How Important is Precautionary Labor Supply?

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Insurance Against Wage Uncertainty

Two components of **future wages**

1. determined by age, training, occupation, . . .
2. is **uncertain**, shocks only partially insured
   - illness, bonus, promotions, health shocks

Self insurance through precautionary saving

What is the role of labor supply for precautionary saving?

Precautionary saving through

1. **extra hours**
2. **less consumption**

- How large is **precautionary labor supply**?
- How much would **self-employed** work, if they had the certainty of **civil servants**?
- How large is overall precautionary saving?
- How large is precautionary belt-tightening?
- What structural **parameter values** can generate the empirical results?

Percentage Reduction of Hours

Table 1: Precautionary Effect for Different Occupations

	Short-Run		Long-Run	
	Perfect Foresight	Civil Servants	Perfect Foresight	Civil Servants
Self-Employed	4.88	3.57	5.53	4.04
Blue Collar	2.09	0.74	2.38	0.84
White Collar	1.98	0.64	2.26	0.72
Civil Servants	1.92	0.58	2.19	0.65
All	2.19	0.85	2.49	0.96

Notes: Simulated percentage reduction in hours of work when reducing wage risk to the sample minimum (perfect foresight) or the median risk faced by civil servants.

- Average precautionary savings due to precautionary labor supply are 59 Euro per month

  13 Euro (average marginal net wage) · 42 (average weekly hours of work) · 0.0249 · 52 weeks /12 months
- Average monthly savings: 450 Euro
- *If 50 percent of savings are precautionary, 26% of precautionary savings are due to precautionary labor supply*

A Calibration Exercise

- Are the estimated results in line with theoretical predictions?
- We calibrate a simple two period model with CRRA utility similar to [2].
- Flexible labor supply and savings
- 1st period wage: 13 Euro
- 2nd period wage: 8 or 18 Euro with equal probability
- $U_t = \frac{C_t^{1+\eta}}{1+\eta} - \Psi \frac{H_t^{1+\gamma}}{1+\gamma}$
  - γ intratemporal substitution parameter ($\frac{1}{\gamma}$ = **Frisch elasticty = 0.2**)
  - Ψ scaling factor
  - η **risk aversion = -1.67**
- Precautionary savings: 58 Euro; Precautionary labor supply: 1.19 h

⇒ *A quarter of precautionary savings due to precautionary labor supply*

How much is saved by belt-tightening, how much by extra hours?

- **Precautionary hours** of work are about **2.5% of total hours** for married men in Germany
- About **1/4** of precautionary savings are due to **extra work hours**
- About **3/4** of precautionary savings are due to **consumption cuts**
- If **self-employed** had the same wage certainty as **civil servants**,their hours of work would **reduce by about 4%**

Dynamic Labor Supply Equation

$$\Delta \ln h_{it} = \tilde{\beta}_1 \Delta \ln w_{it} + \tilde{\beta}_2 \Delta X_{it} + \tilde{\beta}_3 \Delta \sigma_{w,it} + \xi_{it}, \quad (1)$$

ξ_{it} residual of approximation of Euler Equation

With partial adjustment mechanism

$$\Delta \ln h_{it} = \alpha \Delta \ln h_{it-1} + \beta_1 \Delta \ln w_{it} + \beta_2 \Delta X_{it} + \beta_3 \Delta \sigma_{w,it} + \varepsilon_{it} \quad (2)$$

- h weekly hours of work
- w marginal hourly net wage
- σ_w net wage risk
- X controls
  - year dummies
  - household structure
  - demographics
  - predicted unemployment probability
- **Partial adjustment**
  - Short-run effect of wage risk: β_2
  - Long-run effect of wage risk: $\frac{\beta_2}{(1-\alpha)}$

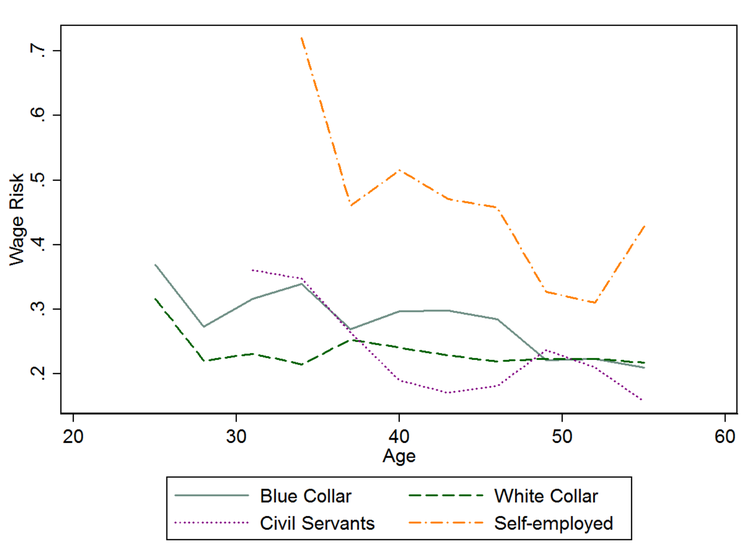
Estimation Results

Table 2: Labor Supply Regressions with Alternative Instrumentation Strategies

	OLS	2SLS	FD-IV	Anderson-Hsiao	DIFF-GMM	SYS-GMM
Lag of Hours Worked				0.160***	0.153***	0.123***
				(0.042)	(0.041)	(0.037)
Net Wage Risk	0.021***	0.028***	0.009*	0.009*	0.009*	0.023***
	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	(0.003)
Unempl. Prob.	0.002	0.016***	0.012**	0.011**	0.011**	0.012***
	(0.004)	(0.005)	(0.005)	(0.006)	(0.005)	(0.003)
Net Wage	-0.058***	0.148***	-0.071*	-0.058	-0.058	0.175***
	(0.011)	(0.021)	(0.039)	(0.042)	(0.038)	(0.019)
Controls	✓	✓	✓	✓	✓	✓
Instruments	—	labinc_{it-1}	$\Delta\text{labinc}_{it-1}$	$\ln h_{it-2}$, $\Delta\text{labinc}_{it-1}$	$\ln h_{it-2}, \ldots, \ln h_{it-13}$, collapsed, $\Delta\text{labinc}_{it-1}$	$\ln h_{it-2}, \ldots, \ln h_{it-13}$, $\Delta \ln h_{it-2}, \ldots, \Delta \ln h_{it-13}$, collapsed, $\Delta\text{labinc}_{it-1}$
Observations	10,987	10,821	8,031	7,989	8,112	10,755
AR(1) in FD					0.000	0.000
AR(2) in FD					0.883	0.212
Hansen					0.289	0.186

Notes: Columns 1-2: Estimation of an immediate adjustment labor supply equation.
Column 3: Estimation of equation (1). Columns 4-6: Estimation of equation (2) using different estimators.
Robust standard errors clustered at the individual level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

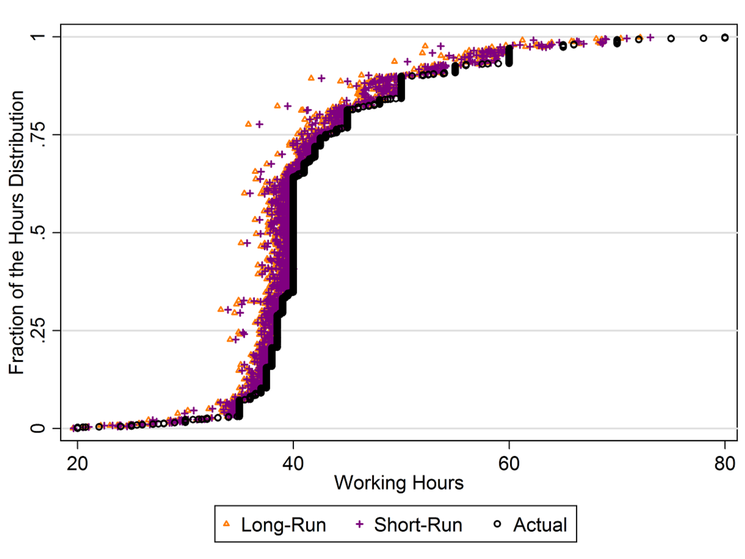
Measure of Expected Future Wages



$$\sigma_{w,it} = \frac{1}{4} \sum_{j=t-6}^{t-1} \sqrt{(ln\tilde{w}_j - ln\bar{\tilde{w}}_j)^2}$$

- Variation of past individual wages similar to [1]
- Standard deviation of detrended log wages $\ln \tilde{w}_{it}$

Shifts in the Hours Distribution



- Circles show percentile rank in the actual observed distribution of hours in 2011.
- Triangles show simulated **short-run** value of the hours of work under minimum uncertainty.
- Plus symbols denote the **long-run** hours of work under minimum uncertainty.

Estimation Methods

- Hourly wages constructed using income and hours information
- Measurement error in hours leads to a downward (denominator) bias of the wage coefficient
- Instrument wages with lags of monthly labor income
- *IV valid even if **measurement error** correlated over time*

References

[1] Simon C. Parker, Yacine Belghitar, and Tim Barmby.
Wage uncertainty and the labour supply of self-employed workers.
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[2] Martin Flodén.
Labour supply and saving under uncertainty.
Economic Journal, 116(513):721–737, 2006.

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