



# Coordination of Hours within the Firm

Claudio Labanca (Monash University, Australia), Dario Pozzoli (Copenhagen Business School)

## 1. ABSTRACT

Although coworkers are spending an increasing share of their working time interacting with one another, little is known about how the coordination of hours among heterogeneous coworkers affects pay, productivity and labor supply. In this paper, we use linked employer-employee data on hours worked in Denmark to first document evidence of positive correlations between wages, productivity and the degree of hours coordination – measured as the dispersion of hours – within firms. We then estimate labor supply elasticities by exploiting changes made to the personal income tax schedule in 2010. We find that hours coordination is associated with attenuated labor supply elasticity and spillovers on coworkers not directly affected by the tax change. These spillovers led to a 3.3% decrease in tax revenues from the 2010 tax reform, and if ignored, they induce substantial downward bias in estimates of the labor supply elasticity. We explain these findings in a framework in which differently productive firms choose whether to coordinate hours in exchange for productivity gains, leading more productive firms to select into coordinating hours and to pay compensating wage differentials.

## 2. RESEARCH QUESTION

In this study we assess:

- Part 1 (observational): how **coordination** of hours predicts **wage differentials** across firms
- Part 2 (quasi-experimental): how **labor supply** elasticities to **tax** changes vary by coordination level

Note: coordination means working a similar number of hours

## 5. PART 1: WAGES AND COORDINATION - ESTIMATION

### Step 1:

$$\ln w_{ijt} = \alpha_i + \psi_{j(i,t)} + \beta_1 X_{ijt} + r_{ijt}$$

- $\psi_{j(i,t)}$  = Proportional wage premium/discount paid by firm  $j$  to all employees.
- Identifying assumption: conditional **exogenous mobility** (CHK tests)

### Step 2:

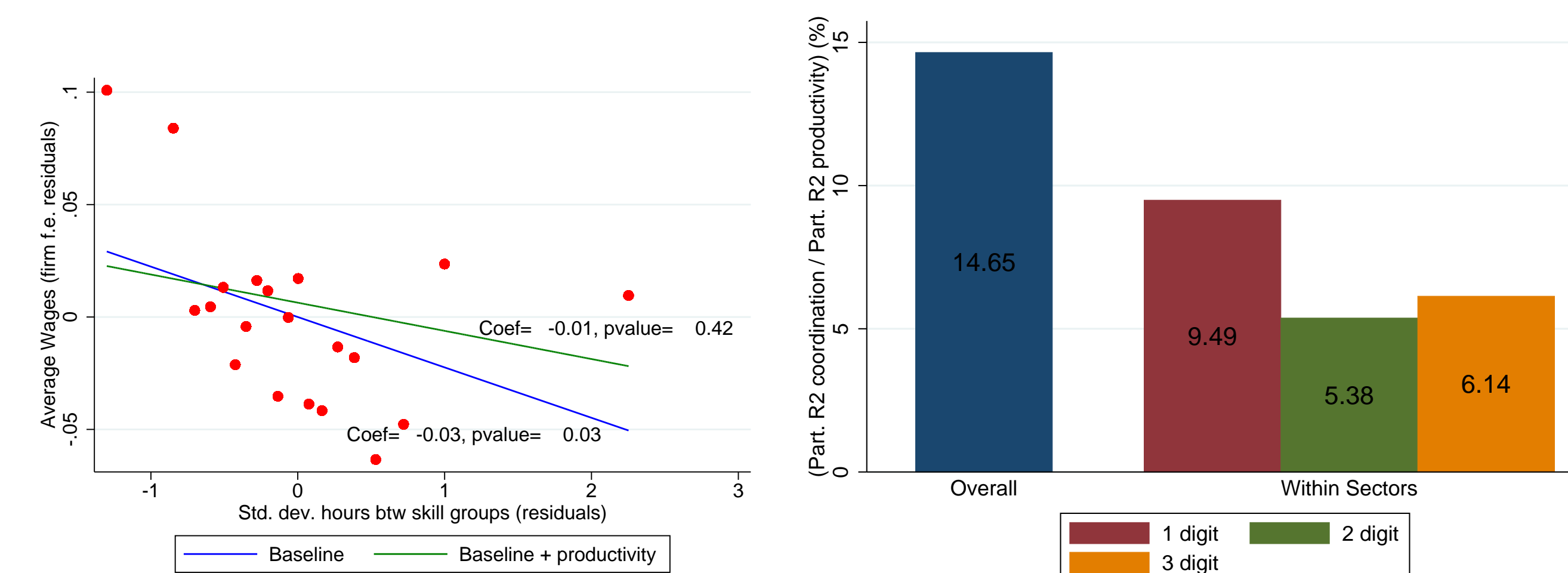
$$\widehat{\psi}_{j(i,t)} = \delta_0 + \delta_1 \sigma_j + \delta_2 \bar{Z}_j + v_j$$

- $\sigma_j$  = average **stand. dev.** of average hours across **skill groups**.
- Firm level controls to **confounding factors** ( $\bar{Z}_j$ ): exporter status, average size, unionization rate, average hours, region fixed effects, **skills** and **gender** composition of the labor force, proxies for **managerial ability**.

## 3. MAIN FINDINGS

- Part 1: **greater coordination** in a firm is associated with **higher wages** conditional on other firm characteristics.
- Part 2: **coordination** of hours is associated with:
  - reduced** labor supply **elasticities**. We find an elasticity 5 times larger in low coordination than in high coordination firms, where it is insignificant.
  - spill-overs** on non-targeted coworkers. We find a significant elasticity of 0.88 between hours of non-targeted and targeted workers, and 0.61 in low coordination firms.

## 6. PART 1: WAGES AND COORDINATION - RESULTS

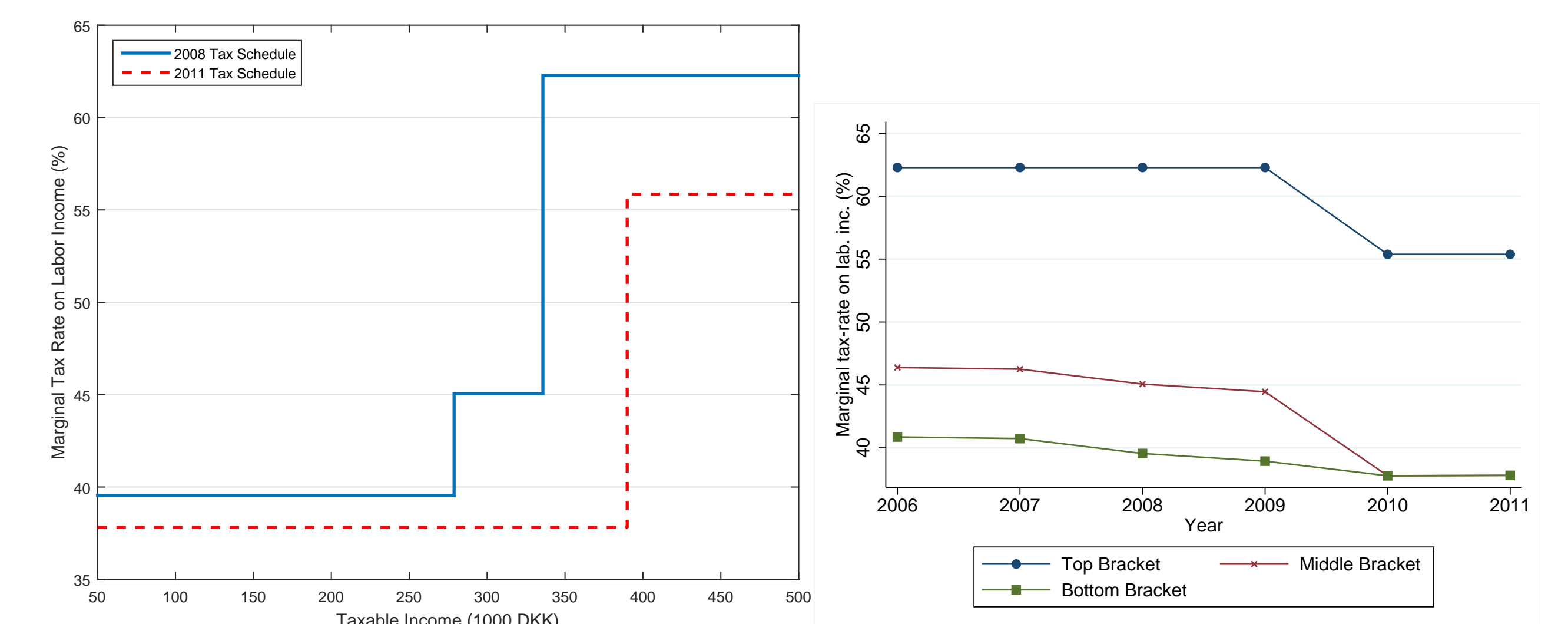


- 1 Std. Dev. increase in coordination is associated with **0.5%** higher wages.
- Wage **premiums** from coordination **depend on productivity**
- Coordination predicts between **6 and 15%** of the variance of firm component of wages due to productivity.

## 4. DATA AND MEASURES OF COORDINATION OF HOURS

- Data:** **Danish** administrative records on **annual hours** worked, individual **tax records** and socio-economic characteristics, **firm accounting data** (mostly large firms).
- Measure of coordination** ( $\sigma_{jt}$ ): **standard deviation** of average hours worked across **skill groups** within a firm.

## 7. PART 2: THE 2010 DANISH TAX REFORM



- The **marginal tax rate** on labor income went **down** by **10%** and **16%** in the **top** and **middle** bracket. In the bottom bracket it decreased by **4%**.
- High skilled** (H) are in the middle or top bracket in 2008 (excluding top-bottom movers). **Low skilled** (L) are tax exempt or in the bottom tax bracket in 2008.

## 8. PART 2: LABOUR SUPPLY ELASTICITY AND COORDINATION - ESTIMATION

### Attenuating effects on high skilled:

$$\log \left( \frac{h_{ijt+3}^H}{h_{ijt}^H} \right) = \alpha_0 + \alpha_1 \log \left( \frac{1 - \tau_{it+3}^H}{1 - \tau_{it}^H} \right) + \alpha_2 X_{ijt}^H + \omega_{ijt}$$

- Estimated separately in high and low coordination firms.
- Attenuating effects  $\Rightarrow \alpha_1$  lower in high coordination firms.

### Spill-over effects on low skilled:

$$\log \left( \frac{h_{ijt+3}^L}{h_{ijt}^L} \right) = \beta_0 + \beta_1 \log \left( \frac{h_{ijt+3}^H}{h_{ijt}^H} \right) + \beta_2 X_{ijt}^L + \epsilon_{ijt}$$

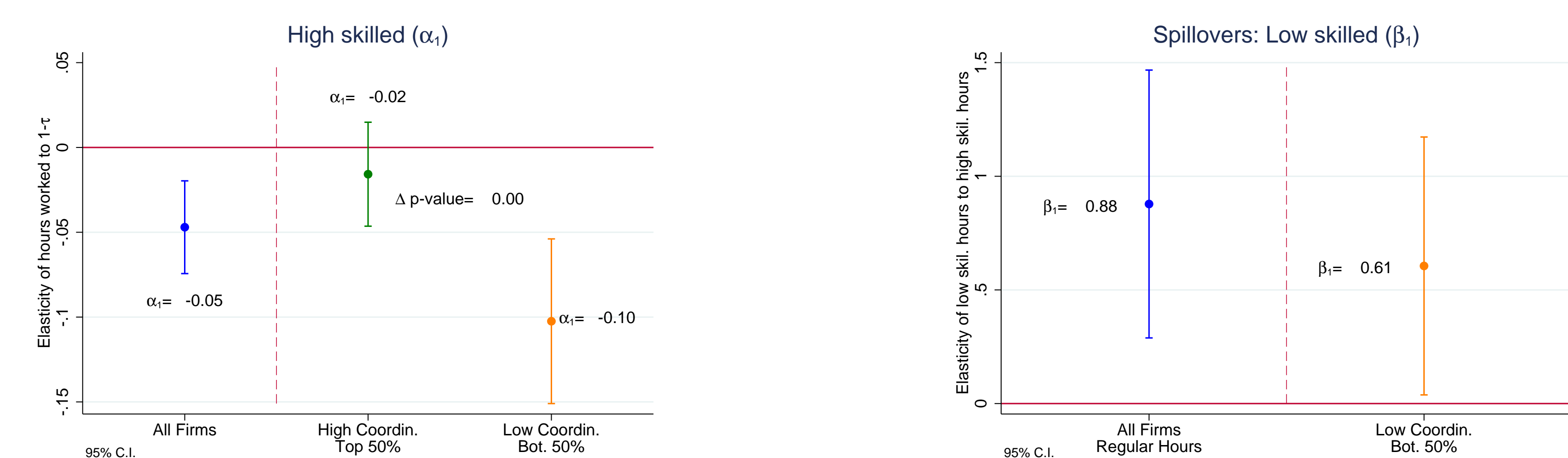
$h$  = Hours worked,  $\tau$  = Marginal Tax Rate on labor income,  $X$  = Ind. controls and firm controls, including net-of-tax rate and virtual income changes

- Spill-overs  $\Rightarrow \beta_1 > 0$  and smaller in magnitude in low coordination firms.
- Instrument:** Change of the simulated post-reform marginal tax rate based on **pre-reform income** ( $\tau_{Mit+3}^H$ ).

## 10. POLICY IMPLICATIONS

- Spillovers cause **downward** bias in the estimation of the labor supply elasticity from **Diff in Diff** models. In our setting we estimate a bias of around **80%** of the elasticity.
- Spillovers induce extra **tax revenues change**. In our setting we estimate a **3% extra reduction** in tax revenues due to spillovers.
- Coordination is **relevant to all policies** that affect **one part of workforce** in a firm (e.g. retirement policies that affect older workers). Much remains to be known on the effects in these other settings.

## 9. PART 2: LABOUR SUPPLY ELASTICITY AND COORDINATION - RESULTS



- Significant **attenuating** effects in **high coordination** firms.
- Significant spillovers** from high to low skilled workers: **.5% - .8%** (9-14 hours).
- Implied ratio of low skilled to high skilled hours of **0.85 to 1**.
- Weaker** spill-overs in **low coordination** firms.

## 11. CONCLUSIONS

- More productive firms coordinate hours more
- Coordination of hours predicts wage differentials across differently productive firms
- Coordination is associated with spillovers and attenuating effects from tax changes