Hours Mismatch and Annual Taxes

NBER Public Economics – July 23, 2025

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Outline

Motivation

Workers often mismatched with respect to their desired hours of work

- reflected by surveys, willingness to pay for flexibility + hours×employer switching (e.g., Kahn and Lang, 1991, Mas & Pallais 2017, Maestas et al 2023, Lachowska et al., 2025)

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Our goals: offer a new approach to identifying the prevalence of hours constraints

- assess how hours mismatch affects labor supply responses to taxes

Introduction: Theory and Empirical Methodology

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   - comparing **missing mass** to standard **excess earnings** $\rightarrow$ % hours constrained

Introduction: Empirical Setting and Results

Application: Norwegian setting w/ two attractive features

- monthly data with information on every employer
- sharp year-end incentives from the tax and transfer system
  — marginal ("participation") taxes from 9%-60%, from 10th to 90th percentile

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Findings: hours constraints are prevalent among marginally attached workers

- prevalence of hours mismatch $\approx$ 60%, participation elasticity is 0.8
- limiting case: all workers hours constrained, participation elasticity $\longrightarrow$ 1.3
- much less important in broader tax system: 0.1 at top, 0.5 at bottom

Contributions – What's New?

Research on labor supply elasticities and optimization frictions

(e.g. Diamond 1980; Slemrod Kopczuk 2002; Saez 2010; Chetty el al 2011, 2012; Chetty & Saez 2012; Kleven & Waseem 2013; Bastani & Selin 2014; Kline and Tartari 2016; Gelber et. al 2017; Søgaard 2019; Bastani & Waldenström 2021; Kostøl Myhre 2021 ++)

— nesting traditional bunching, decomposition of lumpy versus smooth behavior

Research on models of compensating wage differentials and job search

(e.g. Rosen 1974, Ham 1980, Blundell 1988, Altonji & Paxson 1988, Kahn & Lang 1993, Stewart & Swaffield 2003; Lachowska etal 2022; Labanca & Pozzoli 2022 ++)

— method to nonpar. test for hours constraints in the precence of annual taxes

Large literature on dynamic labor supply and micro-macro elasticities

(e.g. review by Keane 2011, Kreiner et al 2014, 2016 on year-end tax planning, and Chetty et. al 2013 for micro-macro puzzle)

— hours constraints account for divergence between micro and macro Frisch elasticities

Outline

A Dynamic Model of Hours Mismatch and Year-End Incentives

Setup and Preferences

Two cases:

(A) free to choose $h_t \in [0, M]$,

(B) exogously assigned fixed $h_t = \tilde{h}$

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- workers paid w
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Max utility $c_t - \theta_i D(h_t)$ choosing work

- where i is individual, $D(\cdot)$ is convex

s.t. to dynamic budget (ignoring search)

$$c_t \leq h_t w \left(1 - \tau\left(CI_{t-1}\right)\right) + x_t$$

$$\tau\left(CI_{t-1}\right) = \begin{cases} 0, & \text{if} \quad CI_{t-1} \leq K \\ \tau, & \text{if} \quad K < CI_{t-1} \end{cases},$$

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Assumption of smooth $\sim \theta_i$ gives smooth $\sim CI_t$ with **excess mass** at K.

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- quitting is optimal if for some subperiod s,

$$\underbrace{\psi_i}_{\text{Quit cost}} < \underbrace{\sum_{t=s}^{T} \delta^{t-s} \left(u\left(x\right) - \left[u\left(h_t w \left(1 - \tau\left(C I_{t-1}\right)\right) + x \right) - \theta_i D\left(h_t\right) \right] \right)}_{\text{Cost of overwork}}$$

... assuming work disutility at zero hours is 0

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(C) Inattention to taxes
- mis-specified: work throughout year, adjust hours after learning
- **never** optimal to quit

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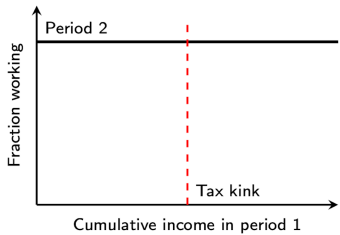
Empirical Approach: Identifying Quits

Basic idea behind the empirical approach: **Participation Probability Function** ($p_{e,t}$)

- where e is a cumulative earnings bin



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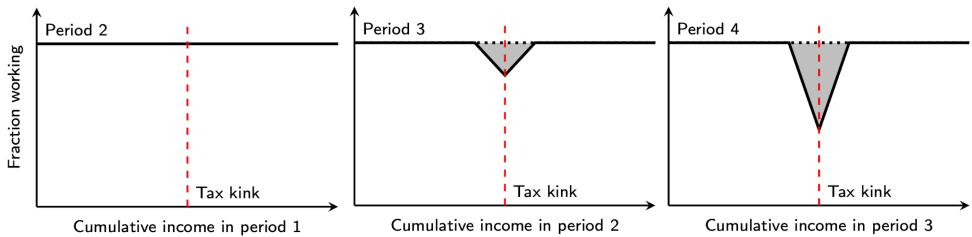

- gray area is denoted **missing mass**
- width of the response region is determined by the severity of hours mismatch

Empirical Approach: Participation Response and Missing Mass

Goal: estimate participation **response** (Δp) and **share** hours constrained (α)

$$\Delta p = E[\tilde{p}_{e,t} - p_{e,t} | e = K], \qquad \text{where } \tilde{p}_{e,t} \text{ is counterfactual}$$

Missing mass defined over response region, from lower to upper bound

$$m_t = \frac{1}{\tilde{p}_{K,t}} \sum_{e=\text{lower bound}}^{\text{upper bound}} (\tilde{p}_{e,t} - p_{e,t})$$

Share (α) relates missing mass (m_t) to excess mass in year-end earnings (b_T)

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$$E[\alpha_T \mid b = K] = \frac{M_T}{B_T}, \qquad \textbf{where M, B are frequencies}$$

Estimation method: rectangular histogram estimator for **m** (+ polynomial for **b**)

Outline

Policy Environment: Labor Markets and Tax-Transfer System

Norwegian labor markets: flexibility and regulation

- permanent contracts are standard, temporary work usually regulated
- hour schedules and wages collectively bargained, little variation within occupations (most mass of weekly hours at **37.5**, 30, 22.5, 15, and 7.5)

Tax system and transfer system: annual taxes and benefit offsets

- **income tax:** kinks of 25% at 5th, ..., and 9% at the 90th percentile of distribution
- **disability insurance:** kink of 60% at about $8K, no withholding

Data: Administrative Employment Records and Samples

Several advantages of Norwegian data: monthly reports by every employer

- for every employee, all ages, part- and full-time jobs
- hours of work, salary and hourly income, bonus payments (but not self-employment)

Program participation data from the welfare administration (NAV)

- monthly data on disability insurance (DI) receipt

Our baseline samples: (A) all taxpayers, and (B) All part-time working DI recipients

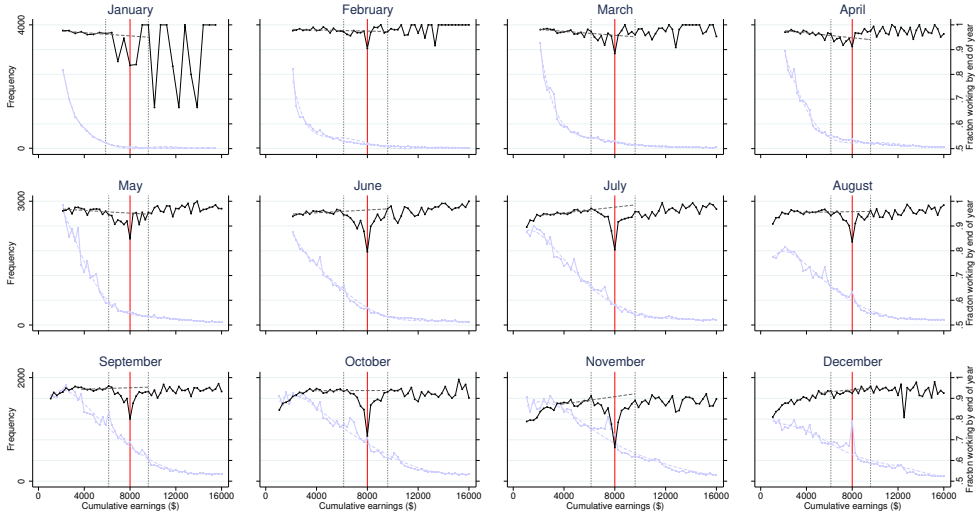
Data: Summary Statistics

	A. Workforce		B. DI Recipients	
	Mean	SD	Mean	SD
Age	41.4	(13.7)	50.0	(11.6)
Fraction female	.47		.54	
Monthly earnings ($)	5,225	(3,210)	971	(1,247)
Regular pay ($)	3,771	(3,232)	328	(855)
Variable pay ($)	1,048	(1,812)	498	(836)
Fraction regular pay	.71		.25	
Fraction hourly pay	.26		.43	
Contracted hours per week	32.8	(12.7)	12.7	(15.3)
Fraction full time	.68		.19	
Fraction part time	.28		.49	
Observations	2,871,511		47,009	

Notes: Sample of all taxpayers aged 18-66, and part-time working DI recipients aged 18-66.

Outline

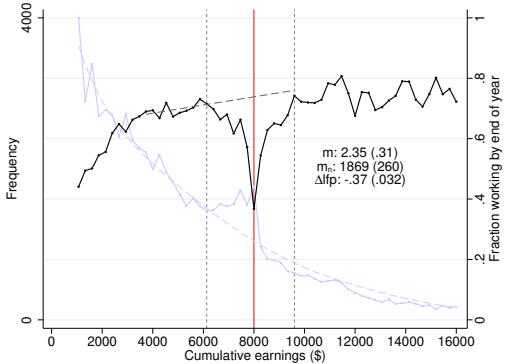
Evidence: Missing Work by Month and Aggregation



Notes: Sample of part-time working DI recipients, $\tau = 50\%$. Pooled data from 2015-2017.

Evidence: Annualized Participation Response and Year-End Earnings

Figure: Participation Response and Missing Mass



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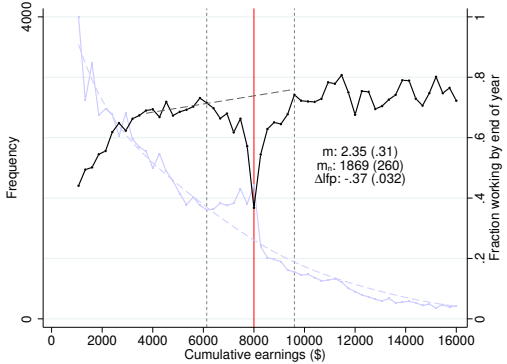
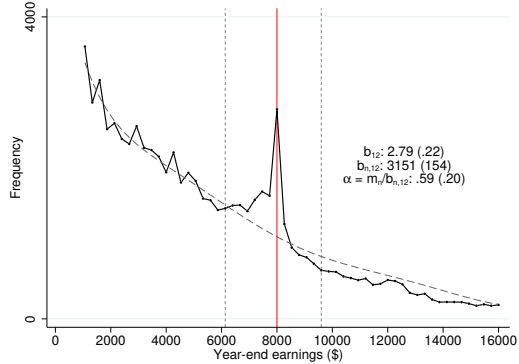


Figure: Year-End Bunching and Share Constrained



Notes: Sample of part-time working DI recipients, $\tau = 50\%$. Left: Last employment observation. Right: Last month of the year.

Evidence: Participation Elasticity

	$\triangle p$		$\tilde{p}$		Participation elasticity (ϵ)		Obs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
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D: Working next year (2015-2016)	-.44	(.02)	.82	(.02)	.85	(.03)	50,791
i) In same firm	-.45	(.02)	.84	(.02)	.86	(.03)	46,162
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E: Not working next year (2015-2016)	-.20	(.05)	.32	(.04)	.98	(.15)	17,497

Notes: Sample of part-time working DI recipients, $\tau = 50\%$. Baseline specification is linear fit for $\tilde{p}$. Standard errors are bootstrapped using 500 repetitions

Evidence: Population Shares

	Missing mass (m)		Excess mass year-end (b_{12})		Fraction hours constrained (α)		Obs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
A: Baseline (2015-2017)	2.35	(.25)	2.79	(.13)	.59	(.12)	93,975
B: Years 2015-2016	2.88	(.23)	2.93	(.17)	.77	(.12)	50,791
i) In same firm	2.91	(.22)	3.01	(.17)	.78	(.12)	46,162
ii) In different firm	3.00	(.62)	2.09	(.34)	1.02	(.44)	10,573

Notes: Baseline specification is linear fit for $\tilde{m}$, and polynomial fit for $\tilde{b}$.
Standard errors are bootstrapped using 500 repetitions

Evidence: Adjustments and Extensions

Frisch Participation Elasticity

- assuming workers fully aware of τ
- limiting case: all are hours constrained

$$\epsilon^* = \frac{\Delta LFP}{\tilde{p}_{K,t}} \cdot \frac{1}{\alpha} = \frac{-.37}{.74} \cdot \frac{1}{0.59} = 1.3$$

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Extension: Tax System

- examine all tax brackets
- at lowest bracket: $\epsilon = 0.2$, $\epsilon^* = 0.47$
- imprecise estimates from 4 of 6 kinks
- second-to-top bracket: some quits
  - very imprecise estimates of excess mass

Extensions: Broader Tax System

	mtr	$\triangle mtr$	Participation elasticity (ϵ)		Missing mass (m)		Year-end bunching (b_{12})	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Kink point:								
\$6,667	25	25	.20	(.06)	.082	(.029)	.115	(.024)
\$9,851	8.2	-16.8	-.08	(.06)	.020	(.023)	-.059	(.024)
\$11,789	23.6	15.4	.01	(.09)	.017	(.027)	.043	(.025)
\$27,612	35.2	11.6	-.05	(.06)	-.001	(.019)	.009	(.028)
\$73,407	44.2	9	.06	(.02)	.016	(.006)	.021	(.023)
\$118,080	47.2	3	-.12	(.11)	-.008	(.012)	.142	(.055)

Notes: Baseline specification is linear fit for $\tilde{m}$, and polynomial fit for $\tilde{b}$.
Standard errors are bootstrapped using 500 repetitions

Outline

Conclusion

We offer the first non-parametric evidence on prevalence of hours frictions, generating important extensive margin responses among marginally attached workers

Lack of Response in Broader Tax System: hours constraints bind

- strong career concerns dominates the cost of ignoring incentive

Micro-Macro Divergence: we show that hours constraints are important

- marginally attached workers have low quitting costs / career concerns
- help understand the pro-cyclical application rates for DI
  (e.g., Autor & Duggan 2003, Maestas Mullen Strand 2013, and many more)

Method has broader applicability: a lot to be done, broader safety net + EITC