Studies

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 - Introduces competition distortions
 - Limits public investment and provision of public service
 - Reduces workers' social protections and access to credit

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 - Limits public investment and provision of public service
 - Reduces workers' social protections and access to credit
- Audits: tool to punish/deter evasion (Allingham & Sandmo 1972)

Introduction

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- Two key questions:
 - How do firms respond **after** the audit?
 - How do firms respond **during** the audit?
- Latvian firms' audit + administrative employer/employee data, 2013-2020
 - Covers (almost) the entire population of firms
 - Detailed timing of the audit process
 - Allows for both firm- and employee-level analysis

Related literature - Firms and audits

- Threat-to-audit and firms' response (Pomeranz 2015, Carillo et al. 2017, Almunia and Lopez 2018, Biro et al. 2022, Bergolo et al. 2023)

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- Audits and firms' response (DeBacker 2015, Asatryan and Peichl 2017, Best et al. 2021, Bjorneby et al. 2021, ...)
- Our contribution:
 - Employer + **employee** data
 - **Monthly** frequency
 - Focus on **labor tax** audit (PIT + SSC)

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 - Widespread in Central and Eastern Europe (Meriküll and Staehr 2010, Tonin 2011, Putnins and Sauka 2015, Paulus 2015, Biro et al. 2022, Gavaille and Zasova 2023a, ...) and beyond (Pelek and Uysal 2018 in Turkey, Kumler et al. 2020 in Mexico, Feinmann et al. 2022 in Brazil, ...)

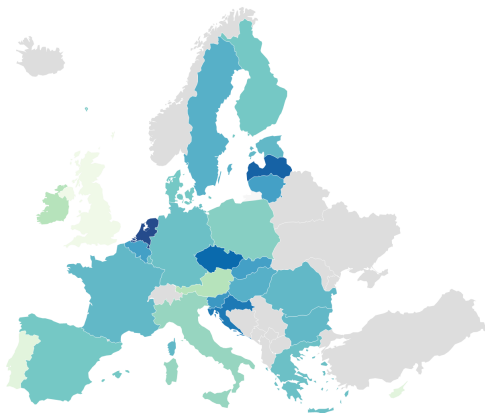
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- Our contribution:
 - Few papers study *where* evasion occurs in the income distribution underreporting (Paulus 2015, Gavaille and Zasova 2023b, Feinmann et al. 2022)
 - Can audit data help for this purpose?

- Envelope wage is a major issue in Latvia
 - Eurobarometer survey (2014): 11% of employed interviewees admitted to receive envelope wages
 - Putnins and Sauka (2015): envelope wages estimate: 34% of total wage in Latvia in 2009
 - Zasova and Jascisens (2019): evidence of a sharp increase in pregnant women's wage during the time period taken into account to calculate parental benefits (7.5%)
 - Gavaille and Zasova (2023a): minimum wage shock as an enforcement tool

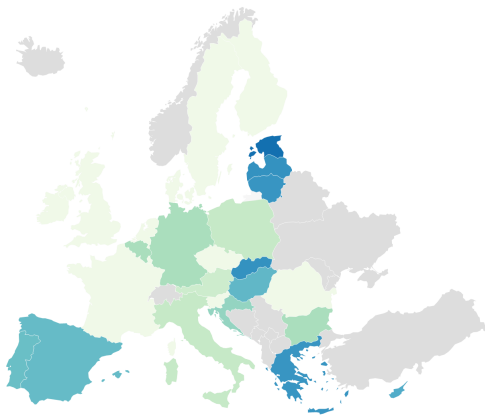
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- Unreported employment is much less widespread (Hazans, 2012, Eurobarometer, 2014)

Share of respondents who are open to receiving undeclared income from employers



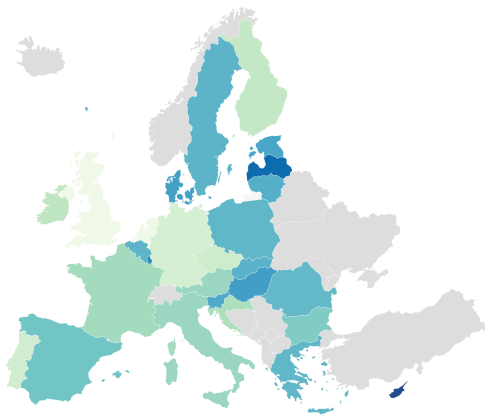
Source: Eurobarometer 2019 • Created with Datawrapper

Share of respondents having >50% of their income unreported (of those who receive unreported income)

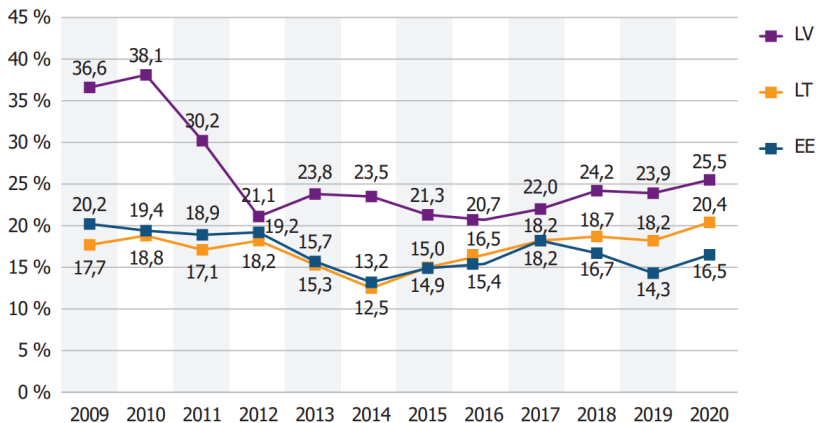


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Share of respondents for whom undeclared income was part of the remuneration for their regular work



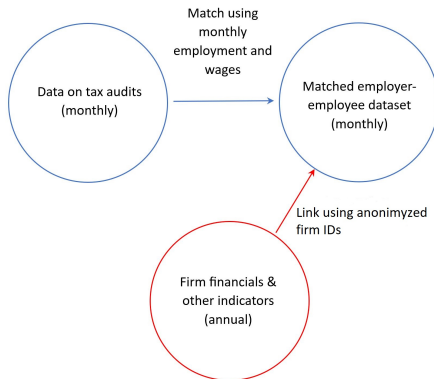
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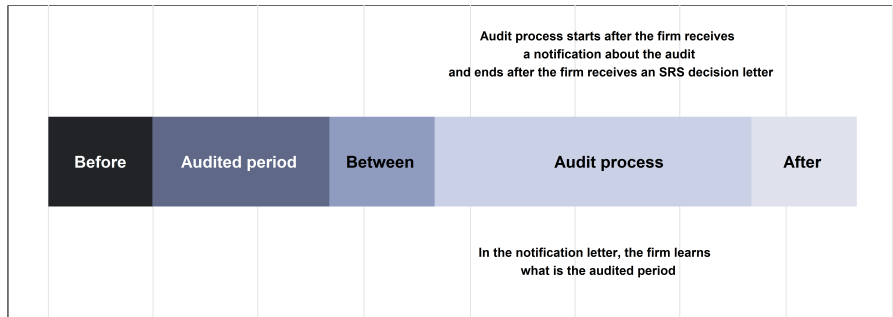
Source: Amis Sauka, Tālis Putniņš (2021). "Shadow Economy Index for the Baltic Countries, 2009-2020"

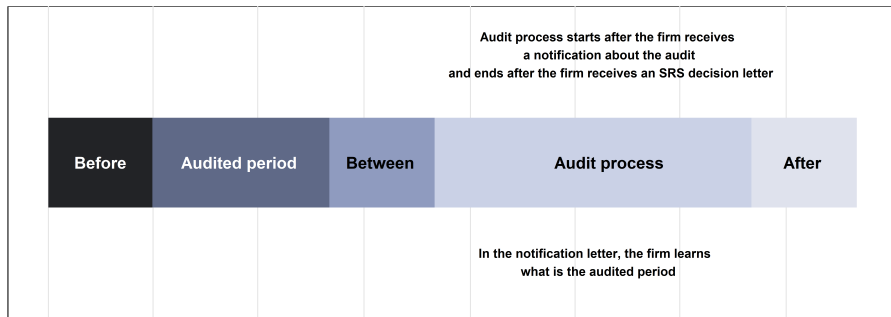
- Data on *all* personal income tax, social security contributions, and VAT audits conducted by the State Revenue Service (SRS) from 2013 to 2020 (around 4,800 audits):
 - Notification date (firm is notified about the audit)
 - Decision date (firm is notified about the results)
 - Audit outcome (additional taxes, penalties or “not guilty”)
 - Audited period;
 - Firm-level average wage and employment at monthly frequency

- Matched employer-employee dataset: monthly info on reported gross wages, paid personal income tax, and social security contributions (from SRS)
- Firms' annual balance sheets and income statements
- Set of general firm characteristics, such as the NACE sector, year of creation, legal form, indicator for foreign ownership



	Observations	# Success	Success rate
Audits - Total	4834	4430	0.916
Only VAT	2861	2584	0.903
Only SSC	0	-	-
Only PIT	1	1	1
PIT+SSC+VAT	1805	1697	0.940
of which PIT/SSC penalty		669	0.370
PIT+SSC	152	133	0.875
PIT+VAT	5	5	1
of which PIT penalty		1	1
SSC+VAT	10	10	1
of which SSC penalty		0	0
Audited firms	4181		
Audited/EE merged firms	3642		
% merged	0.871		





- In SRS data: employees and wage **after** correction!

Empirical approach

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 - Issues with TWFE (de Chaisemartin and d'Haultfoeuille 2020, Goodman-Bacon 2021, Callaway and Sant'Anna 2021)

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 - Some firms audited more than once
 - Audit sequence differs in length

	Audited period	Between	Audit process
Average	13.18	3.31	6.54
Minimum	1	0	2
25th percentile	7	2	5
Median	13	3	5
75th percentile	19	4	7
Maximum	36	20	31

Empirical approach

- To mitigate selection bias: combination of **matching + difference-in-differences approach**
 - First: match audited firms with controls (based on info at $t - 1$)
 - Second: difference-in-differences regression at the **firm level**
 - Third: **employee-level** analysis

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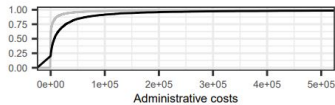
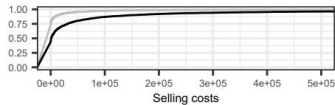
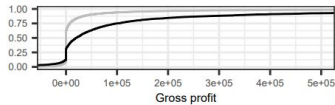
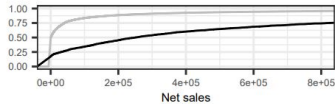
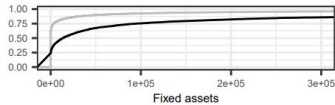
Matching

- Two alternative matching approach:
 - NN5 propensity score matching (baseline)
 - Coarsened exact matching
- Set of matching variables: firm age, NACE sector, foreign ownership status, a range of financial variables such as fixed assets, revenue, profits, selling costs, administrative costs, corporate income tax paid, cash, liabilities
 - Matching based on data from the year *preceding* the audit
 - Matching occurs only within a specific year
- Drop firms audited twice
- Final sample: 2,633 audited firms and 13,165 control firms

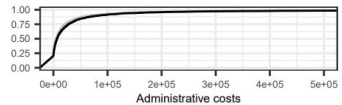
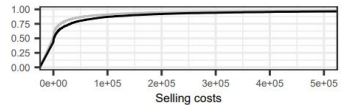
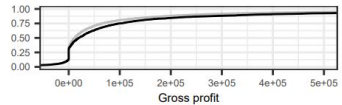
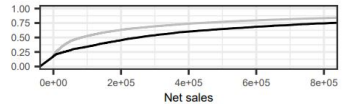
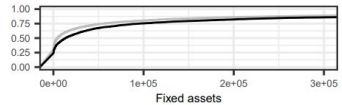
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- Resulting sample: 2,633 audited firms and 13,165 control firms

All



Matched

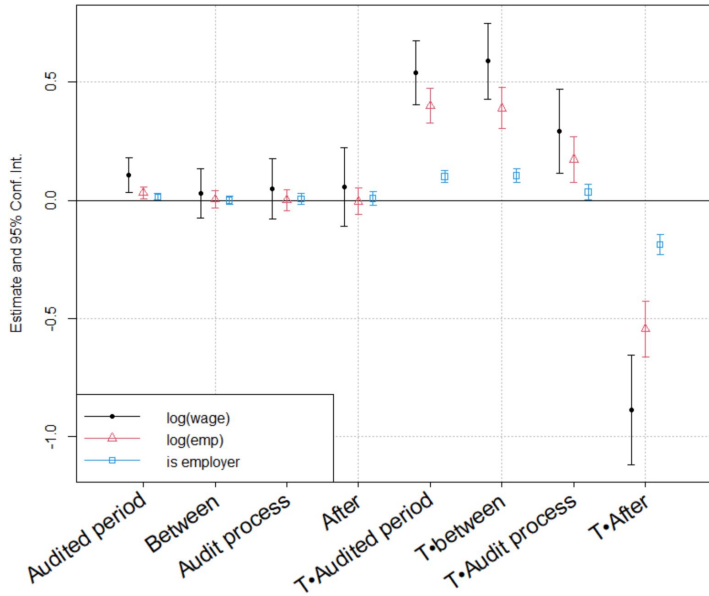


Firm level analysis

- Baseline specification:

$$Y_{ijt} = \alpha_1 \text{AuditPeriod}_t + \alpha_2 \text{Between}_t + \alpha_3 \text{AuditProcess}_t + \alpha_4 \text{After}_t + \\ \alpha_5 \text{Treated}_i \cdot \text{AuditPeriod}_t + \alpha_6 \text{Treated}_i \cdot \text{Between}_t + \\ \alpha_7 \text{Treated}_i \cdot \text{AuditProcess}_t + \alpha_8 \text{Treated}_i \cdot \text{After}_t + \gamma_i + \xi_t + \epsilon_{it}$$

- Outcome variables Y_{it} :
 - (log of) number of employees
 - (log of) the average wage
 - Is employer: dummy =1 if the firm has >0 employees
- Treated firms - firms that underwent a labor tax audit and were charged with misreporting
- Baseline sample: “Before” = 6 months preceding the audit, “After” = 12 months following conclusion of an audit
- Final sample: 505 audited firms and 2,525 matched controls



Firm level analysis

- Conclusion: # reported employees and average wage are **adjusted upward** during the audited period
 - Previously undeclared workers "appear" in the data
- This adjustment persists till the end of the audit process
- After the conclusion of the audit: # reported employees and average wage **decrease**
 - Similar results with coarsened matching
 - Similar results with alternative window span

Firm level analysis

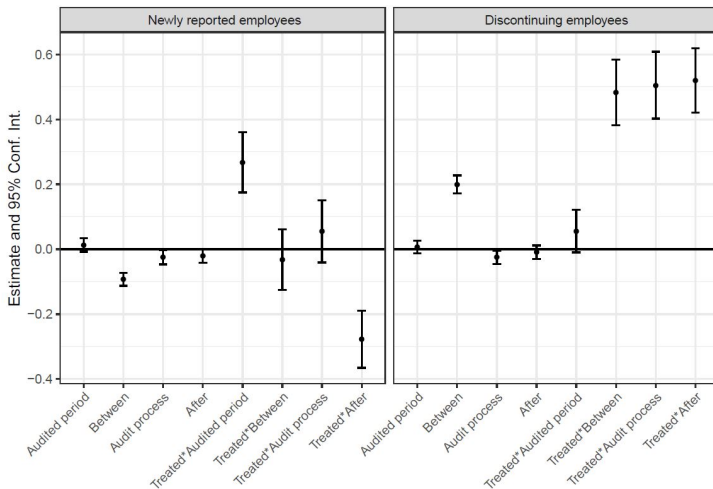
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 - Similar results with coarsened matching
 - Similar results with alternative window span
- When using set of firms "audited but not guilty": similar picture, but smaller magnitude

Disaggregating adjustments

- What is driving the average wage up?
 - We need to study workers' flows and wage adjustments
- In each **period** (before, audited period, between, audit process, after): definition of workers's types:
 - **Newly reported**: worker is employed at least 75% of the months in a period, 0 month in the previous one
 - **Discontinued**: worker employed at least 75% of the months in the previous period, max 1 in the current period
 - **Continuing**: worker employed at least 75% of the months in **both** the current and the previous periods

- Is average wage moving up because of "new" workers or increase in the wage of existing workers?

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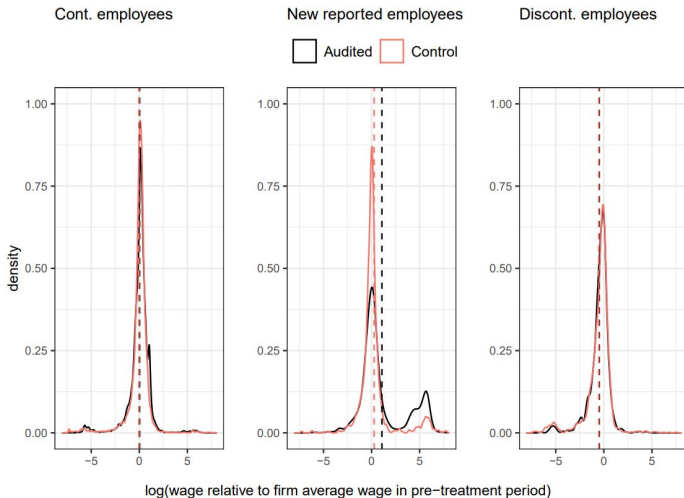
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- We compare the distribution of employees' wage relative to firm's average wage
- Relative wage:

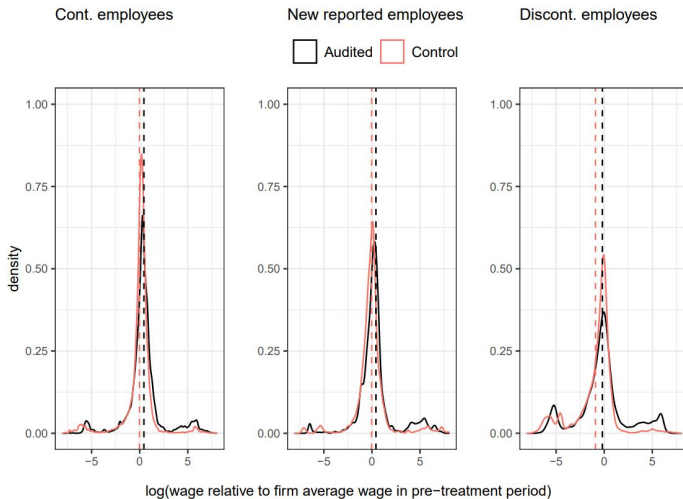
$$RelativeWage_{ijt} = \log(wage_{ijt}) - \log(wage_{jt-1})$$

where $\log(wage_{ijt})$ is the logarithm of the wage of a worker of type i ($i = \text{continuing employee, newly newly reported employee, or discontinued employee}$) in firm j in any period of the auditing process, and $\log(wage_j)$ is the average wage in firm j in the pre-audit period

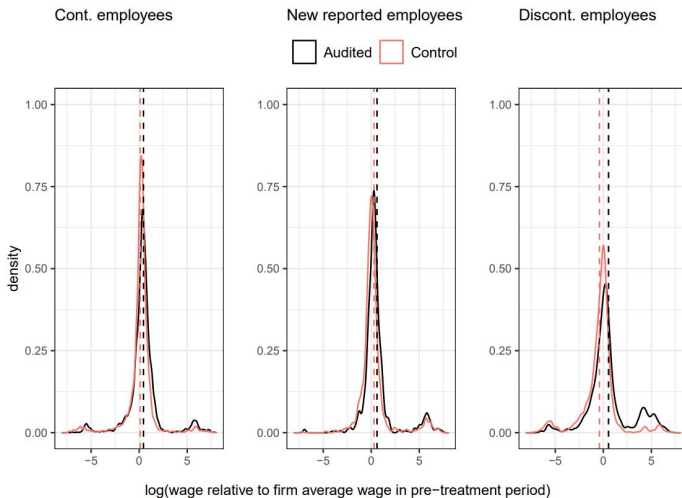
Wages in the **audited period** relative to pre-audit period



Wages in the **audit** process relative to pre-audit period



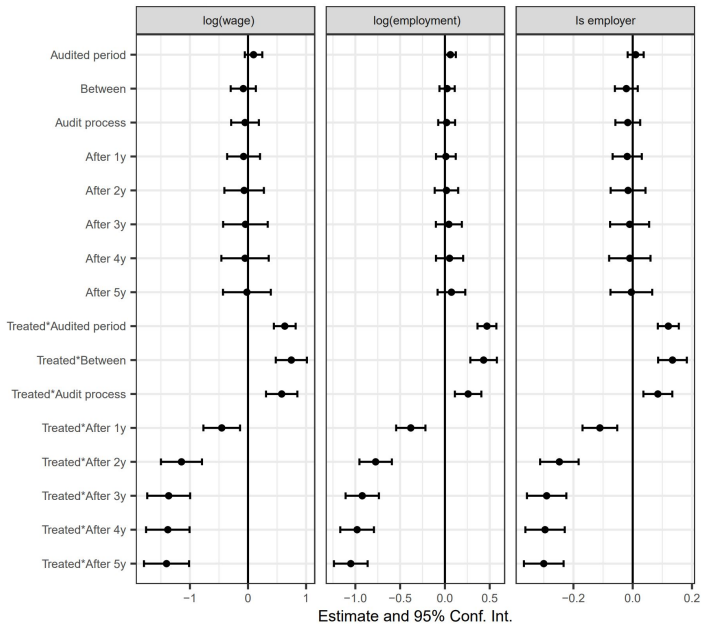
Wages after the audit process relative to pre-audit period



- To sum up:
 - No significant change in the wage of **existing** workers
 - **Newly reported** employees have a wage **above** firm's average wage
 - Workers paid above firm's average more likely to be **discontinued** after the audit

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 - No significant change in the wage of **existing** workers
 - **Newly reported** employees have a wage **above** firm's average wage
 - Workers paid above firm's average more likely to be **discontinued** after the audit
- The increase in firm's average wage is driven by newly reported employees
 - Not by an increase in wages of existing employees

- Previously: "after" period set to 12 months
 - Decrease in employment and average wage
- What happens to firms after the audit in the **medium run**?
 - “Bomb crater” effect (Maciejovsky et al. 2007; Mittone 2006, DeBacker et al. 2015)?
- Probability to shut down?



- Conclusion

- Audits are successful at detecting **undeclared** employees
- But not so much at detecting **underreported** wages
 - Harder to spot?
 - Lack of legal tools?
 - Second order objective?
- Audited/guilty firms likely to shut down

- What is next to do?
 - More on the dynamics **within** periods
 - Imai et al. (2021) approach
 - Exploit firms audited more than once
 - Better exploit audited/not-guilty firms
 - Back-of-the-envelop calculus: gain/loss in labor tax?
 - Who are the workers "popping up" in the audited period?
 - Where do discontinued employees go?

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- Settling down the title
 - "The Revizor effect"
 - "The Anatomy of labor tax audits"

Thank you for your attention!