

# The Impact of Income Taxes on Worker Shirking

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But ... do taxes also trigger employees to shirk their contractual work days ...?

**Theory:** work-incentive channel

- Income taxes distort the **return to effort**
- Shirking is one way to **adjust actually worked days** to the tax-altered work incentives (esp. if full wage compensation)
- The shirking channel might be particularly relevant (frictions)

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## Standard outcomes in tax-reform analyses typically do not capture these responses ...

- If shirking is not detected -> not (fully) reflected in **taxable income**.
- ETI **not** sufficient statistic for welfare analysis

# Empirical challenges

Empirically, shirking activities are challenging to study

- Individuals **conceal** their shirking activities
- Analyzable settings with **well-defined** shirking incentives are hard to find
- Suitable identifying **variation** in tax rates is rare

**Consequence:** The effects of income taxes on shirking behavior are **not** fully understood

# Our Paper ...

... focuses on the Austrian setting to examine shirking behavior

This setting...

- provides **health/tax data** to identify shirking of contractual work days through sick leaves
- imposes incentives for shirking: individuals receive **continued wage payments**
- offers **cross-bracket variation** in tax rates

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**Message 4:** The ETI potentially ignores such shirking responses

**Message 5:** ETI neglects up to **13%** of the individuals' behavioral responses..

- we estimate an upper bound for the welfare-relevant elasticity being **0.39**.
- not accounting for any shirking responses results in an ETI estimate of **0.34**.

# The Reform ...

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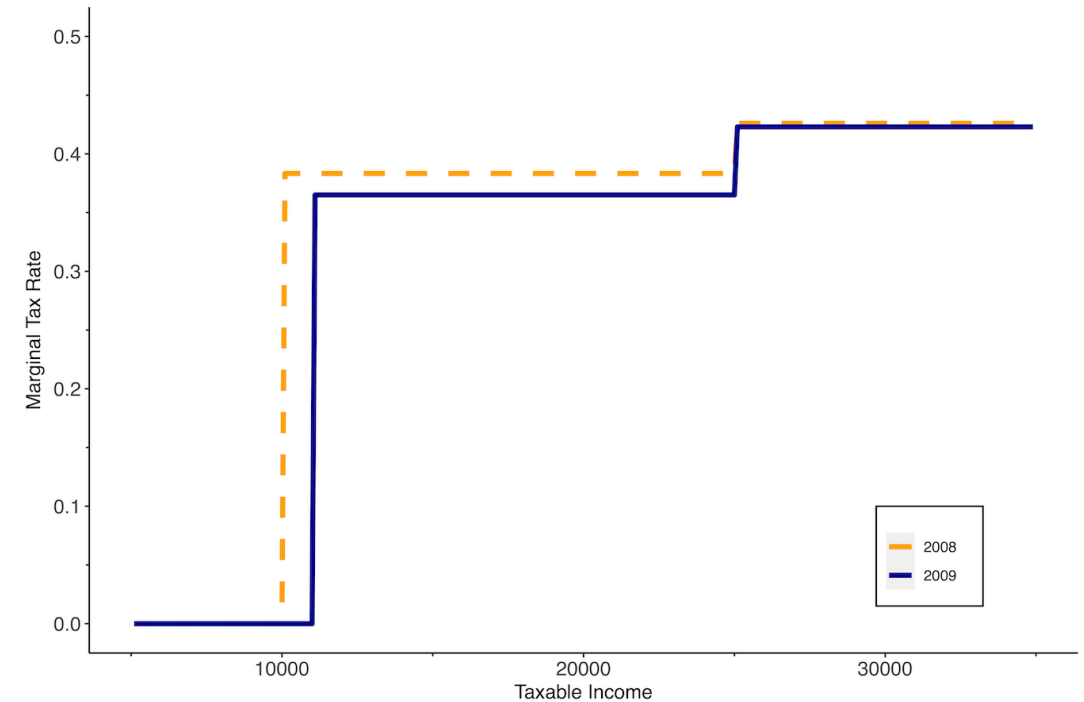
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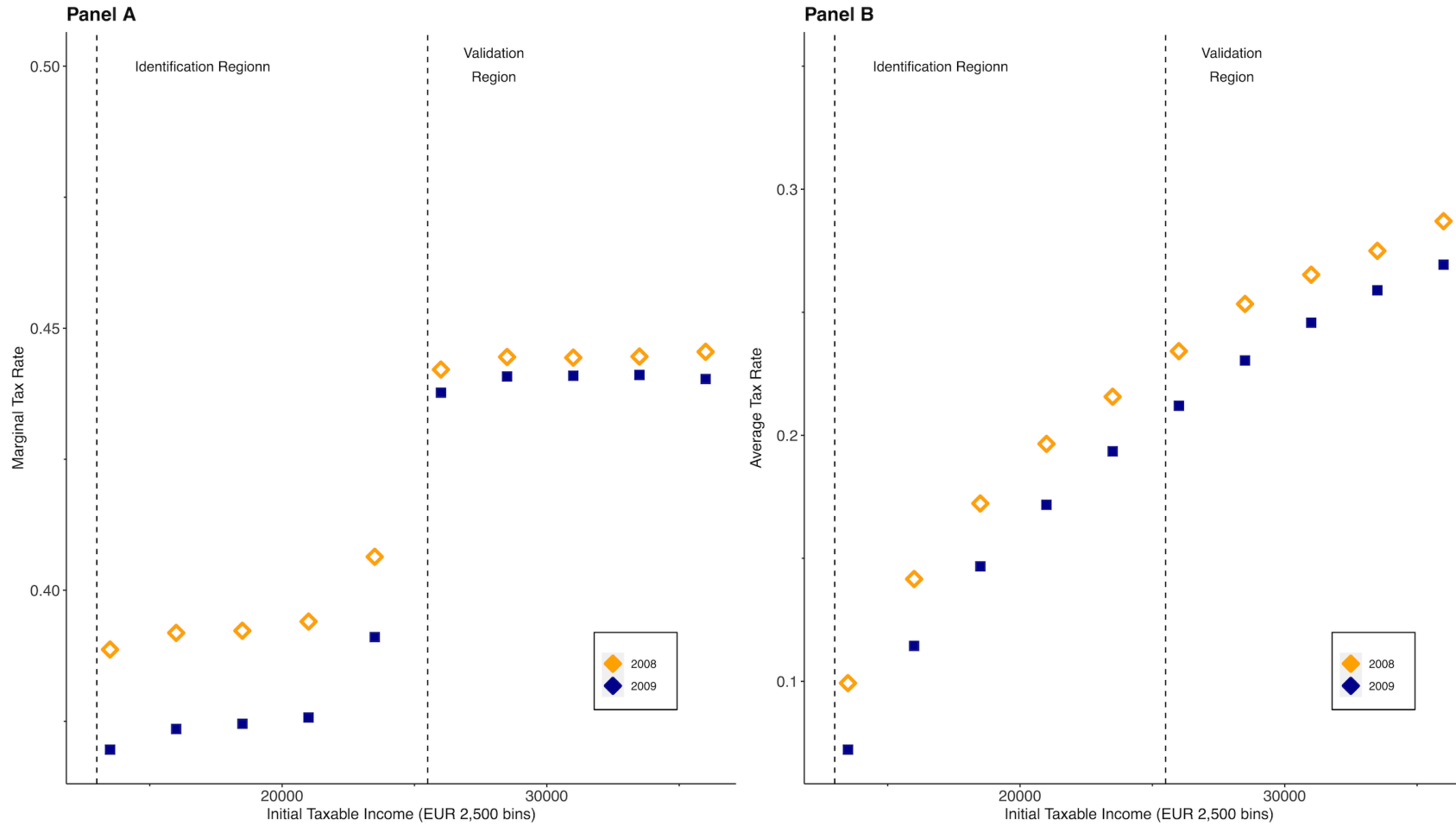
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# Only MTR changed discontinuously at the 25k threshold ...



**... and the Data ...**



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## Note that ...

- Workers are entitled to **full wage compensation** for 6 to 12 weeks (partial afterwards)
- workers have to submit a medical certificate to the employer.
- **sick notes** do not mention a specific **diagnosis**
  - it is **forbidden** that employers ask workers to disclose their diagnosis

# Empirical Strategy

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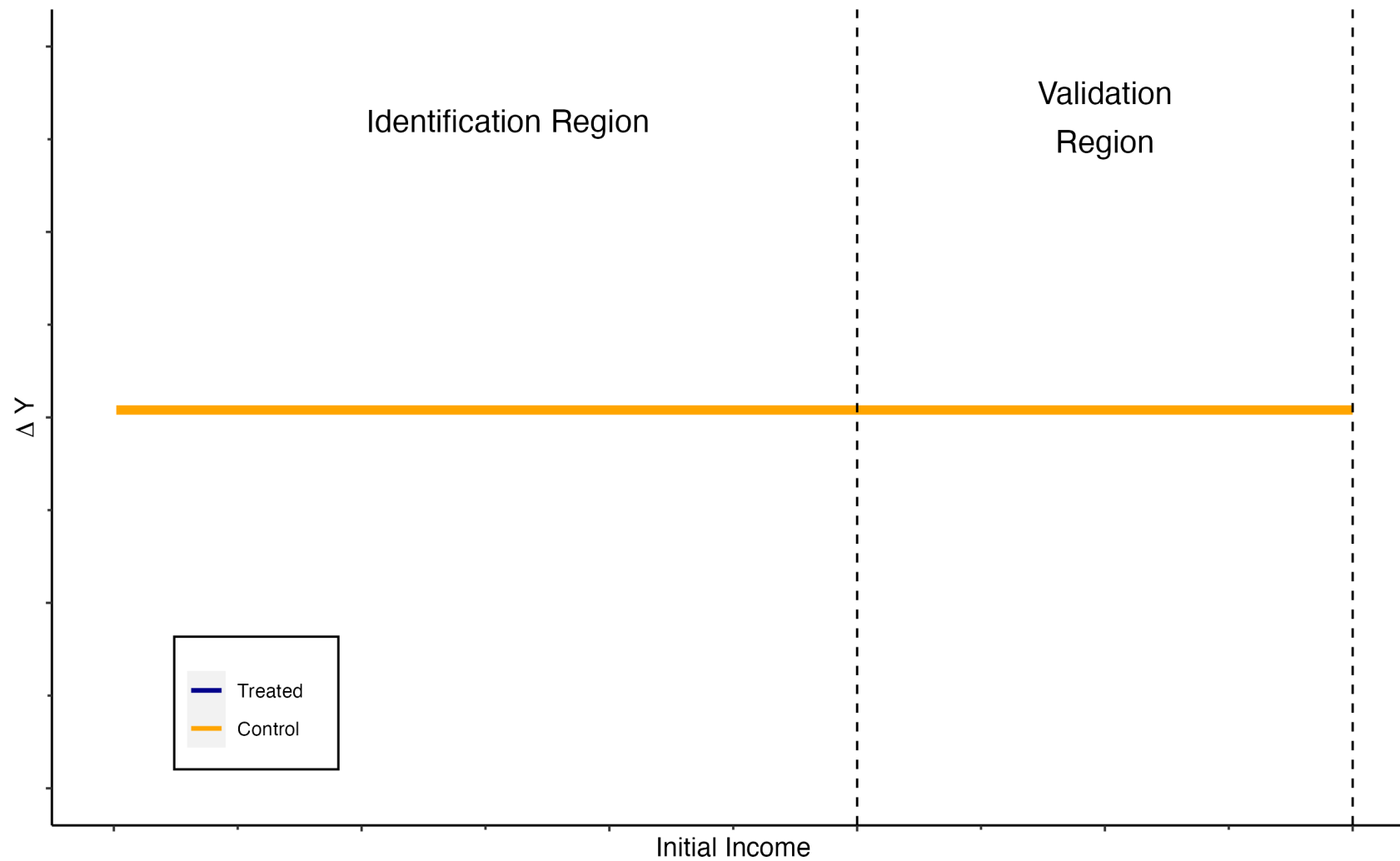
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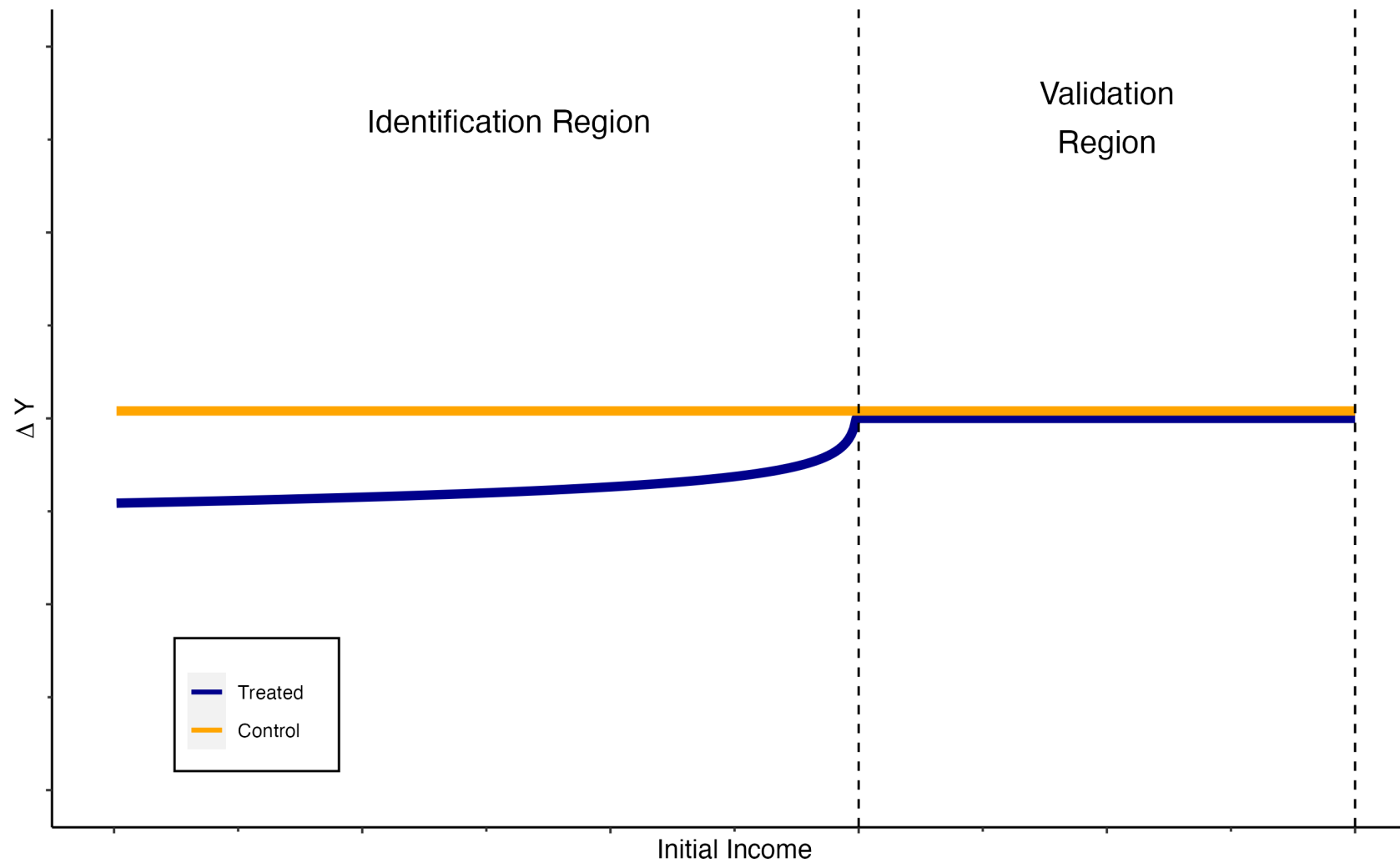
## Intuition

- Control Period (2006-2007) where tax schedule remains unchanged
- Treatment Period (2008-2009) where tax reform (2009) changes the marginal tax rates.
- Tax reform only affects **part of the income distribution**
  - $\text{income} < k \rightarrow \text{identification region}$
  - $\text{income} \geq k \rightarrow \text{validation region}$

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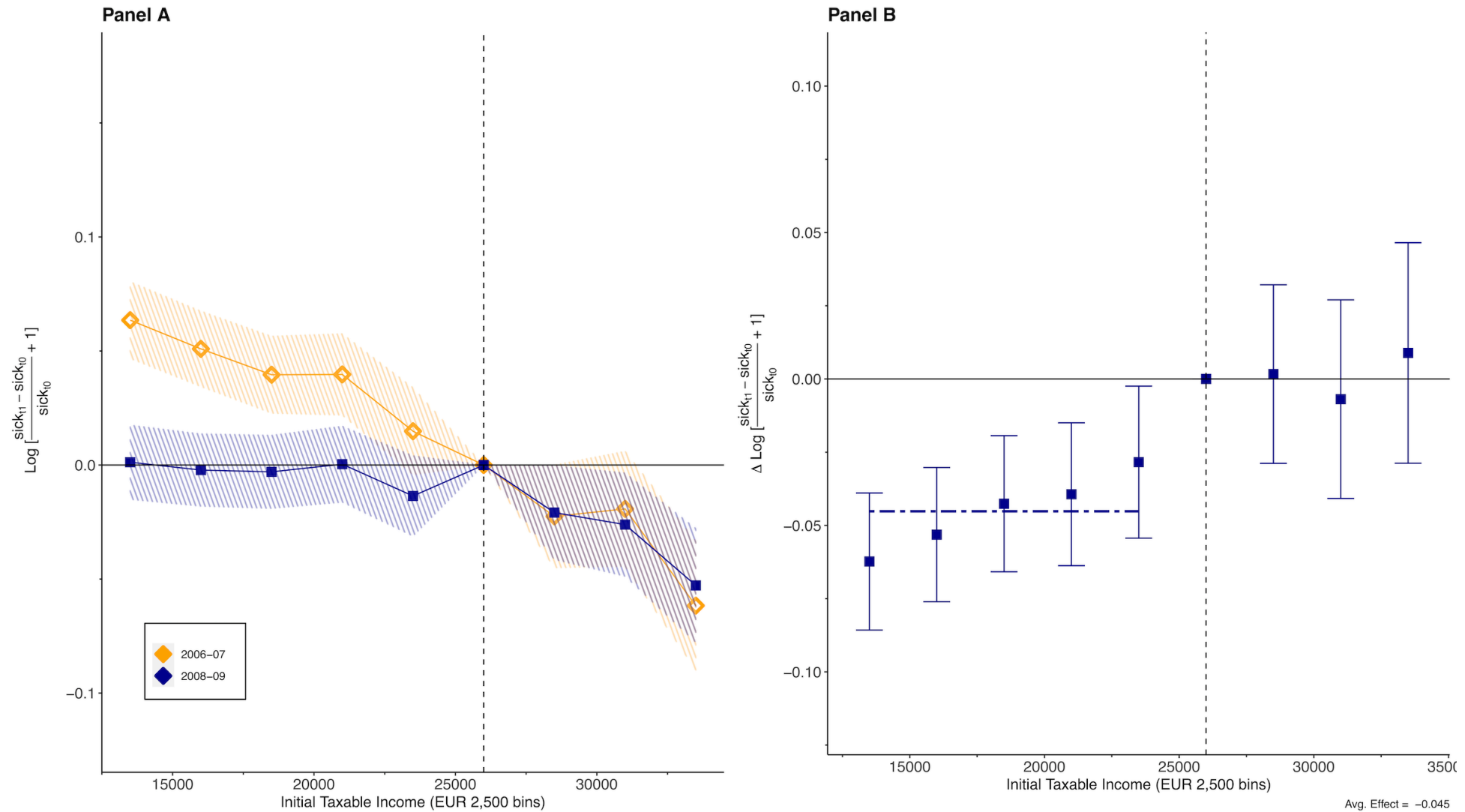


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# Results

# Sick leaves are clearly affected by the reform ...



**Is this change in sick leave taking attributable to shirking then ...?**

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- Analyzing **easy-to-shirk** vs. **hard-to-shirk** diagnoses, we find evidence that the change in sick leave taking behavior is indeed mostly driven by easy-to-shirk diagnoses. ([Link](#))
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- Overall **health** seems not to be affected by the reform. [\(Link\)](#)
- Response is sensitive to the taxpayers **knowledge** of the tax schedule. [\(Link\)](#)
- Response is sensitive to employers' market power. [\(Link\)](#)



**So taxes do affect shirking behavior ...**

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... but does this have any implications for  
the ETI?**

(skip)

# We start by extending Chetty (2009) to include shirking responses ...

## Taxpayers ...

$$\begin{aligned} \max_{l,s} \quad & u(c, l, s) = c - \psi(w \cdot l) + g(w \cdot s) \\ \text{s.t.} \quad & c = w \cdot (l - q \cdot s) - t \cdot w \cdot (l - q \cdot s). \end{aligned}$$

- Taxable Income:  $w \cdot (l - q \cdot s)$
- Shirked Income:  $w \cdot s$
- $q$ : extent to which *shirking* is tax-relevant (e.g. not being promoted/ getting a raise, having to reimburse employer)

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## Firms ...

$$\max_l \quad \pi(l) = \rho \cdot f(l - s) - w \cdot (l - q \cdot s).$$

- assuming  $s$  and  $q$  to be exogenous from the firm's perspective.

# By extending Chetty (2009) to include shirking responses ...

$$\begin{aligned} W(t) = & \left\{ (1-t) \cdot w \cdot (\hat{l} - q \cdot \hat{s}) - \psi(w \cdot \hat{l}) + g(w \cdot \hat{s}) \right\} \\ & + \left\{ \rho \cdot f(\hat{l} - \hat{s}) - w \cdot (\hat{l} - q \cdot \hat{s}) \right\} \\ & + t \cdot w \cdot (\hat{l} - q \cdot \hat{s}). \end{aligned}$$

Where ...

- $\hat{l}(w, t)$  ... equilibrium quantity of **labor**.
- $\hat{s}(w, t, q)$  ... equilibrium quantity of **shirking**.

# By extending Chetty (2009) to include shirking responses ...

- we are able to show, that the effect of the tax on taxable income is **not a sufficient statistic** to calculate the welfare effect ...

$$\frac{\partial W(t)}{\partial t} = t \cdot \frac{\partial \widehat{TI}}{\partial t} - (1 - q) \cdot \frac{\partial \widehat{SI}}{\partial t},$$

- where  $TI = w \cdot (l - q \cdot s)$  reflects the taxable income.
- $SI = w \cdot s$  refers to the shirked income. (e.g. income accrued while shirking)
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## Note:

- Any 'monetarized' consequences of detected shirking are **captured by  $TI$**
- Any shirking behavior not detected and/or punished is **captured by  $SI$**

# Estimating the Elasticities of Shirked and Taxable Income

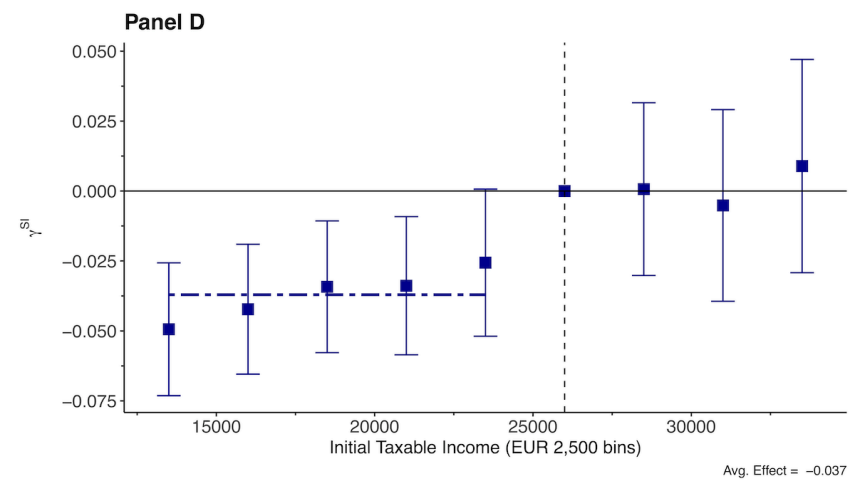
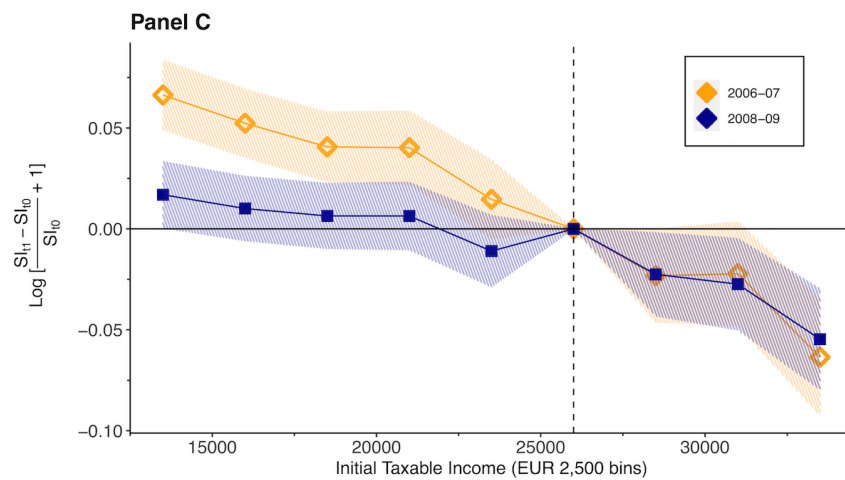
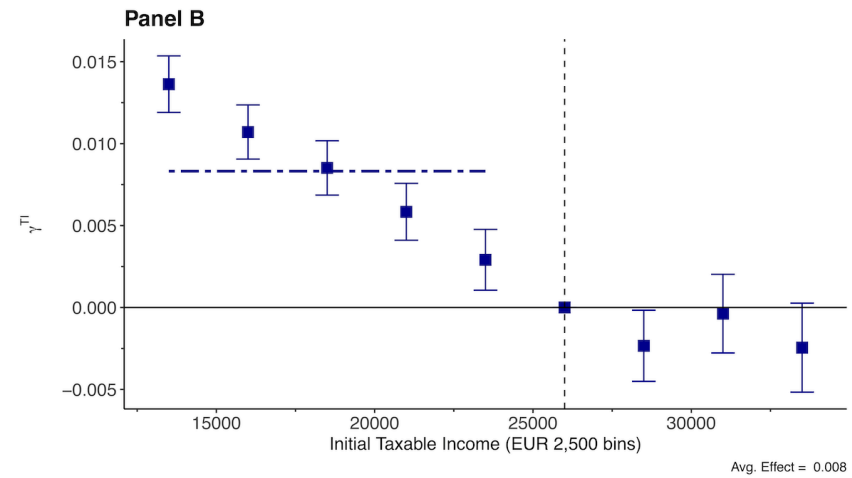
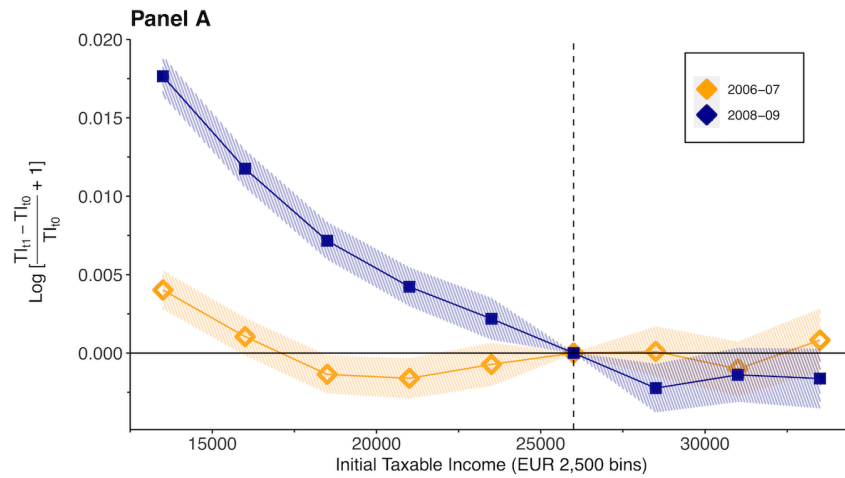


# We are able to show, that ...

$$e^{SI} \approx \hat{e}^{TI} \cdot \underbrace{\frac{\mathbb{E}[\Delta \ln SI_{ip} | D_{ip} = 1] - \mathbb{E}[\Delta \ln SI_{ip} | D_{ip} = 0]}{\mathbb{E}[\Delta \ln TI_{ip} | D_{ip} = 1] - \mathbb{E}[\Delta \ln TI_{ip} | D_{ip} = 0]}}_{\hat{\sigma}} = \hat{e}^{TI} \cdot \frac{\hat{\gamma}_3^{SI}}{\hat{\gamma}_3^{TI}},$$

- Elasticity of shirked income is a function of
  - Elasticity of taxable income (accounting for detected shirking)
  - estimated changes in **trend differentials** for shirked income and taxable income
  - $\hat{\gamma}_3^{SI}$  controls for tax-unrelated growth in shirked income by subtracting the average shirked income growth in the pre-reform period from that in the post-reform period.
  - $\hat{\gamma}_3^{TI}$  does the same for taxable income.

# Luckily, we already know how to estimate the trend differentials ...



How do we get the  $\hat{e}^{TI}$  then?

To estimate  $\hat{e}^{TI}$ , we follow (Gruber and Saez, 2002)

$$\Delta \ln \widehat{TI}_{ip} = \alpha + \mu(\widehat{TI}_{ip-k}) + \beta \cdot D_{ip} + e^{TI} \cdot \ln \Delta \tau_{ip} + v_{ip},$$

where

- $\mu(\widehat{TI}_{ip-k})$  is a function flexibly controlling for initial income
- $D_{ip}$  is a dummy indicating the reform period
- and where the instrument for the net-of-tax rate  $\ln \Delta \tau_{ip}$  is  $\ln \Delta \tau_{\widehat{TI}_{ip}}^P = \mathbf{E}(\Delta \ln \tau_{ip}^P | \widehat{TI}_{ip-k})$ .

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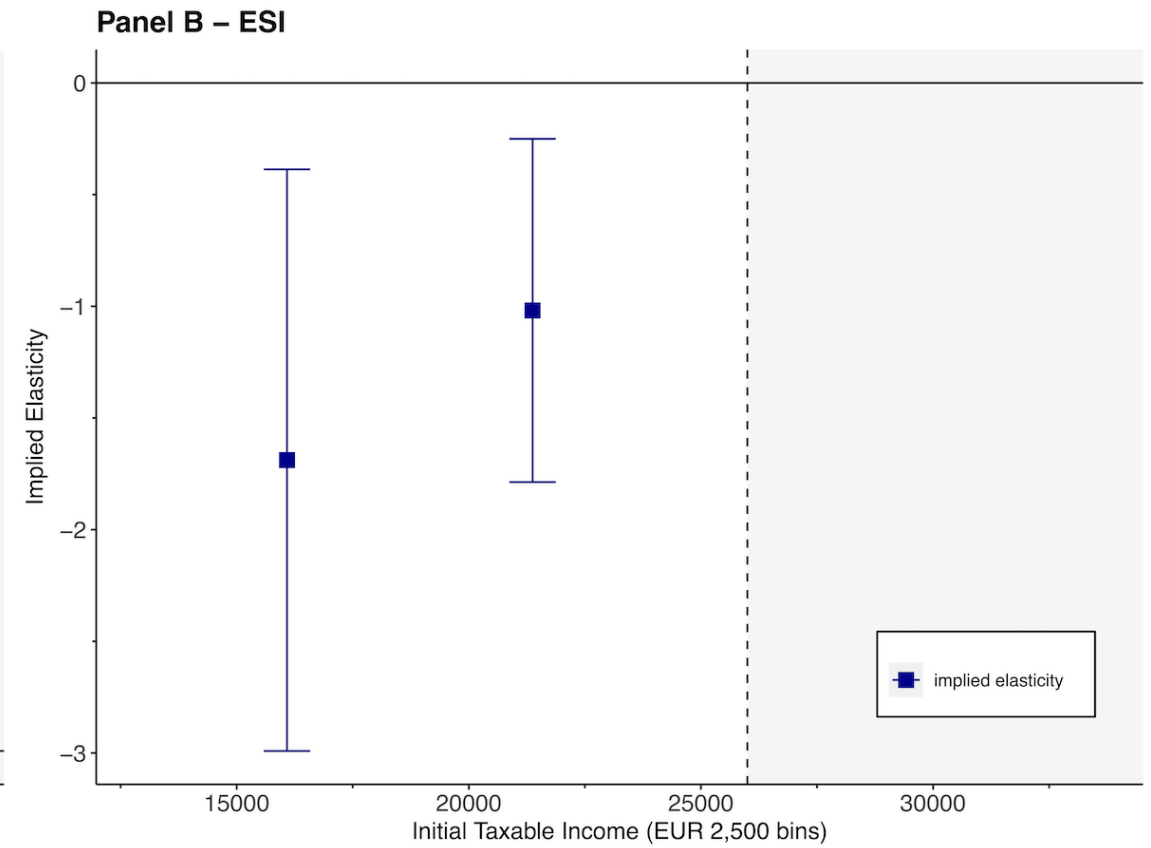
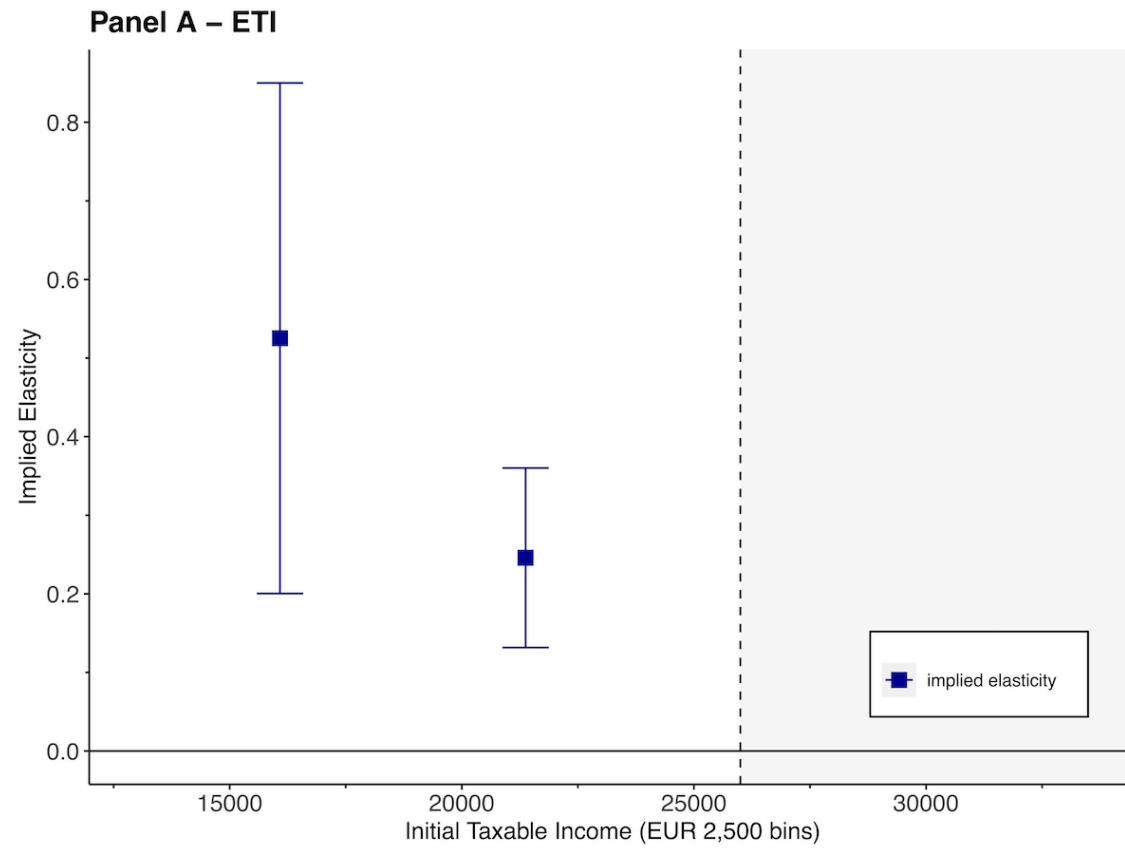
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**However, not identified unless** we assume constant trend differentials (yes, those again)! (Jakobsen and Sogaard, 2020)

# Elasticity of shirked income



Having estimates for the ETI and the ESI, we are now able to find an upper bound for the welfare relevant effect  $e^{PI}$  ...

$$e^{PI} = e^{TI} \cdot \frac{\widehat{TI}_{ip-k}}{\widehat{PI}_{ip-k}} + e^{SI} \cdot (q-1) \cdot \frac{\widehat{SI}_{ip-k}}{\widehat{PI}_{ip-k}}, \quad \widehat{PI} = \widehat{LI} - \widehat{SI}$$

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## Thought experiment ...

Assume firms are not able to detect any shirking:  $q = 0$

- **Falsely** estimating **vanilla** ETI would leave us with  $e^{PI} \sim 0.34$

Accounting for shirking responses increases the welfare-relevant elasticity by up to **15%**.

- we estimate an upper bound for the welfare-relevant elasticity being **0.39**.



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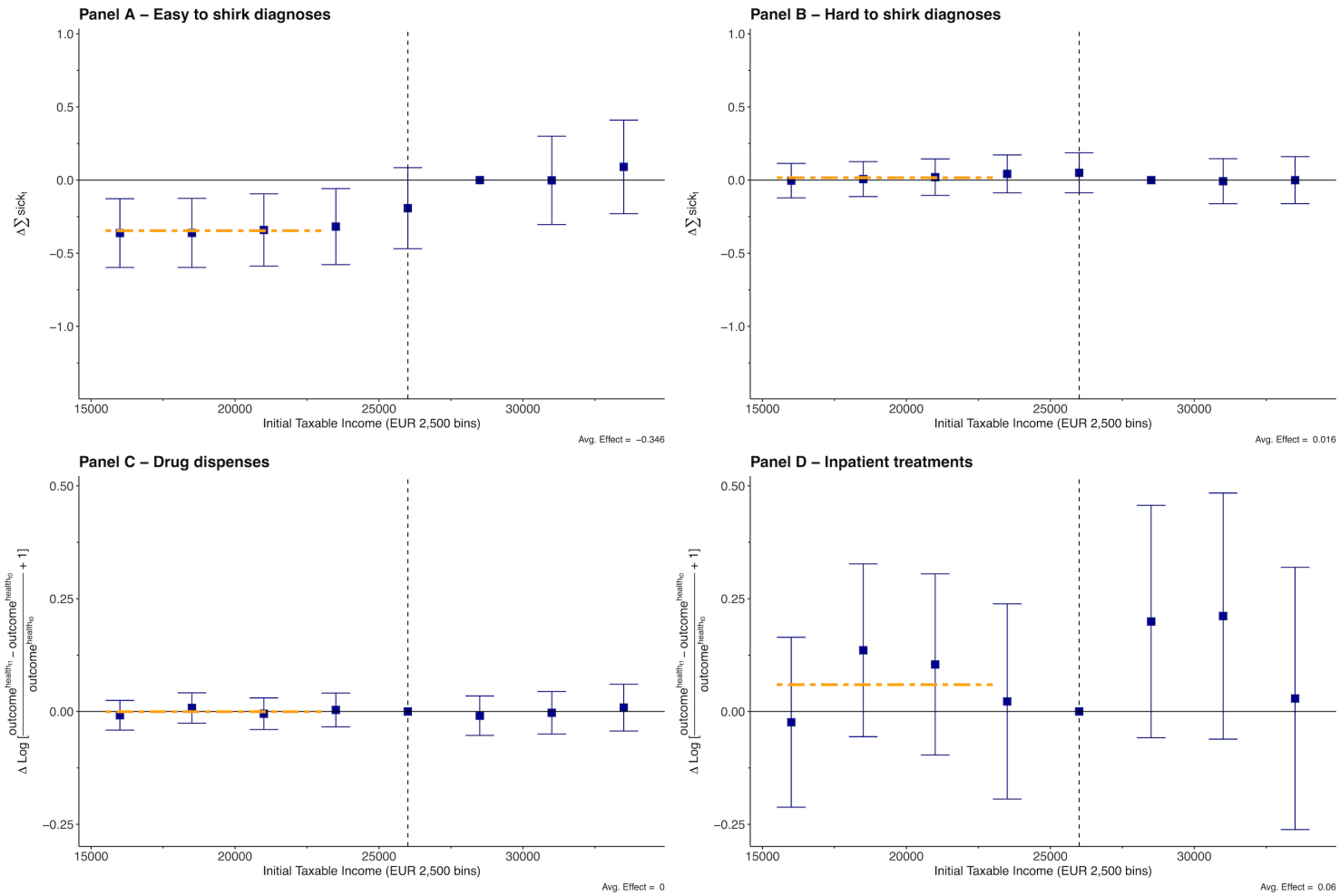
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end

# Appendix

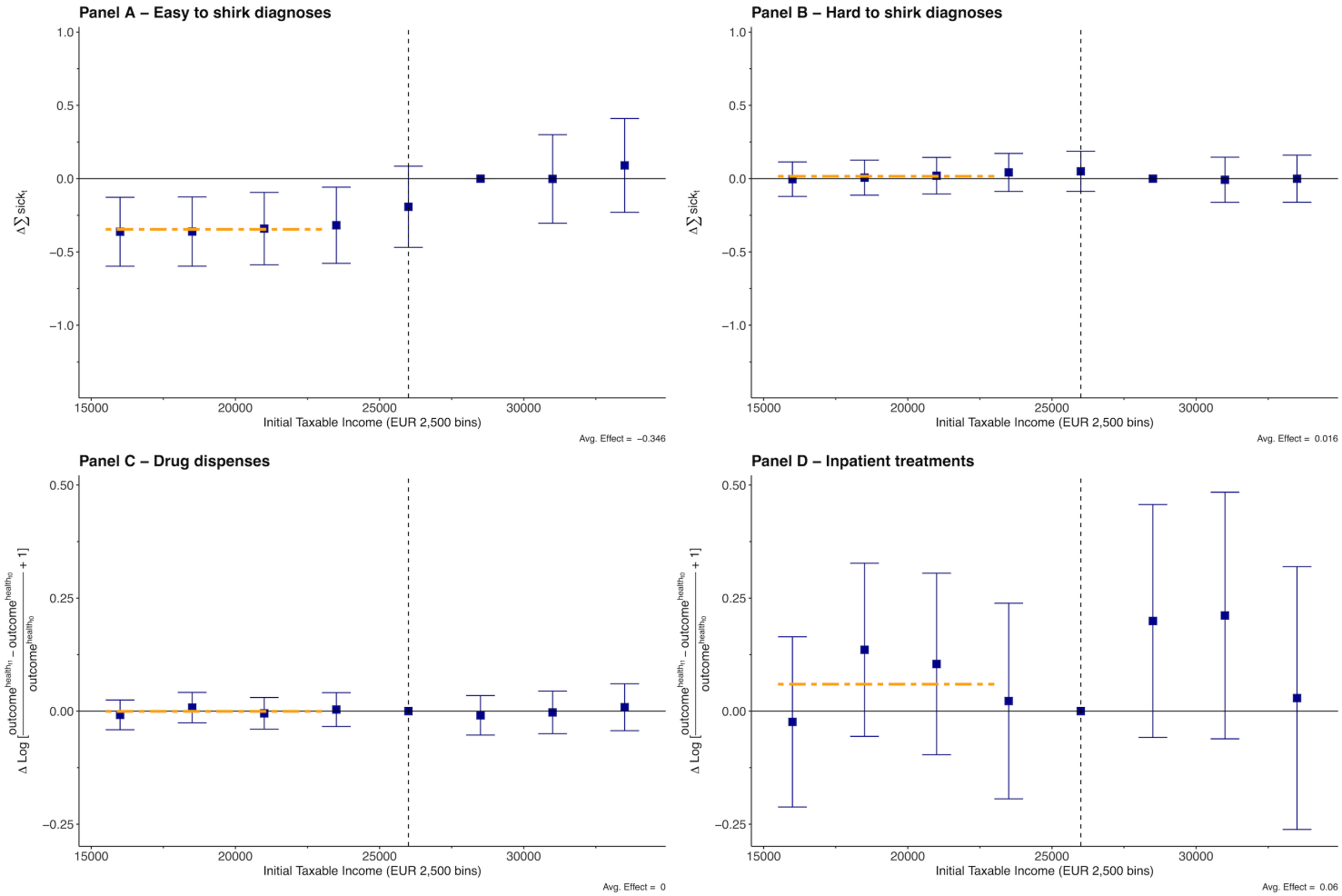


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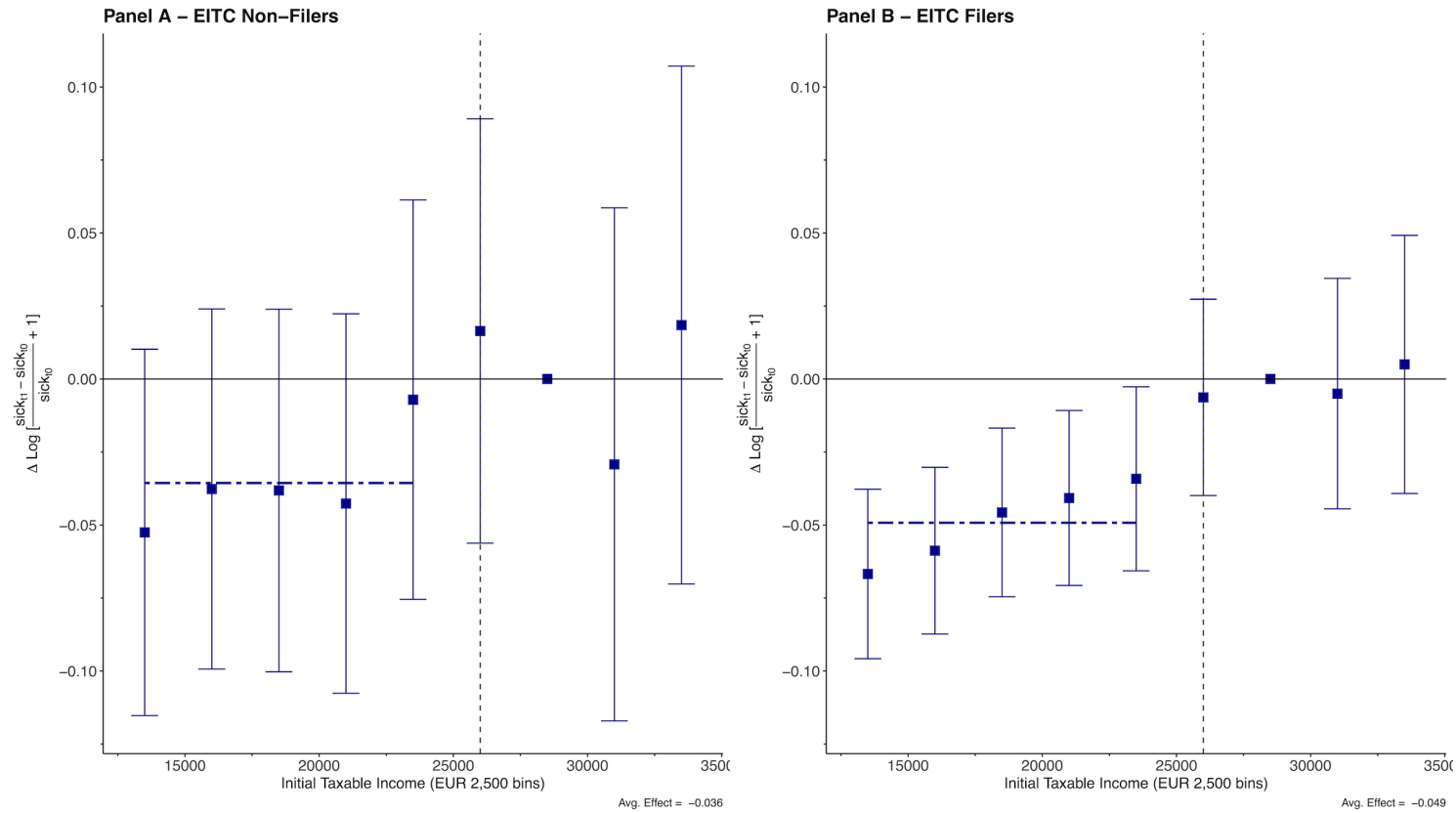
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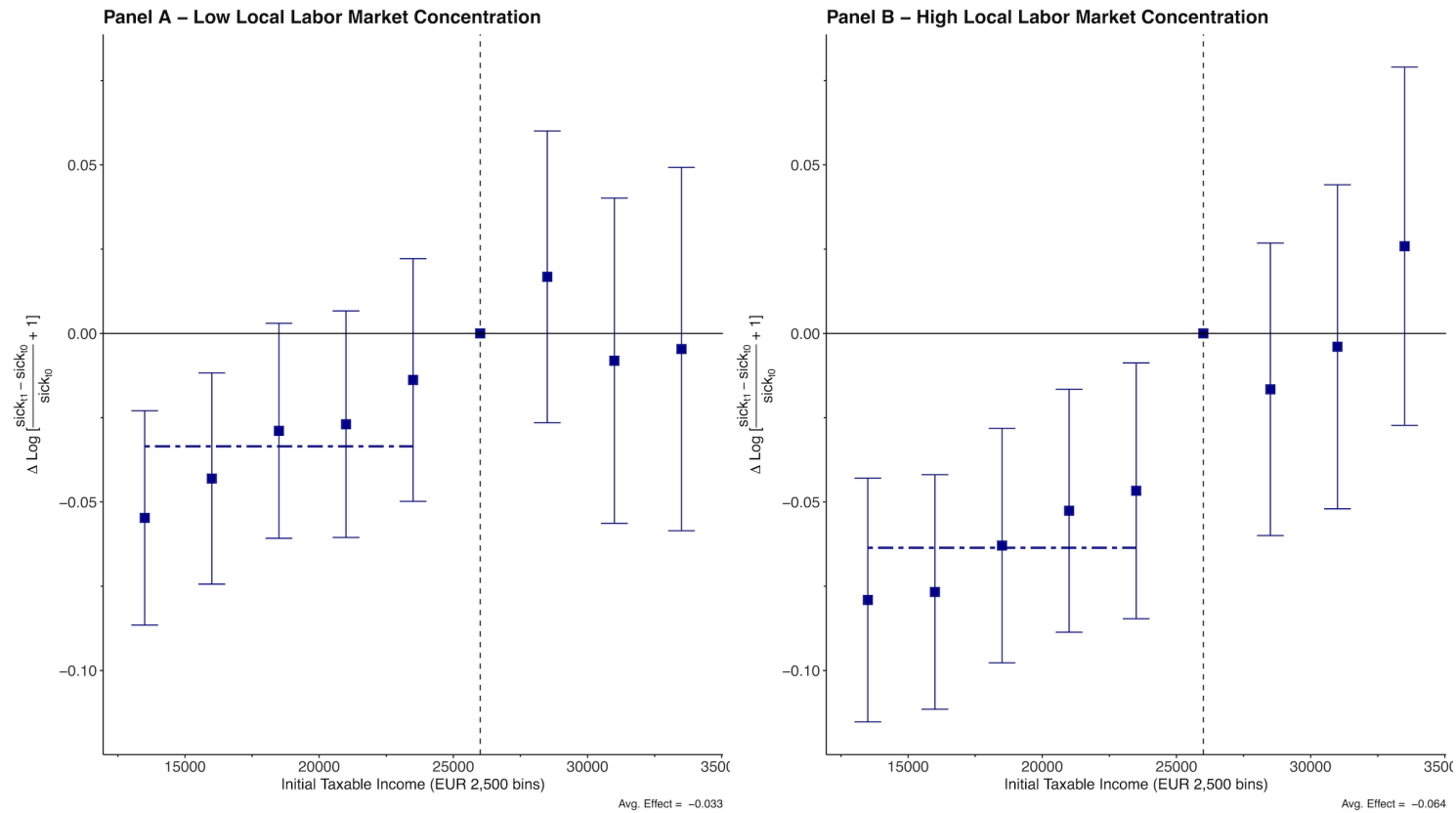
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# Is it driven by taxpayers knowledge about the tax schedule?



Go back

# Monopsony power plays a role ...



- **Market power** is computed as a regional (60 min) commuter-region Herfindahl–Hirschman index.

Go back

# 'Earlier' Pre-Reform Trends ...

