Increasing Hours Worked: Moonlighting Responses to a Large Tax Reform

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Increasing Hours Worked and Labor Force Participation

Many policies aim at

- increasing workforce participation
- providing incentives to work longer hours

But workers appear relatively unresponsive to financial incentives, because of

- adjustment and information frictions
- career concerns, etc

However, few studies explore secondary job holding or moonlighting margin of response
Moonlighting

- Between 5% to 10% individuals moonlight in OECD countries

- Increase in alternative working arrangements (Uber, TaskRabbit, Instacart, etc)
  - easier access, higher hour flexibility
  - possibly lower tax liability through deductions

We don’t know much about moonlighting:

1. Are participation elasticities for moonlighting similar to primary jobs?

2. Why do people moonlight?
   - hour constraints, job complementarities?

Identification Problem: No exogenous variation as primary and secondary incomes are jointly taxed
Why Care About Moonlighting?

- Most common among low-income individuals

- If moonlighting is very elastic ⇒ Ramsey-rule argument to tax secondary earnings less

- Moonlighting tax breaks may be appealing because of a narrow tax base
  - Provides marginal tax cut but does not affect primary earnings taxation

- Moonlighting may become more common in the future
This Paper

Study a unique reform in Germany that **reduced** taxation of secondary jobs **only**

Four goals and contributions:

1. estimate first causal participation elasticity of moonlighting
   - large elasticities 0.29 – to 2.72 (primary jobs < 0.35)

2. explore substitution between primary and secondary earnings
   - no evidence of substitution ⇒ genuine increase in hours

3. study displacement effects on low-income workers
   - large number of new jobs created, no evidence of displacement

4. understand determinants of moonlighting
   - hour constraints and job access play critical roles
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Literature Review

**Moonlighting Tax elasticities:** (no exogenous tax variation)
O’Connell (1979)

**Descriptive studies:**
- **US:** Paxson and Sicherman (1996)
- **Canada:** Kimmel and Powell (1999)
- **UK and Germany:** Heineck (2009)

**Reasons for moonlighting:**
- **Hour constraints:** Shishko and Rostker (1976)
- **Uncertainty:** Bell et al. (1997)
- **Complementarities:** Lundborg (1995)
- **Skill training:** Panos et al. (2014)
- **Individual preferences:** Renna and Oaxaca (2006)

**Gig economy studies and experiments:**
Data

Administrative Social Security data:
- labor histories for 2% of wage earners in Germany
- 1999-2010 panel, basic demographics and firm characteristics
- no hour or wage data, no family info

Dataset construction
- age 31-54 (to focus on working adults)
- 1st job = highest earnings, 2nd job = 2nd highest, etc
- Count as secondary job if jobs overlap by $\geq 15$ days
  - not sensitive as average duration is 8 months
The Reform

Starting April 2003:

Individuals can hold a small secondary job tax free IF

1. primary earnings > €400 per month
2. secondary earnings ≤ €400 per month

Individual tax savings = 21-66%
Firms’ tax savings ≈ 0% because must pay social security tax

Other changes:
- the SS/income tax-free threshold increased from €325 to €400 per month
Moonlighting Over Time: €0-€400 Secondary Jobs

percent of population

1999 2001 2003 2005 2007 2009 2011

1999 2001 2003 2005 2007 2009 2011
Moonlighting Over Time

- Secondary earnings < €400
- Secondary earnings (€400, €1000]
- Secondary earnings > €1000

Percent of population over time.
Secondary Employment – 12 Months after Reform

The diagram illustrates the distribution of secondary monthly earnings (in euros) for January-March 2003 and January-March 2004. The x-axis represents the secondary monthly earnings, ranging from 0 to 1600 euros, while the y-axis shows the frequency, ranging from 0 to 180,000.

Comparing the two periods, it is evident that there is a shift in the distribution of earnings. In January-March 2003, there is a higher concentration of earnings around the lower end of the scale, indicating a more common occurrence of lower secondary earnings. In contrast, January-March 2004 shows a more spread-out distribution, with a higher frequency at the mid-range earnings, suggesting a diversification in secondary earnings. The peak in 2003 is significantly higher than the peak in 2004, indicating a more pronounced concentration of earning at lower levels in 2003.
Secondary Job Holding by Income level

Tax savings:

- $\Delta \tau = 33\%$
- $\Delta \tau = 44\%$
- $\Delta \tau = 48\%$
- $\Delta \tau = 56\%$
- $\Delta \tau > 58\%$

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Top 5 Most Common Occupations in Secondary Employment
Top 5 Most Common Occupations in Secondary Employment

- Doormen and custodians, Waiters
- House cleaners, warehouse and transport workers
- Office workers
- Teachers, Medical nurses and assistants
- Entrepreneurs and Consultants, Social workers
Top 5 Most Common Occupations in Secondary Employment ≤€400, by Primary Earnings

- Housekeeping
- Salespersons
- House cleaners, Office workers, Warehouse & transport workers
- Waiters
- Doormen and Custodians
Do Primary and Secondary Occupations Match?

- **Primary < 400**: 40%
- **Primary (400,1000)**: 43%
- **Primary >1000**: 39%

- **Secondary earnings < 400**: 34%
- **Secondary earnings (400,1000)**: 32%
- **Secondary earnings >1000**: 39%

Bar chart showing the percentage of people with primary and secondary occupations that match in different earning categories.
Did Secondary Workers Displace Low-Income Workers?

![Graph showing the number of jobs (in million) from 1999 to 2011 for different income categories: Primary (€0, €162], Primary (€162, €400], Secondary (€0, €162], Secondary (€162, €400]. The graph indicates a trend where the number of jobs in the higher income categories (Primary and Secondary) increased, while the number of jobs in the lower income category (Primary) decreased significantly around the year 2003.]
Q1: Does the take up of secondary jobs increase?

**Estimate:**

\[
P(2nd\_Mini_{it} = 1) = \beta_1 + \sum_{t=1999}^{2010} \beta_2 t \delta_t + \sum_{t=1999}^{2010} \beta_3 t (Treat_{it} \times \delta_t) + \gamma X_{it} + \epsilon_{it},
\]

*2nd\_Job_{it}*: 1 if holds a €0-€400 secondary job, 0 otherwise

*\delta_t*: time fixed effects (quarterly)

*X_{it}*: age, occupation fixed effects, year and quarter fixed effects, state fixed effects, and individual fixed effects

S.E.: clustered by individual
Recall: the Reform

Starting April 2003:

Individuals can hold a small secondary job tax free IF

1. primary earnings > €400

2. secondary earnings ≤ €400

Other changes:

- the SS/income tax-free threshold increased from €325 to €400

⇒ Individuals don’t pay income or social security tax if combined earnings are below €325/€400 threshold
Q1: Does the take up of secondary jobs increase?

**Approach 1**: treat/control based on current primary income

**Control**: ineligible workers – primary earnings < €162

**Treatment**: eligible workers – primary earnings > €400

**Approach 2**: treat/control based on pre-reform primary income

**Control**: pre-reform primary earnings > €4000

**Treatment**: pre-reform primary earnings €400-€4000
Approach 1: Current Earnings

**Control:** ineligible workers – primary earnings < €162

**Treat:** eligible workers – primary earnings > €400

**Pro:** assignment based on current incentives

**Con:** may suffer from selection

**Estimate a LPM:**

\[
P(2nd\_Mini_{it} = 1) = \beta_1 + \sum_{t=1999}^{2010} \beta_2 t \delta_t + \sum_{t=1999}^{2010} \beta_3 t (Treat_{it} \times \delta_t) + \gamma X_{it} + \epsilon_{it},
\]

2nd\_Mini_{it}: 1 if holds a €0-€400 secondary job, 0 otherwise

X_{it}: age, occupation fixed effects, year and quarter fixed effects, state fixed effects, and individual fixed effects

S.E.: clustered by individual
Parallel Trends and Elasticity Calculation

\[ \eta \equiv \frac{\% \Delta Participation}{\% \Delta (1 - \tau)} \]

- Pre-reform Participation = 4.51%
- After 7 years: \( \Delta \text{Participation} = 6.84 \text{pp} \)
- Within 2 years: \( \Delta \text{Participation} = 2.22 \text{pp} \)
Parallel Trends: Other Income Groups

- 0 to 15 percent of individuals from 1999 to 2011
- w/ primary (€400, €1000]
- w/ primary (€1000, €3000]
- w/ primary > €3000
- w/ primary < €162
Approach 1: Selection?
Control/Treatment Group Shifting:
Current earnings if reported €0-162 two years ago
Approach 1: Primary earnings €400-€1000
Approach 1: Primary earnings €1000-€3000
Approach 1: Primary earnings €3000-€4000

Coefficient of treat x time period

1999 2001 2003 2005 2007 2009 2011

95% CI Coefficient
Approach 2: Pre-Reform Primary Earnings

**Control:** pre-reform primary earnings > €4000
**Treatment:** pre-reform primary earnings €400-€4000

**Pro:** no selection,
**Con:** downward bias b/c control is treated; assignment may not reflect current incentives

Estimate a LPM:

\[
P(2nd_{Mini_{it}} = 1) = \beta_1 + \sum_{t=1999}^{2010} \beta_2 t \delta_t + \sum_{t=1999}^{2010} \beta_3 t (Treat_{it} \times \delta_t) + \gamma X_{it} + \varepsilon_{it},
\]

2nd_{Mini_{it}}: 1 if holds a €0-€400 secondary job, 0 otherwise

X_{it}: age, occupation fixed effects, year and quarter fixed effects, state fixed effects, and individual fixed effects

S.E.: clustered by individual
Approach 2: Parallel Trends
Approach 2: Primary earnings €400-€1000
Approach 2: Primary earnings €1000-€3000
Approach 2: Primary earnings €3000-€4000

![Graph showing the coefficient of treat x time period from 1999 to 2011 with 95% CI.

- Coefficient values range from approximately -0.5 to 2.0.
- The data points indicate a trend with a peak around 2007.
- The 95% confidence intervals are shown as error bars.

The graph illustrates the change in the coefficient of treat x time period over the years, with a notable increase starting from 2007.
Additional Robustness checks

**Approach 3**: treat/control = number of secondary jobs

- **Control**: secondary high-paying holding rates (> €1000)
- **Treatment**: secondary mini-job holding rates (≤ €400)

**Approach 4**: treat/control = number of secondary/primary jobs ≤ €400

- **Control**: primary mini-job holding rates (≤ €400)
- **Treatment**: secondary mini-job holding rates (≤ €400)

\[
\log(Num_{Jobs_{jt}}) = \gamma_0 + \gamma_1 Treat_{jt} + \gamma_2 After_{jt} + \gamma_3 (Treat_{jt} \times After_{jt}) + \varepsilon_{jt}
\]
Approach 3: Parallel Trends

- Percentage of population, > €400
- Secondary earnings < €400
- Secondary earnings > €1000

Graph showing trends from 1999 to 2011.
Approach 4: Parallel Trends

The diagram illustrates the number of jobs in million from 1999 to 2011. Two lines are plotted:

- **Primary (€0, €400]**: Represented by a dashed blue line.
- **Secondary (€0, €400]**: Represented by a solid yellow line.

The x-axis represents the years from 1999 to 2011, while the y-axis indicates the number of jobs in million. The data shows trends in employment across these categories over the specified period.
Define participation elasticities

\[ \eta \equiv \frac{%\Delta Participation}{%\Delta (1 - \tau)} = \frac{%\Delta Participation}{%\Delta (1 - \tau_{SS} - \tau_{Income})} \]

**Elasticity Assumptions:**

- individuals are single (cannot identify spouses)
- labor demand fully flexible; no labor demand shift
  - firm incentives have not changed, if anything decreased

⇒ **Estimated elasticities are lower-bound**

**Primary empl. participation elasticities (for comparison)**
- men: 0-0.25
- women: 0-0.35
Participation Elasticities

**Short Term**
- Pre-reform > €4000
- Current < €162
- Secondary > €1000
- Primary < €400

Short Term 95% CI

**Long Term**
- Pre-reform > €4000
- Current < €162
- Secondary > €1000
- Primary < €400

Long Term 95% CI
Distributional Effects of the Reform

Tax savings: \( \Delta \tau = 33\% \), \( \Delta \tau = 48\% \), \( \Delta \tau = 58\% \)

Cost: 

- €24 - €63
- €39 - €126
- €124 - €210

Population Share:

- 7%
- 53%
- 28%
Q 2: Do individuals with new secondary jobs reduce earnings in primary jobs?

Recall: no tax on secondary job earnings up to €400 ⇒ incentive to split main job into 2 jobs

1. Employer incentives: none (unless tax savings shared)
   - Empirically: few secondary jobs have the same employer as in their primary jobs

2. Employee incentives: back-of-the-envelope calculation
   - €2000/month job implies gross wage €12/hour and net wage of €8
   - Average secondary job wage €7-€9 in 2006-2010 (Tazhitdinova 2018)
   - ⇒ Arbitrage opportunity for lower-income workers only
   - Empirically: no evidence of substitution
Q 2 : Do individuals with secondary jobs reduce earnings in primary jobs?

Compare **changes** in primary earnings from **previous year**

**Treatment:** individuals with **new €0-€400** secondary jobs

**Control:** individuals with **new €400+** secondary jobs or **no secondary jobs**

⇒ should observe a ≈ €400 drop in primary earnings after reform for treatment group if arbitrage happens
Empirical Approach

Estimate

\[ \Delta PrimaryEarnings_{it} = \beta_0 + \beta_1 Treat_{it} + \beta_2 After_{it} \]
\[ + \beta_3 (Treat_{it} \times After_{it}) + \delta X_{it} + \varepsilon_{it}, \]

or

\[ P(\Delta Primary\_Earnings_{it} \in [-350, -450]) \]
\[ = \gamma_0 + \gamma_1 Treat_{it} + \gamma_2 After_{it} + \gamma_3 (Treat_{it} \times After_{it}) + \delta X_{it} + \varepsilon_{it}. \]
Control group = individuals with new €400+ secondary jobs

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<td>Outcome: change in primary earnings in € from previous year</td>
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<tr>
<td>Treat × After</td>
<td>-32.41 (25.63)</td>
<td>-24.44 (35.13)</td>
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<td>-22.39 (24.69)</td>
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<td>25.10 (27.66)</td>
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<td>30.29</td>
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<td>Outcome: 100 if primary earnings decreased by €300-€450</td>
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<td>Treat × After</td>
<td>1.15 (0.94)</td>
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<td>1.23 (1.6)</td>
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Control group = individuals with NO secondary jobs

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|                          | (4)        | (5)       | (6)       |
| Outcome: 100 if primary earnings decreased by €300-€450 |            |           |
| Treat $\times$ After    | -1.17      | -1.10     | -1.28     |
|                         | (0.83)     | (0.79)    | (0.84)    |
| Mean Outcome Treatment Group 2002 | 6.84       | 6.84      | 6.84      |

|                          | (1)        | (2)       | (3)       |
| N of Observations       | 305,473    | 304,274   | 304,274   |
| Demographic Controls    | no         | yes       | yes       |
| Year, Quarter FE        | no         | yes       | yes       |
| Individual FE           | no         | no        | yes       |
Conclusion and Policy Implications

1 Moonlighting is very responsive to tax incentives
   - large elasticities across income groups
   - responses not driven by temporary substitution
   - ⇒ a possible channel to incentivize longer working hours

2 Hour constraints likely to be the key reason for moonlighting
   a Lack of substitution of primary for secondary ⇒ hour constraints at primary jobs
   b Many small (€0-€300) secondary jobs ⇒ hour constraints at secondary jobs
   c Most secondary jobs are low-skilled service jobs regardless of primary occupation
Conclusion and Policy Implications

3 Moonlighting tax breaks = effective policy
   - Follows Ramsey principle – secondary job holding more elastic than primary
   - More revenue-effective than a MTR break because the tax break only applies to secondary earnings
     - Compare two reforms: a 20% MTR break or 20% MTR break on secondary earnings only
     - Based on elasticities, similar outcomes expected

4 Moonlighting likely to increases in the future
   - Any platform that offers high-paying part-time work could increase moonlighting dramatically (e.g. maybe Task Rabbit)
   - Moreover, "gig" jobs are harder to tax ⇒ even larger response
Importance of Occupations and Job Access

Primary Occupation $\in$ {Popular Sec. Occupations}

Primary Occupation $\notin$ {Popular Sec. Occupations}
Conclusion and Policy Implications

- If moonlighting responses are constrained by job availabilities:
  - ⇒ Uber and Lyft increase availability of time-flexible jobs
  - ⇒ TaskRabbit (?) increase availability of higher-paying jobs
- Any platform that offers high-paying part-time work could increase moonlighting dramatically
- Moreover, “gig" jobs are harder to tax ⇒ even larger response