The Extension of STW Schemes during the Great Recession: A Story of Success?

Bjoern Brey & Matthias S. Hertweck

University of Konstanz

16th IWH-CIREQ Macroeconometric Workshop
December 8, 2015

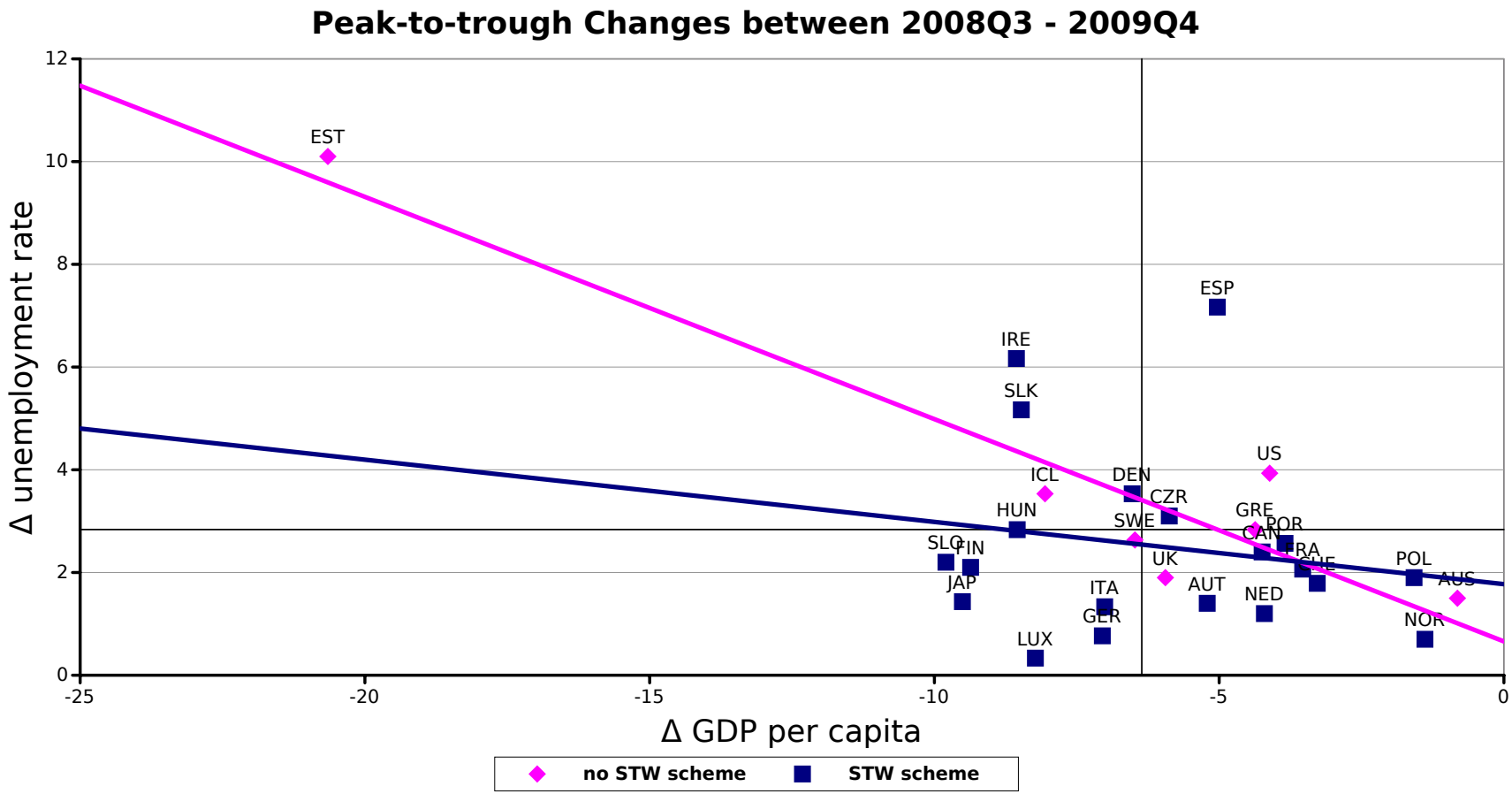
Outline

Outline

Unemployment in the Great Recession

- during the Great Recession, almost all OECD countries experienced a **sharp contraction** in GDP
- but there were large differences in **labor market resilience**: the **cross-country Okun's law** relationship was very weak
- popular argument: differences can be explained by **short-time work** (STW) compensation
  - Arpaia et al. (2010), Boeri & Bruecker (2011), Cahuc & Carcillo (2011), Hijzen & Venn (2011), Hijzen & Martin (2013)

The Impact of STW



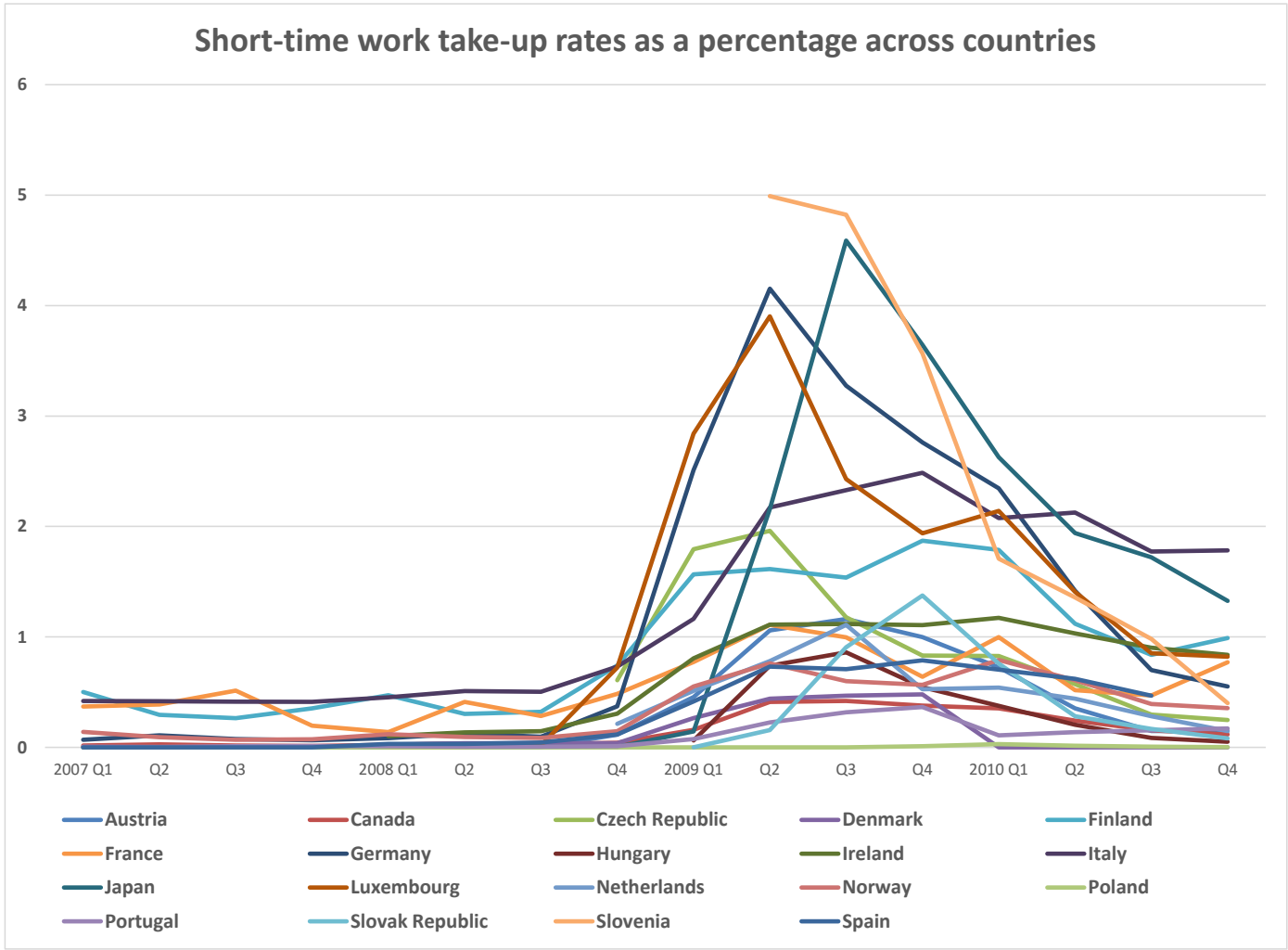
What is STW?

- a marginal **employment subsidy** targeted at temporarily distressed firms (Wießner 2015)
- incentivizes firms to **reduce working hours** along the intensive (hours per worker) rather than the extensive (**job destruction**) margin of employment
- firms pay wages only for **actual hours** worked, while a **government-financed** fund partially compensates the affected employees for their **loss of income**

Usage of STW in the Great Recession

- 15 out of 34 OECD countries **extend existing STW schemes** (e.g. by relaxing eligibility criteria, Hijzen & Venn 2011)
- seven OECD countries even decided to implement a **new STW system** at short notice
- in total **25 out of 34 OECD** countries operated a STW scheme at that time
- consequently, STW take-up rates in most OECD countries surged to **unprecedented levels** (Cahuc & Carcillo 2011)

Usage of STW during the Great Recession



Benefits of STW in Recessions

- aims at **preventing individual unemployment**, thereby avoiding associated adverse consequences such as the loss of (firm-specific) human capital (Kruppe & Scholz 2014)
- acts as an **automatic stabilizer** because in recessions more firms meet the eligibility criteria for the subsidy than in booms (Balleer et al. 2015)

Research Question I

Does the **dampening effect** of STW on the unemployment rate **diminish** at high STW take-up rates?

- main drawback of STW: **deadweight losses**, which arise whenever workers participate in STW programs whose jobs are **not at risk** (Hijzen & Venn 2011)
- when **eligibility criteria** are relaxed, not only STW take-up increases, but also the share of deadweight loss
- **discretionary STW** does not affect expectations of forward-looking agents (Balleer et al. 2015)

Answer: Yes, when STW take-up exceeds 3%!

Research Question II

Are **newly established** STW schemes able to **fully exploit** the benefits of STW?

- implementation often simply **came too late**
- workers and firms **need some time** to learn the system
- hasty introduction may be interpreted as a **temporary move**

Answer: No!

Outline

STW Take-Up Rates

- we use the **cross-country panel** on STW take-up rates constructed by Hijzen & Venn (2011)
  - publicly available OECD data are not **harmonized** & use a **broader concept** of STW (not only for economic, but also for seasonal and technical reasons)
  - **sample size**: 21 countries from 2007 Q1 to 2010 Q4; we add 7 non-STW countries & exclude Belgium
  - dataset suffers from **missing values** (time series starts later than 2007Q1 for 9 countries)
  - no data for actual hours reduction (**FTE**) available
- other than that, **publicly available** OECD data are used

Estimation Strategy

- we develop a **difference** version of Okun's law:
  - increases in STW take-up **dampen the rise** in unemployment during recessions
  - reductions in STW **lead to lower reductions** in unemployment in the early recovery
- with **distributed lags**:
  - changes in unemployment are **autocorrelated**
  - changes in GDP growth affect unemployment only **with delays**
- we control for **labor market institutions** (EPL, UB)

Baseline Specification

$$\Delta U_{n,t} = \delta \Delta U_{n,t-1} + \sum_{i=0}^{1} [\alpha_i \Delta \ln(GDP_{n,t-i}) + \\ + \alpha_{i+2} EPL_n * \Delta \ln(GDP_{n,t-i}) + \alpha_{i+4} UB_n * \Delta \ln(GDP_{n,t-i})]$$

$$+ \varphi_1 \Delta STW_{n,t} + \varphi_2 \Delta STW^2_{n,t} + \varphi_3 \Delta(STW_{n,t} * D_{New})$$

$$+ \varphi_4 \Delta STW_{n,t} * \Delta \ln(GDP_{n,t}) + \sum_{i=0}^{1} \delta_{i+1} \Delta \bar{U}_{t-i} + \Delta \epsilon_{n,t}$$

- research question 1: $\Delta STW^2_{n,t}$
- research question 2: $\Delta(STW_{n,t} * D_{New})$

Arellano-Bond Difference GMM

- captures the endogeneity aring from **simultaneity** between changes in $\Delta U_{n,t}$ and $\Delta STW_{n,t}$ (e.g. Boeri & Bruecker 2011)
- captures the "**dynamic panel bias**" (Nickell 1981) arising from the inclusion of Δu_{t-1} as regressor when T is short:
- solves also the trade-off between lag-length and sample size in **unbalanced panels**
- standard errors are we use the **Windmeijer**-corrected

Cross-Sectional Correlation

- standard treatment: **quarter dummies**
- however, this entails $T - 2 = 14$ additional (weak) instruments
- alternative strategy: we include (distributed lags of) the **average OECD-wide** unemployment rate
- this **reduces** the sum of squared cross-sectional residual sums by 80% (root: 56%) and the number of instruments by 12

Outline

	Time Dummies		OECD UNEM	
	OLS	GMM	OLS	GMM
$\Delta U_{n,t-1}$	0.641	0.278	0.655	0.685
	(0.081)***	(0.229)	(0.080)***	(0.166)***
$\Delta STW_{n,t}$	-0.168	-0.919	-0.186	-1.032
	(0.115)	(0.384)**	(0.099)*	(0.335)***
$\Delta STW^2_{n,t}$	0.026	0.12	0.024	0.134
	(0.019)	(0.054)**	(0.018)	(0.039)***
$\Delta STW_{n,t} \times D_{new}$	0.43	0.538	0.407	0.764
	(0.170)**	(0.238)**	(0.176)**	(0.347)**
$\Delta STW_{n,t} \times \Delta \log(GDP_{n,t})$	0.044	0.431	0.034	0.191
	(0.023)*	(0.215)*	(0.021)*	(0.118)
$\Delta \log(GDP_{n,t})$	-0.037	-0.095	-0.031	-0.011
	(0.035)	(0.053)*	(0.031)	(0.022)
$\Delta \log(GDP_{n,t-1})$	-0.046	-0.066	-0.04	-0.049
	(0.031)	(0.029)**	(0.032)	(0.019)**
$\Delta \log(GDP_{n,t}) \times EPL$	-0.007	-0.022	-0.013	-0.07
	(0.027)	(0.048)	(0.026)	(0.044)
$\Delta \log(GDP_{n,t-1}) \times EPL$	0.052	0.029	0.057	0.044
	(0.030)*	(0.024)	(0.031)*	(0.019)**
$\Delta \log(GDP_{n,t}) \times UB$	0.012	-0.046	0.016	-0.031
	(0.028)	(-0.06)	(0.028)	(0.047)
$\Delta \log(GDP_{n,t-1}) \times UB$	0.002	-0.022	-0.001	-0.004
	(0.032)	(0.025)	(0.032)	(0.024)
Number of countries	26	26	26	26
Number of observations	320	312	320	312
Number of instruments		30		18
R-Squared	0.71		0.7	
Hansen test		0.997		0.851
AB-test AR(2)		0.936		0.207

	Time Dummies		OECD UNEM	
	OLS	GMM	OLS	GMM
$\Delta U_{n,t-1}$	0.641	0.278	0.655	0.685
	(0.081)***	(0.229)	(0.080)***	(0.166)***
$\Delta STW_{n,t}$	-0.168	-0.919	-0.186	-1.032
	(0.115)	(0.384)**	(0.099)*	(0.335)***
$\Delta STW^2_{n,t}$	0.026	0.12	0.024	0.134
	(0.019)	(0.054)**	(0.018)	(0.039)***
$\Delta STW_{n,t} \times D_{new}$	0.43	0.538	0.407	0.764
	(0.170)**	(0.238)**	(0.176)**	(0.347)**
$\Delta STW_{n,t} \times \Delta \log(GDP_{n,t})$	0.044	0.431	0.034	0.191
	(0.023)*	(0.215)*	(0.021)*	(0.118)
$\Delta \log(GDP_{n,t})$	-0.037	-0.095	-0.031	-0.011
	(0.035)	(0.053)*	(0.031)	(0.022)
$\Delta \log(GDP_{n,t-1})$	-0.046	-0.066	-0.04	-0.049
	(0.031)	(0.029)**	(0.032)	(0.019)**
$\Delta \log(GDP_{n,t}) \times EPL$	-0.007	-0.022	-0.013	-0.07
	(0.027)	(0.048)	(0.026)	(0.044)
$\Delta \log(GDP_{n,t-1}) \times EPL$	0.052	0.029	0.057	0.044
	(0.030)*	(0.024)	(0.031)*	(0.019)**
$\Delta \log(GDP_{n,t}) \times UB$	0.012	-0.046	0.016	-0.031
	(0.028)	(-0.06)	(0.028)	(0.047)
$\Delta \log(GDP_{n,t-1}) \times UB$	0.002	-0.022	-0.001	-0.004
	(0.032)	(0.025)	(0.032)	(0.024)
Number of countries	26	26	26	26
Number of observations	320	312	320	312
Number of instruments		30		18
R-Squared	0.71		0.7	
Hansen test		0.997		0.851
AB-test AR(2)		0.936		0.207

	Time Dummies		OECD UNEM	
	OLS	GMM	OLS	GMM
$\Delta U_{n,t-1}$	0.641	0.278	0.655	0.685
	(0.081)***	(0.229)	(0.080)***	(0.166)***
$\Delta STW_{n,t}$	-0.168	-0.919	-0.186	-1.032
	(0.115)	(0.384)**	(0.099)*	(0.335)***
$\Delta STW^2_{n,t}$	0.026	0.12	0.024	0.134
	(0.019)	(0.054)**	(0.018)	(0.039)***
$\Delta STW_{n,t} \times D_{new}$	0.43	0.538	0.407	0.764
	(0.170)**	(0.238)**	(0.176)**	(0.347)**
$\Delta STW_{n,t} \times \Delta \log(GDP_{n,t})$	0.044	0.431	0.034	0.191
	(0.023)*	(0.215)*	(0.021)*	(0.118)
$\Delta \log(GDP_{n,t})$	-0.037	-0.095	-0.031	-0.011
	(0.035)	(0.053)*	(0.031)	(0.022)
$\Delta \log(GDP_{n,t-1})$	-0.046	-0.066	-0.04	-0.049
	(0.031)	(0.029)**	(0.032)	(0.019)**
$\Delta \log(GDP_{n,t}) \times EPL$	-0.007	-0.022	-0.013	-0.07
	(0.027)	(0.048)	(0.026)	(0.044)
$\Delta \log(GDP_{n,t-1}) \times EPL$	0.052	0.029	0.057	0.044
	(0.030)*	(0.024)	(0.031)*	(0.019)**
$\Delta \log(GDP_{n,t}) \times UB$	0.012	-0.046	0.016	-0.031
	(0.028)	(-0.06)	(0.028)	(0.047)
$\Delta \log(GDP_{n,t-1}) \times UB$	0.002	-0.022	-0.001	-0.004
	(0.032)	(0.025)	(0.032)	(0.024)
Number of countries	26	26	26	26
Number of observations	320	312	320	312
Number of instruments		30		18
R-Squared	0.71		0.7	
Hansen test		0.997		0.851
AB-test AR(2)		0.936		0.207

	Time Dummies		OECD UNEM	
	OLS	GMM	OLS	GMM
$\Delta U_{n,t-1}$	0.641	0.278	0.655	0.685
	(0.081)***	(0.229)	(0.080)***	(0.166)***
$\Delta STW_{n,t}$	-0.168	-0.919	-0.186	-1.032
	(0.115)	(0.384)**	(0.099)*	(0.335)***
$\Delta STW^2_{n,t}$	0.026	0.12	0.024	0.134
	(0.019)	(0.054)**	(0.018)	(0.039)***
$\Delta STW_{n,t} \times D_{new}$	0.43	0.538	0.407	0.764
	(0.170)**	(0.238)**	(0.176)**	(0.347)**
$\Delta STW_{n,t} \times \Delta \log(GDP_{n,t})$	0.044	0.431	0.034	0.191
	(0.023)*	(0.215)*	(0.021)*	(0.118)
$\Delta \log(GDP_{n,t})$	-0.037	-0.095	-0.031	-0.011
	(0.035)	(0.053)*	(0.031)	(0.022)
$\Delta \log(GDP_{n,t-1})$	-0.046	-0.066	-0.04	-0.049
	(0.031)	(0.029)**	(0.032)	(0.019)**
$\Delta \log(GDP_{n,t}) \times EPL$	-0.007	-0.022	-0.013	-0.07
	(0.027)	(0.048)	(0.026)	(0.044)
$\Delta \log(GDP_{n,t-1}) \times EPL$	0.052	0.029	0.057	0.044
	(0.030)*	(0.024)	(0.031)*	(0.019)**
$\Delta \log(GDP_{n,t}) \times UB$	0.012	-0.046	0.016	-0.031
	(0.028)	(-0.06)	(0.028)	(0.047)
$\Delta \log(GDP_{n,t-1}) \times UB$	0.002	-0.022	-0.001	-0.004
	(0.032)	(0.025)	(0.032)	(0.024)
Number of countries	26	26	26	26
Number of observations	320	312	320	312
Number of instruments		30		18
R-Squared	0.71		0.7	
Hansen test		0.997		0.851
AB-test AR(2)		0.936		0.207

	Time Dummies		OECD UNEM	
	OLS	GMM	OLS	GMM
$\Delta U_{n,t-1}$	0.641	0.278	0.655	0.685
	(0.081)***	(0.229)	(0.080)***	(0.166)***
$\Delta STW_{n,t}$	-0.168	-0.919	-0.186	-1.032
	(0.115)	(0.384)**	(0.099)*	(0.335)***
$\Delta STW^2_{n,t}$	0.026	0.12	0.024	0.134
	(0.019)	(0.054)**	(0.018)	(0.039)***
$\Delta STW_{n,t} \times D_{new}$	0.43	0.538	0.407	0.764
	(0.170)**	(0.238)**	(0.176)**	(0.347)**
$\Delta STW_{n,t} \times \Delta \log(GDP_{n,t})$	0.044	0.431	0.034	0.191
	(0.023)*	(0.215)*	(0.021)*	(0.118)
$\Delta \log(GDP_{n,t})$	-0.037	-0.095	-0.031	-0.011
	(0.035)	(0.053)*	(0.031)	(0.022)
$\Delta \log(GDP_{n,t-1})$	-0.046	-0.066	-0.04	-0.049
	(0.031)	(0.029)**	(0.032)	(0.019)**
$\Delta \log(GDP_{n,t}) \times EPL$	-0.007	-0.022	-0.013	-0.07
	(0.027)	(0.048)	(0.026)	(0.044)
$\Delta \log(GDP_{n,t-1}) \times EPL$	0.052	0.029	0.057	0.044
	(0.030)*	(0.024)	(0.031)*	(0.019)**
$\Delta \log(GDP_{n,t}) \times UB$	0.012	-0.046	0.016	-0.031
	(0.028)	(-0.06)	(0.028)	(0.047)
$\Delta \log(GDP_{n,t-1}) \times UB$	0.002	-0.022	-0.001	-0.004
	(0.032)	(0.025)	(0.032)	(0.024)
Number of countries	26	26	26	26
Number of observations	320	312	320	312
Number of instruments		30		18
R-Squared	0.71		0.7	
Hansen test		0.997		0.851
AB-test AR(2)		0.936		0.207

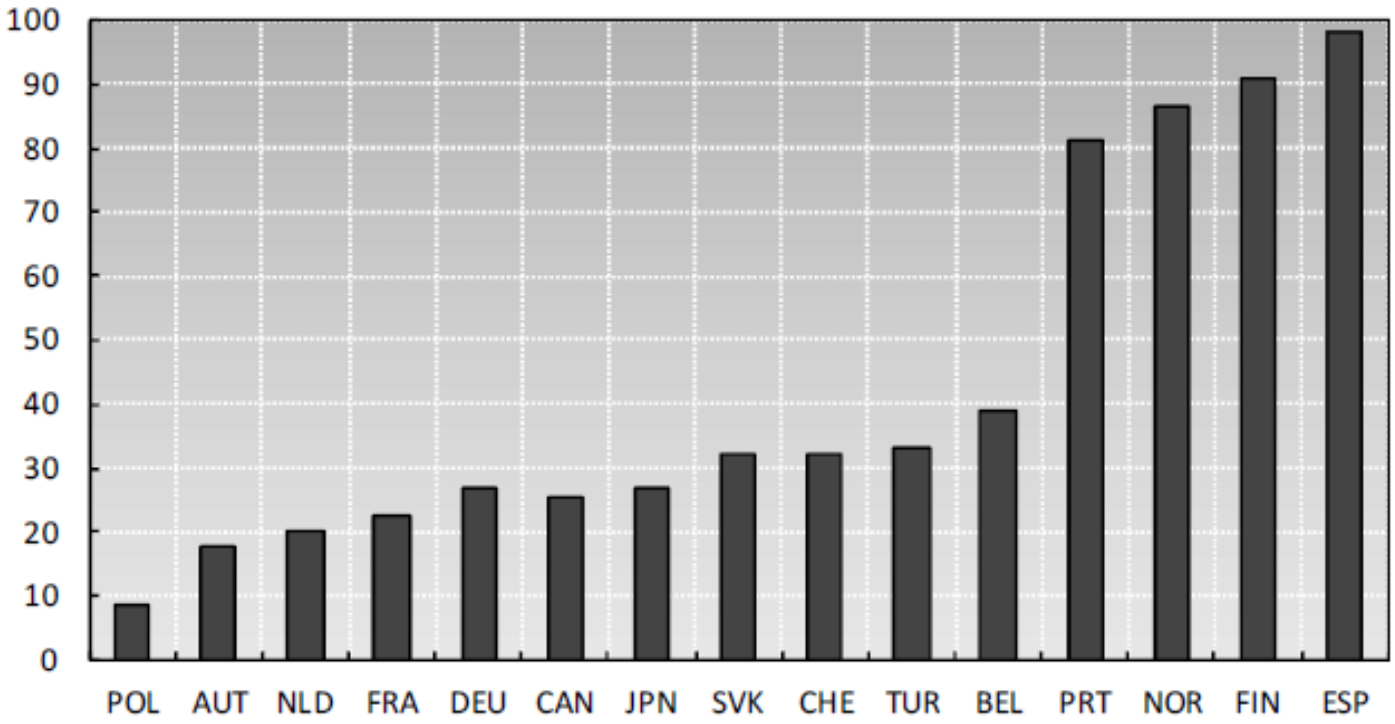
	Time Dummies		OECD UNEM	
	OLS	GMM	OLS	GMM
$\Delta U_{n,t-1}$	0.641	0.278	0.655	0.685
	(0.081)***	(0.229)	(0.080)***	(0.166)***
$\Delta STW_{n,t}$	-0.168	-0.919	-0.186	-1.032
	(0.115)	(0.384)**	(0.099)*	(0.335)***
$\Delta STW^2_{n,t}$	0.026	0.12	0.024	0.134
	(0.019)	(0.054)**	(0.018)	(0.039)***
$\Delta STW_{n,t} \times D_{new}$	0.43	0.538	0.407	0.764
	(0.170)**	(0.238)**	(0.176)**	(0.347)**
$\Delta STW_{n,t} \times \Delta \log(GDP_{n,t})$	0.044	0.431	0.034	0.191
	(0.023)*	(0.215)*	(0.021)*	(0.118)
$\Delta \log(GDP_{n,t})$	-0.037	-0.095	-0.031	-0.011
	(0.035)	(0.053)*	(0.031)	(0.022)
$\Delta \log(GDP_{n,t-1})$	-0.046	-0.066	-0.04	-0.049
	(0.031)	(0.029)**	(0.032)	(0.019)**
$\Delta \log(GDP_{n,t}) \times EPL$	-0.007	-0.022	-0.013	-0.07
	(0.027)	(0.048)	(0.026)	(0.044)
$\Delta \log(GDP_{n,t-1}) \times EPL$	0.052	0.029	0.057	0.044
	(0.030)*	(0.024)	(0.031)*	(0.019)**
$\Delta \log(GDP_{n,t}) \times UB$	0.012	-0.046	0.016	-0.031
	(0.028)	(-0.06)	(0.028)	(0.047)
$\Delta \log(GDP_{n,t-1}) \times UB$	0.002	-0.022	-0.001	-0.004
	(0.032)	(0.025)	(0.032)	(0.024)
Number of countries	26	26	26	26
Number of observations	320	312	320	312
Number of instruments		30		18
R-Squared	0.71		0.7	
Hansen test		0.997		0.851
AB-test AR(2)		0.936		0.207

The Dampening Effect of STW

- the dampening impact of STW is **significant** and **strong**
- at low take-up rates, one additional percentage point STW take-up reduces $U_{n,t}$ by **one percentage point**
- even a **small reduction** in working hours be very effektive
- our macro level capture direct and **indirect** job saving effects (unlike **firm level** studies)

Figure 6. **Average hours reductions and full-time equivalent take-up rates in selected countries**

Panel A. **Average hours reductions (% of normal full-time working hours), 2009**



Source: Hijzen & Venn, 2011, Figure 6

Research Questions

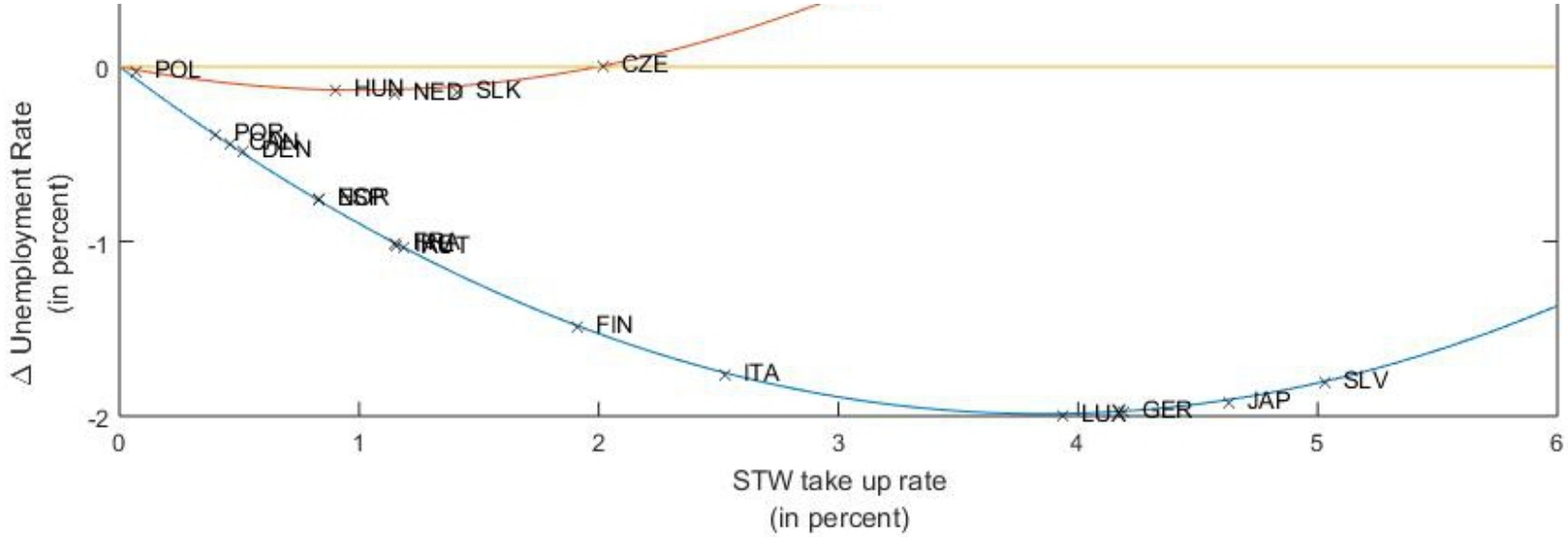
Question I:

- the dampening effect of STW **levels out** at take-up rates higher than 3%
- the **U-shape** is significant (Lind and Mehlum 2007)

Question II:

- for **newly-established** STW schemes, the dampening effect is significantly weaker (-75%)

Illustration of Our Central Result



- note: the graph is based on the **(significant) coefficients** of $\Delta STW_{n,t}$, $\Delta STW_{n,t}^2$, $\Delta STW_{n,t} \times D_{new}$

Results — Discussion

- **endogeneity**: OLS coefficients are $\sim 80\%$ **smaller**
- **too many instruments**: when using quarter dummies, some coefficients are not robust (Roodman 2009)
- for this reason, we prefer to use (distributed lags of) the **OECD-wide average** unemployment rate

Cross-Sectional Errors

	sum of squared residual sums		**reduction in %**	
	level	root	level	root
no control for common shocks	235.5	15.3	0	0
OECD unemployment	106.0	10.3	55	33
OECD unemployment L(0/1)	45.5	6.7	81	56
Endogenous OECD Unemp.	47.1	6.9	80	55
quarter dummies	2.0	1.4	99	91

	Institutions		Excluding Country Groups			
	None	Extended	High FTE	Low FTE	New STW	Outliers
$\Delta U_{n,t-1}$	0.726	0.693	0.519	0.868	0.751	0.525
	(0.126)***	(0.143)***	(0.216)**	(0.124)***	(0.163)***	(0.209)**
$\Delta STW_{n,t}$	-0.936	-0.844	-1.387	-0.603	-0.853	-1.247
	(0.301)***	(0.296)***	(0.512)**	(0.280)**	(0.343)**	(0.386)***
$\Delta STW^2_{n,t}$	0.119	0.113	0.182	0.082	0.111	0.163
	(0.031)***	(0.036)***	(0.061)***	(0.035)**	(0.044)**	(0.043)***
$\Delta STW_{n,t} \times D_{new}$	0.788	0.704	0.682	0.897		0.607
	(0.331)**	(0.369)*	(0.263)**	(0.444)*		(0.232)**
$\Delta STW_{n,t} \times \Delta \log(GDP_{n,t})$	0.181	0.156	0.245	0.04	0.134	0.245
	(0.136)	(0.105)	(0.154)	(0.105)	(0.121)	(0.156)
$\Delta \log(GDP_{n,t})$	-0.049	-0.017	-0.018	0.006	-0.009	-0.034
	(0.027)*	(0.018)	(0.044)	(0.026)	(0.018)	(-0.04)
$\Delta \log(GDP_{n,t-1})$	-0.021	-0.046	-0.076	-0.043	-0.05	-0.066
	(0.018)	(0.020)**	(0.023)***	(0.019)**	(0.019)**	(0.025)**
$\Delta \log(GDP_{n,t}) \times EPL$		-0.038	-0.115	-0.023	-0.048	-0.08
		(0.027)	(0.056)*	(0.013)*	(0.034)	(0.059)
$\Delta \log(GDP_{n,t-1}) \times EPL$		0.05	0.049	0.061	0.053	0.033
		(0.023)**	(0.018)**	(0.019)***	(0.021)**	(0.016)**
$\Delta \log(GDP_{n,t}) \times UB$		-0.103	-0.021	-0.012	-0.017	-0.033
		(0.058)*	(0.066)	(0.039)	(0.041)	(0.066)
$\Delta \log(GDP_{n,t-1}) \times UB$		0.035	-0.012	0.012	-0.002	0.005
		(0.020)*	(0.038)	(0.025)	(0.025)	(0.028)
$\Delta \log(GDP_{n,t}) \times CBI$		0.104				
		(0.050)**				
Number of instruments	14	22	18	18	16	18
Number of countries	26	26	21	21	21	24
Hansen test	0.76	0.864	0.917	0.539	0.945	0.953
AB-test AR(2)	0.158	0.21	0.346	0.254	0.143	0.1

	Institutions		Excluding Country Groups			
	None	Extended	High FTE	Low FTE	New STW	Outliers
$\Delta U_{n,t-1}$	0.726	0.693	0.519	0.868	0.751	0.525
	(0.126)***	(0.143)***	(0.216)**	(0.124)***	(0.163)***	(0.209)**
$\Delta STW_{n,t}$	-0.936	-0.844	-1.387	-0.603	-0.853	-1.247
	(0.301)***	(0.296)***	(0.512)**	(0.280)**	(0.343)**	(0.386)***
$\Delta STW^2_{n,t}$	0.119	0.113	0.182	0.082	0.111	0.163
	(0.031)***	(0.036)***	(0.061)***	(0.035)**	(0.044)**	(0.043)***
$\Delta STW_{n,t} \times D_{new}$	0.788	0.704	0.682	0.897		0.607
	(0.331)**	(0.369)*	(0.263)**	(0.444)*		(0.232)**
$\Delta STW_{n,t} \times \Delta \log(GDP_{n,t})$	0.181	0.156	0.245	0.04	0.134	0.245
	(0.136)	(0.105)	(0.154)	(0.105)	(0.121)	(0.156)
$\Delta \log(GDP_{n,t})$	-0.049	-0.017	-0.018	0.006	-0.009	-0.034
	(0.027)*	(0.018)	(0.044)	(0.026)	(0.018)	(-0.04)
$\Delta \log(GDP_{n,t-1})$	-0.021	-0.046	-0.076	-0.043	-0.05	-0.066
	(0.018)	(0.020)**	(0.023)***	(0.019)**	(0.019)**	(0.025)**
$\Delta \log(GDP_{n,t}) \times EPL$		-0.038	-0.115	-0.023	-0.048	-0.08
		(0.027)	(0.056)*	(0.013)*	(0.034)	(0.059)
$\Delta \log(GDP_{n,t-1}) \times EPL$		0.05	0.049	0.061	0.053	0.033
		(0.023)**	(0.018)**	(0.019)***	(0.021)**	(0.016)**
$\Delta \log(GDP_{n,t}) \times UB$		-0.103	-0.021	-0.012	-0.017	-0.033
		(0.058)*	(0.066)	(0.039)	(0.041)	(0.066)
$\Delta \log(GDP_{n,t-1}) \times UB$		0.035	-0.012	0.012	-0.002	0.005
		(0.020)*	(0.038)	(0.025)	(0.025)	(0.028)
$\Delta \log(GDP_{n,t}) \times CBI$		0.104				
		(0.050)**				
Number of instruments	14	22	18	18	16	18
Number of countries	26	26	21	21	21	24
Hansen test	0.76	0.864	0.917	0.539	0.945	0.953
AB-test AR(2)	0.158	0.21	0.346	0.254	0.143	0.1

	Institutions		Excluding Country Groups			
	None	Extended	High FTE	Low FTE	New STW	Outliers
$\Delta U_{n,t-1}$	0.726	0.693	0.519	0.868	0.751	0.525
	(0.126)***	(0.143)***	(0.216)**	(0.124)***	(0.163)***	(0.209)**
$\Delta STW_{n,t}$	-0.936	-0.844	-1.387	-0.603	-0.853	-1.247
	(0.301)***	(0.296)***	(0.512)**	(0.280)**	(0.343)**	(0.386)***
$\Delta STW^2_{n,t}$	0.119	0.113	0.182	0.082	0.111	0.163
	(0.031)***	(0.036)***	(0.061)***	(0.035)**	(0.044)**	(0.043)***
$\Delta STW_{n,t} \times D_{new}$	0.788	0.704	0.682	0.897		0.607
	(0.331)**	(0.369)*	(0.263)**	(0.444)*		(0.232)**
$\Delta STW_{n,t} \times \Delta \log(GDP_{n,t})$	0.181	0.156	0.245	0.04	0.134	0.245
	(0.136)	(0.105)	(0.154)	(0.105)	(0.121)	(0.156)
$\Delta \log(GDP_{n,t})$	-0.049	-0.017	-0.018	0.006	-0.009	-0.034
	(0.027)*	(0.018)	(0.044)	(0.026)	(0.018)	(-0.04)
$\Delta \log(GDP_{n,t-1})$	-0.021	-0.046	-0.076	-0.043	-0.05	-0.066
	(0.018)	(0.020)**	(0.023)***	(0.019)**	(0.019)**	(0.025)**
$\Delta \log(GDP_{n,t}) \times EPL$		-0.038	-0.115	-0.023	-0.048	-0.08
		(0.027)	(0.056)*	(0.013)*	(0.034)	(0.059)
$\Delta \log(GDP_{n,t-1}) \times EPL$		0.05	0.049	0.061	0.053	0.033
		(0.023)**	(0.018)**	(0.019)***	(0.021)**	(0.016)**
$\Delta \log(GDP_{n,t}) \times UB$		-0.103	-0.021	-0.012	-0.017	-0.033
		(0.058)*	(0.066)	(0.039)	(0.041)	(0.066)
$\Delta \log(GDP_{n,t-1}) \times UB$		0.035	-0.012	0.012	-0.002	0.005
		(0.020)*	(0.038)	(0.025)	(0.025)	(0.028)
$\Delta \log(GDP_{n,t}) \times CBI$		0.104				
		(0.050)**				
Number of instruments	14	22	18	18	16	18
Number of countries	26	26	21	21	21	24
Hansen test	0.76	0.864	0.917	0.539	0.945	0.953
AB-test AR(2)	0.158	0.21	0.346	0.254	0.143	0.1

	Institutions		Excluding Country Groups			
	None	Extended	High FTE	Low FTE	New STW	Outliers
$\Delta U_{n,t-1}$	0.726	0.693	0.519	0.868	0.751	0.525
	(0.126)***	(0.143)***	(0.216)**	(0.124)***	(0.163)***	(0.209)**
$\Delta STW_{n,t}$	-0.936	-0.844	-1.387	-0.603	-0.853	-1.247
	(0.301)***	(0.296)***	(0.512)**	(0.280)**	(0.343)**	(0.386)***
$\Delta STW^2_{n,t}$	0.119	0.113	0.182	0.082	0.111	0.163
	(0.031)***	(0.036)***	(0.061)***	(0.035)**	(0.044)**	(0.043)***
$\Delta STW_{n,t} \times D_{new}$	0.788	0.704	0.682	0.897		0.607
	(0.331)**	(0.369)*	(0.263)**	(0.444)*		(0.232)**
$\Delta STW_{n,t} \times \Delta \log(GDP_{n,t})$	0.181	0.156	0.245	0.04	0.134	0.245
	(0.136)	(0.105)	(0.154)	(0.105)	(0.121)	(0.156)
$\Delta \log(GDP_{n,t})$	-0.049	-0.017	-0.018	0.006	-0.009	-0.034
	(0.027)*	(0.018)	(0.044)	(0.026)	(0.018)	(-0.04)
$\Delta \log(GDP_{n,t-1})$	-0.021	-0.046	-0.076	-0.043	-0.05	-0.066
	(0.018)	(0.020)**	(0.023)***	(0.019)**	(0.019)**	(0.025)**
$\Delta \log(GDP_{n,t}) \times EPL$		-0.038	-0.115	-0.023	-0.048	-0.08
		(0.027)	(0.056)*	(0.013)*	(0.034)	(0.059)
$\Delta \log(GDP_{n,t-1}) \times EPL$		0.05	0.049	0.061	0.053	0.033
		(0.023)**	(0.018)**	(0.019)***	(0.021)**	(0.016)**
$\Delta \log(GDP_{n,t}) \times UB$		-0.103	-0.021	-0.012	-0.017	-0.033
		(0.058)*	(0.066)	(0.039)	(0.041)	(0.066)
$\Delta \log(GDP_{n,t-1}) \times UB$		0.035	-0.012	0.012	-0.002	0.005
		(0.020)*	(0.038)	(0.025)	(0.025)	(0.028)
$\Delta \log(GDP_{n,t}) \times CBI$		0.104				
		(0.050)**				
Number of instruments	14	22	18	18	16	18
Number of countries	26	26	21	21	21	24
Hansen test	0.76	0.864	0.917	0.539	0.945	0.953
AB-test AR(2)	0.158	0.21	0.346	0.254	0.143	0.1

	Institutions		Excluding Country Groups			
	None	Extended	High FTE	Low FTE	New STW	Outliers
$\Delta U_{n,t-1}$	0.726	0.693	0.519	0.868	0.751	0.525
	(0.126)***	(0.143)***	(0.216)**	(0.124)***	(0.163)***	(0.209)**
$\Delta STW_{n,t}$	-0.936	-0.844	-1.387	-0.603	-0.853	-1.247
	(0.301)***	(0.296)***	(0.512)**	(0.280)**	(0.343)**	(0.386)***
$\Delta STW^2_{n,t}$	0.119	0.113	0.182	0.082	0.111	0.163
	(0.031)***	(0.036)***	(0.061)***	(0.035)**	(0.044)**	(0.043)***
$\Delta STW_{n,t} \times D_{new}$	0.788	0.704	0.682	0.897		0.607
	(0.331)**	(0.369)*	(0.263)**	(0.444)*		(0.232)**
$\Delta STW_{n,t} \times \Delta \log(GDP_{n,t})$	0.181	0.156	0.245	0.04	0.134	0.245
	(0.136)	(0.105)	(0.154)	(0.105)	(0.121)	(0.156)
$\Delta \log(GDP_{n,t})$	-0.049	-0.017	-0.018	0.006	-0.009	-0.034
	(0.027)*	(0.018)	(0.044)	(0.026)	(0.018)	(-0.04)
$\Delta \log(GDP_{n,t-1})$	-0.021	-0.046	-0.076	-0.043	-0.05	-0.066
	(0.018)	(0.020)**	(0.023)***	(0.019)**	(0.019)**	(0.025)**
$\Delta \log(GDP_{n,t}) \times EPL$		-0.038	-0.115	-0.023	-0.048	-0.08
		(0.027)	(0.056)*	(0.013)*	(0.034)	(0.059)
$\Delta \log(GDP_{n,t-1}) \times EPL$		0.05	0.049	0.061	0.053	0.033
		(0.023)**	(0.018)**	(0.019)***	(0.021)**	(0.016)**
$\Delta \log(GDP_{n,t}) \times UB$		-0.103	-0.021	-0.012	-0.017	-0.033
		(0.058)*	(0.066)	(0.039)	(0.041)	(0.066)
$\Delta \log(GDP_{n,t-1}) \times UB$		0.035	-0.012	0.012	-0.002	0.005
		(0.020)*	(0.038)	(0.025)	(0.025)	(0.028)
$\Delta \log(GDP_{n,t}) \times CBI$		0.104				
		(0.050)**				
Number of instruments	14	22	18	18	16	18
Number of countries	26	26	21	21	21	24
Hansen test	0.76	0.864	0.917	0.539	0.945	0.953
AB-test AR(2)	0.158	0.21	0.346	0.254	0.143	0.1

	Institutions		Excluding Country Groups			
	None	Extended	High FTE	Low FTE	New STW	Outliers
$\Delta U_{n,t-1}$	0.726	0.693	0.519	0.868	0.751	0.525
	(0.126)***	(0.143)***	(0.216)**	(0.124)***	(0.163)***	(0.209)**
$\Delta STW_{n,t}$	-0.936	-0.844	-1.387	-0.603	-0.853	-1.247
	(0.301)***	(0.296)***	(0.512)**	(0.280)**	(0.343)**	(0.386)***
$\Delta STW^2_{n,t}$	0.119	0.113	0.182	0.082	0.111	0.163
	(0.031)***	(0.036)***	(0.061)***	(0.035)**	(0.044)**	(0.043)***
$\Delta STW_{n,t} \times D_{new}$	0.788	0.704	0.682	0.897		0.607
	(0.331)**	(0.369)*	(0.263)**	(0.444)*		(0.232)**
$\Delta STW_{n,t} \times \Delta \log(GDP_{n,t})$	0.181	0.156	0.245	0.04	0.134	0.245
	(0.136)	(0.105)	(0.154)	(0.105)	(0.121)	(0.156)
$\Delta \log(GDP_{n,t})$	-0.049	-0.017	-0.018	0.006	-0.009	-0.034
	(0.027)*	(0.018)	(0.044)	(0.026)	(0.018)	(-0.04)
$\Delta \log(GDP_{n,t-1})$	-0.021	-0.046	-0.076	-0.043	-0.05	-0.066
	(0.018)	(0.020)**	(0.023)***	(0.019)**	(0.019)**	(0.025)**
$\Delta \log(GDP_{n,t}) \times EPL$		-0.038	-0.115	-0.023	-0.048	-0.08
		(0.027)	(0.056)*	(0.013)*	(0.034)	(0.059)
$\Delta \log(GDP_{n,t-1}) \times EPL$		0.05	0.049	0.061	0.053	0.033
		(0.023)**	(0.018)**	(0.019)***	(0.021)**	(0.016)**
$\Delta \log(GDP_{n,t}) \times UB$		-0.103	-0.021	-0.012	-0.017	-0.033
		(0.058)*	(0.066)	(0.039)	(0.041)	(0.066)
$\Delta \log(GDP_{n,t-1}) \times UB$		0.035	-0.012	0.012	-0.002	0.005
		(0.020)*	(0.038)	(0.025)	(0.025)	(0.028)
$\Delta \log(GDP_{n,t}) \times CBI$		0.104				
		(0.050)**				
Number of instruments	14	22	18	18	16	18
Number of countries	26	26	21	21	21	24
Hansen test	0.76	0.864	0.917	0.539	0.945	0.953
AB-test AR(2)	0.158	0.21	0.346	0.254	0.143	0.1

	Institutions		Excluding Country Groups			
	None	Extended	High FTE	Low FTE	New STW	Outliers
$\Delta U_{n,t-1}$	0.726	0.693	0.519	0.868	0.751	0.525
	(0.126)***	(0.143)***	(0.216)**	(0.124)***	(0.163)***	(0.209)**
$\Delta STW_{n,t}$	-0.936	-0.844	-1.387	-0.603	-0.853	-1.247
	(0.301)***	(0.296)***	(0.512)**	(0.280)**	(0.343)**	(0.386)***
$\Delta STW^2_{n,t}$	0.119	0.113	0.182	0.082	0.111	0.163
	(0.031)***	(0.036)***	(0.061)***	(0.035)**	(0.044)**	(0.043)***
$\Delta STW_{n,t} \times D_{new}$	0.788	0.704	0.682	0.897		0.607
	(0.331)**	(0.369)*	(0.263)**	(0.444)*		(0.232)**
$\Delta STW_{n,t} \times \Delta \log(GDP_{n,t})$	0.181	0.156	0.245	0.04	0.134	0.245
	(0.136)	(0.105)	(0.154)	(0.105)	(0.121)	(0.156)
$\Delta \log(GDP_{n,t})$	-0.049	-0.017	-0.018	0.006	-0.009	-0.034
	(0.027)*	(0.018)	(0.044)	(0.026)	(0.018)	(-0.04)
$\Delta \log(GDP_{n,t-1})$	-0.021	-0.046	-0.076	-0.043	-0.05	-0.066
	(0.018)	(0.020)**	(0.023)***	(0.019)**	(0.019)**	(0.025)**
$\Delta \log(GDP_{n,t}) \times EPL$		-0.038	-0.115	-0.023	-0.048	-0.08
		(0.027)	(0.056)*	(0.013)*	(0.034)	(0.059)
$\Delta \log(GDP_{n,t-1}) \times EPL$		0.05	0.049	0.061	0.053	0.033
		(0.023)**	(0.018)**	(0.019)***	(0.021)**	(0.016)**
$\Delta \log(GDP_{n,t}) \times UB$		-0.103	-0.021	-0.012	-0.017	-0.033
		(0.058)*	(0.066)	(0.039)	(0.041)	(0.066)
$\Delta \log(GDP_{n,t-1}) \times UB$		0.035	-0.012	0.012	-0.002	0.005
		(0.020)*	(0.038)	(0.025)	(0.025)	(0.028)
$\Delta \log(GDP_{n,t}) \times CBI$		0.104				
		(0.050)**				
Number of instruments	14	22	18	18	16	18
Number of countries	26	26	21	21	21	24
Hansen test	0.76	0.864	0.917	0.539	0.945	0.953
AB-test AR(2)	0.158	0.21	0.346	0.254	0.143	0.1

Robustness

- all our conclusions are robust to removing/adding more **institutions**: e.g. index of centralized bargaining (Visser 2009) or the share of temporary workers (IMF 2010)
- also removing the set of countries with the **highest/lowest reduction** in terms of **full-time equivalents** does not change the results
- **other robustness checks**: no "new STW" countries, no "outliers", jackknife resampling

	Baseline			
		incl. CHE	excl. JPN	excl. SLV
$\Delta U_{n,t-1}$	0.685	0.654	0.696	0.666
	(0.166)***	(0.162)***	(0.176)***	(0.215)***
$\Delta STW_{n,t}$	-1.032	-1.057	-0.807	-1.385
	(0.335)***	(0.334)***	(0.390)**	(0.879)
$\Delta STW^2_{n,t}$	0.134	0.128	0.116	0.156
	(0.039)***	(0.040)***	(0.054)**	(0.087)*
$\Delta STW_{n,t} \times D_{new}$	0.764	0.682	0.662	1.014
	(0.347)**	(0.305)**	(0.395)	(0.427)**
$\Delta STW_{n,t} \times \Delta \log(GDP_{n,t})$	0.191	0.251	0.132	0.303
	(0.118)	(0.140)*	(0.132)	(0.289)
$\Delta \log(GDP_{n,t})$	-0.011	-0.016	-0.039	-0.024
	(0.022)	(0.019)	(0.018)**	(0.025)
$\Delta \log(GDP_{n,t-1})$	-0.049	-0.05	-0.042	-0.047
	(0.019)**	(0.018)**	(0.022)*	(0.027)*
$\Delta \log(GDP_{n,t}) \times EPL$	-0.07	-0.073	-0.048	-0.053
	(0.044)	(0.041)*	(0.024)*	(0.047)
$\Delta \log(GDP_{n,t-1}) \times EPL$	0.044	0.043	0.056	0.029
	(0.019)**	(0.017)**	(0.021)**	(0.033)
$\Delta \log(GDP_{n,t}) \times UB$	-0.031	-0.035	0.01	-0.045
	(0.047)	(0.046)	(0.039)	(0.053)
$\Delta \log(GDP_{n,t-1}) \times UB$	-0.004	-0.005	-0.016	0.003
	(0.024)	(0.023)	(0.022)	(0.041)
Number of countries	26	27	25	25
Number of observations	312	326	298	307
Number of instruments	18	18	18	18
Hansen test	0.851	0.93	0.666	0.82
AB-test AR(2)	0.207	0.205	0.252	0.125

	Baseline			
		incl. CHE	excl. JPN	excl. SLV
$\Delta U_{n,t-1}$	0.685	0.654	0.696	0.666
	(0.166)***	(0.162)***	(0.176)***	(0.215)***
$\Delta STW_{n,t}$	-1.032	-1.057	-0.807	-1.385
	(0.335)***	(0.334)***	(0.390)**	(0.879)
$\Delta STW^2_{n,t}$	0.134	0.128	0.116	0.156
	(0.039)***	(0.040)***	(0.054)**	(0.087)*
$\Delta STW_{n,t} \times D_{new}$	0.764	0.682	0.662	1.014
	(0.347)**	(0.305)**	(0.395)	(0.427)**
$\Delta STW_{n,t} \times \Delta \log(GDP_{n,t})$	0.191	0.251	0.132	0.303
	(0.118)	(0.140)*	(0.132)	(0.289)
$\Delta \log(GDP_{n,t})$	-0.011	-0.016	-0.039	-0.024
	(0.022)	(0.019)	(0.018)**	(0.025)
$\Delta \log(GDP_{n,t-1})$	-0.049	-0.05	-0.042	-0.047
	(0.019)**	(0.018)**	(0.022)*	(0.027)*
$\Delta \log(GDP_{n,t}) \times EPL$	-0.07	-0.073	-0.048	-0.053
	(0.044)	(0.041)*	(0.024)*	(0.047)
$\Delta \log(GDP_{n,t-1}) \times EPL$	0.044	0.043	0.056	0.029
	(0.019)**	(0.017)**	(0.021)**	(0.033)
$\Delta \log(GDP_{n,t}) \times UB$	-0.031	-0.035	0.01	-0.045
	(0.047)	(0.046)	(0.039)	(0.053)
$\Delta \log(GDP_{n,t-1}) \times UB$	-0.004	-0.005	-0.016	0.003
	(0.024)	(0.023)	(0.022)	(0.041)
Number of countries	26	27	25	25
Number of observations	312	326	298	307
Number of instruments	18	18	18	18
Hansen test	0.851	0.93	0.666	0.82
AB-test AR(2)	0.207	0.205	0.252	0.125

	Baseline			
		incl. CHE	excl. JPN	excl. SLV
$\Delta U_{n,t-1}$	0.685	0.654	0.696	0.666
	(0.166)***	(0.162)***	(0.176)***	(0.215)***
$\Delta STW_{n,t}$	-1.032	-1.057	-0.807	-1.385
	(0.335)***	(0.334)***	(0.390)**	(0.879)
$\Delta STW^2_{n,t}$	0.134	0.128	0.116	0.156
	(0.039)***	(0.040)***	(0.054)**	(0.087)*
$\Delta STW_{n,t} \times D_{new}$	0.764	0.682	0.662	1.014
	(0.347)**	(0.305)**	(0.395)	(0.427)**
$\Delta STW_{n,t} \times \Delta \log(GDP_{n,t})$	0.191	0.251	0.132	0.303
	(0.118)	(0.140)*	(0.132)	(0.289)
$\Delta \log(GDP_{n,t})$	-0.011	-0.016	-0.039	-0.024
	(0.022)	(0.019)	(0.018)**	(0.025)
$\Delta \log(GDP_{n,t-1})$	-0.049	-0.05	-0.042	-0.047
	(0.019)**	(0.018)**	(0.022)*	(0.027)*
$\Delta \log(GDP_{n,t}) \times EPL$	-0.07	-0.073	-0.048	-0.053
	(0.044)	(0.041)*	(0.024)*	(0.047)
$\Delta \log(GDP_{n,t-1}) \times EPL$	0.044	0.043	0.056	0.029
	(0.019)**	(0.017)**	(0.021)**	(0.033)
$\Delta \log(GDP_{n,t}) \times UB$	-0.031	-0.035	0.01	-0.045
	(0.047)	(0.046)	(0.039)	(0.053)
$\Delta \log(GDP_{n,t-1}) \times UB$	-0.004	-0.005	-0.016	0.003
	(0.024)	(0.023)	(0.022)	(0.041)
Number of countries	26	27	25	25
Number of observations	312	326	298	307
Number of instruments	18	18	18	18
Hansen test	0.851	0.93	0.666	0.82
AB-test AR(2)	0.207	0.205	0.252	0.125

Outline

Conclusion

- at low take-up rates, STW is a very **effective job saver**
- however, at take-up rates around 3 % the **marginal effect** of increasing STW approaches **zero**

$\Rightarrow$ this result calls for **strict eligibility** criteria to avoid **deadweight losses**

- **newly introduced** STW-schemes were not able to dampen the increase in the unemployment rate

$\Rightarrow$ STW is **not a suitable quick-fix** solution to rising unemployment in recessions

Groups of Countries

- **newly established** STW schemes:
  - Czech Republic, Hungary, Netherlands, Poland, Slovak Republic
- **no STW** scheme:
  - Australia, Estonia, Greece, Iceland, United Kingdom, United States
- classification of countries by **average hours reduction**:
  - **high hours reduction**: Finland, Italy, Norway, Portugal, Spain
  - **low hour reduction**: Austria, France, Germany, Netherlands, Poland
  - annual estimate for 2009 available for 15 OECD countries (Hijzen & Venn 2011)

Countries in Our Sample

	Country	STW Scheme	Data Availability	Comment
1	Australia	No STW	Yes	
2	Austria	STW	Yes	
3	Belgium	STW	Yes	excluded
4	Canada	STW	Yes	
5	Chile	No Information	No	
6	Czech Republic	New STW	Yes	
7	Denmark	STW	Yes	
8	Estonia	No STW	Yes	Cahuc & Carcillo (2011): No Information
9	Finland	STW	Yes	
10	France	STW	Yes	
11	Germany	STW	Yes	
12	Greece	No STW	Yes	
13	Hungary	New STW	Yes	
14	Iceland	No STW	Yes	
15	Ireland	STW	Yes	
16	Israel	No Information	No	not mentioned
17	Italy	STW	Yes	
18	Japan	STW	Yes	
19	Korea	STW	No	

Countries in Our sample

	Country	STW Scheme	Data Availability	Comment
20	Luxembourg	STW	Yes	
21	Mexico	New STW	No	
22	Netherlands	New STW	Yes	
23	New Zealand	STW	No	
24	Norway	STW	Yes	
25	Poland	New STW	Yes	
26	Portugal	STW	Yes	
27	Slovak Republic	New STW	Yes	
28	Slovenia	STW	Yes	Cahuc & Carcillo (2011): No Information
29	Spain	STW	Yes	
30	Sweden	No STW	Yes	
31	Switzerland	STW	Yes	excluded in baseline
32	Turkey	STW	No	
33	United Kingdom	No STW	Yes	
34	United States	No STW	Yes	Cahuc & Carcillo (2011): STW in 17 states

Data Sources

- **GDP growth** rates: $\Delta \ln(GDP_{n,t})$
  - real, seasonally adjusted GDP, quarter-on-quarter percentage changes, summed up for use in xtabond2
- **unemployment rate**: $U_{n,t}$
  - harmonized, seasonally adjusted rate
- **employment protection** legislation: EPL_n
  - strictness of employment protection for individual and collective dismissals (regular contracts) in 2008
- **unemployment benefits**: UB_n
  - unemployment benefits excluding top-ups and housing assistance average over 5 years in 2008
- **temporary employment** share
  - share of temporary employment of total dependent employment (IMF, 2010)
- **centralized bargaining** index
  - degree of wage-setting coordination (Visser, 2009)

Why not System GMM?

- the **difference-in-Hansen** test rejects the use of system GMM for the corresponding level version
- the coefficients are robust (but lose significance) when the **differenced equation** is estimated using system GMM
- **system GMM** uses past differences to estimate current levels
- which is appropriate when endogenous variables are **highly persistent** and changes in STW and the country-fixed effect μ_i are uncorrelated: $E(\Delta STW_{i,t}\mu_i) = 0$ for all i and t
- **difference GMM** instead uses **past levels** to estimate current differences (which seems more appropriate in our case)

Instruments:	LEVELS	IV DIFFERENCES	DIFF-GMM LEVELS	SYS-GMM DIFFERENCES
$\Delta U_{n,t-1}$	0.596 (0.083)***	0.6 (0.097)***	0.653 (0.127)***	0.777 (0.340)**
$\Delta STW_{n,t}$	-0.844 (0.507)*	-1.004 (0.725)	-0.966 (0.457)**	-1.077 (0.912)
$\Delta STW^2_{n,t}$	0.124 (0.078)	0.153 (0.121)	0.14 (0.063)**	0.161 (0.149)
$\Delta STW_{n,t} \times D_{new}$	0.739 (0.365)**	0.818 (-0.61)	0.802 (0.270)***	2.019 (1.625)
$\Delta STW_{n,t} \times \Delta \log(GDP_{n,t})$	0.155 (0.078)**	0.103 (0.144)	0.16 (0.159)	0.298 (0.197)
$\Delta \log(GDP_{n,t})$	-0.06 (0.028)**	-0.058 (0.033)*	-0.049 (0.031)	-0.049 (0.038)
$\Delta \log(GDP_{n,t-1})$	-0.02 (-0.02)	-0.027 (0.021)	-0.02 (0.015)	-0.01 (0.035)
Quarter Dummies	Yes	Yes	Yes	Yes
Number of observations	312	286	312	320
Number of instruments	25	24	26	26
R-Squared	0.6	0.59		
LM test	0.06	0.14		
Hansen test	0.57	0.4	0.78	0.85
AB-test AR(2)			0.28	0.29

- Column 1 & 3 use the **lagged levels of the endogenous variables** as instruments leading to **significant, more precise results**
- While in Column 2 & 4 the **lagged differences of the endogenous variables** are used as instrument leading to similar, but not significant results (as well as underidentification in the IV-specification).

	Quarter dummies		OECD Unemployment	
	Institution	No Inst.	Institution	No Inst.
$\Delta U_{n,t-1}$	0.278	0.653	0.685	0.726
	(0.229)	(0.127)***	(0.166)***	(0.126)***
$\Delta STW_{n,t}$	-0.919	-0.966	-1.032	-0.936
	(0.384)**	(0.457)**	(0.335)***	(0.301)***
$\Delta STW^2_{n,t}$	0.12	0.14	0.134	0.119
	(0.054)**	(0.063)**	(0.039)***	(0.031)***
$\Delta STW_{n,t} \times D_{new}$	0.538	0.802	0.764	0.788
	(0.238)**	(0.270)***	(0.347)**	(0.331)**
$\Delta STW_{n,t} \times \Delta \log(GDP_{n,t})$	0.431	0.16	0.191	0.181
	(0.215)*	(0.159)	(0.118)	(0.136)
$\Delta \log(GDP_{n,t})$	-0.095	-0.049	-0.011	-0.049
	(0.053)*	(0.031)	(0.022)	(0.027)*
$\Delta \log(GDP_{n,t-1})$	-0.066	-0.02	-0.049	-0.021
	(0.029)**	(0.015)	(0.019)**	(0.018)
$\Delta \log(GDP_{n,t}) \times EPL$	-0.022		-0.07	
	(0.048)		(0.044)	
$\Delta \log(GDP_{n,t-1}) \times EPL$	0.029		0.044	
	(0.024)		(0.019)**	
$\Delta \log(GDP_{n,t}) \times UB$	-0.046		-0.031	
	(-0.06)		(0.047)	
$\Delta \log(GDP_{n,t-1}) \times UB$	-0.022		-0.004	
	(0.025)		(0.024)	
Number of instruments	30	26	18	14
Hansen test	0.997	0.78	0.851	0.76
AB-test AR(2)	0.936	0.282	0.207	0.158

	Quarter dummies		OECD Unemployment	
	Institution	No Inst.	Institution	No Inst.
$\Delta U_{n,t-1}$	0.278	0.653	0.685	0.726
	(0.229)	(0.127)***	(0.166)***	(0.126)***
$\Delta STW_{n,t}$	-0.919	-0.966	-1.032	-0.936
	(0.384)**	(0.457)**	(0.335)***	(0.301)***
$\Delta STW^2_{n,t}$	0.12	0.14	0.134	0.119
	(0.054)**	(0.063)**	(0.039)***	(0.031)***
$\Delta STW_{n,t} \times D_{new}$	0.538	0.802	0.764	0.788
	(0.238)**	(0.270)***	(0.347)**	(0.331)**
$\Delta STW_{n,t} \times \Delta \log(GDP_{n,t})$	0.431	0.16	0.191	0.181
	(0.215)*	(0.159)	(0.118)	(0.136)
$\Delta \log(GDP_{n,t})$	-0.095	-0.049	-0.011	-0.049
	(0.053)*	(0.031)	(0.022)	(0.027)*
$\Delta \log(GDP_{n,t-1})$	-0.066	-0.02	-0.049	-0.021
	(0.029)**	(0.015)	(0.019)**	(0.018)
$\Delta \log(GDP_{n,t}) \times EPL$	-0.022		-0.07	
	(0.048)		(0.044)	
$\Delta \log(GDP_{n,t-1}) \times EPL$	0.029		0.044	
	(0.024)		(0.019)**	
$\Delta \log(GDP_{n,t}) \times UB$	-0.046		-0.031	
	(-0.06)		(0.047)	
$\Delta \log(GDP_{n,t-1}) \times UB$	-0.022		-0.004	
	(0.025)		(0.024)	
Number of instruments	30	26	18	14
Hansen test	0.997	0.78	0.851	0.76
AB-test AR(2)	0.936	0.282	0.207	0.158

	Quarter dummies		OECD Unemployment	
	Institution	No Inst.	Institution	No Inst.
$\Delta U_{n,t-1}$	0.278	0.653	0.685	0.726
	(0.229)	(0.127)***	(0.166)***	(0.126)***
$\Delta STW_{n,t}$	-0.919	-0.966	-1.032	-0.936
	(0.384)**	(0.457)**	(0.335)***	(0.301)***
$\Delta STW^2_{n,t}$	0.12	0.14	0.134	0.119
	(0.054)**	(0.063)**	(0.039)***	(0.031)***
$\Delta STW_{n,t} \times D_{new}$	0.538	0.802	0.764	0.788
	(0.238)**	(0.270)***	(0.347)**	(0.331)**
$\Delta STW_{n,t} \times \Delta \log(GDP_{n,t})$	0.431	0.16	0.191	0.181
	(0.215)*	(0.159)	(0.118)	(0.136)
$\Delta \log(GDP_{n,t})$	-0.095	-0.049	-0.011	-0.049
	(0.053)*	(0.031)	(0.022)	(0.027)*
$\Delta \log(GDP_{n,t-1})$	-0.066	-0.02	-0.049	-0.021
	(0.029)**	(0.015)	(0.019)**	(0.018)
$\Delta \log(GDP_{n,t}) \times EPL$	-0.022		-0.07	
	(0.048)		(0.044)	
$\Delta \log(GDP_{n,t-1}) \times EPL$	0.029		0.044	
	(0.024)		(0.019)**	
$\Delta \log(GDP_{n,t}) \times UB$	-0.046		-0.031	
	(-0.06)		(0.047)	
$\Delta \log(GDP_{n,t-1}) \times UB$	-0.022		-0.004	
	(0.025)		(0.024)	
Number of instruments	30	26	18	14
Hansen test	0.997	0.78	0.851	0.76
AB-test AR(2)	0.936	0.282	0.207	0.158

	Quadratic New STW		STW-Variable Lags		Both	
$\Delta U_{n,t-1}$	0.717	0.705	0.687	0.709	0.701	0.731
	(0.122)***	(0.177)***	(0.103)***	(0.114)***	(0.129)***	(0.152)***
$\Delta STW_{n,t}$	-0.915	-0.977	-0.833	-0.877	-0.766	-0.815
	(0.252)***	(0.319)***	(0.454)*	(0.416)**	(0.449)*	(0.436)*
$\Delta STW_{n,t-1}$			0.06	0.112	0.056	0.121
			(-0.28)	(-0.22)	(0.283)	(0.218)
$\Delta STW^2_{n,t}$	0.119	0.126	0.112	0.117	0.103	0.108
	(0.026)***	(0.038)***	(0.053)**	(0.055)**	(0.052)*	(0.059)*
$\Delta STW^2_{n,t-1}$			-0.011	-0.017	-0.011	-0.019
			(0.035)	(0.031)	(0.036)	(0.031)
$\Delta STW_{n,t} \times D_{new}$	0.942	0.856	0.34	0.382	0.325	0.45
	(0.367)**	(0.543)	(0.243)	(0.199)*	(0.555)	(0.625)
$\Delta STW_{n,t-1} \times D_{new}$			0.238	0.208	0.186	0.096
			(0.221)	(0.179)	(0.628)	(0.623)
$\Delta STW^2_{n,t} \times D_{new}$	-0.089	-0.052			-0.001	-0.038
	(0.149)	(0.216)			(0.227)	(0.266)
$\Delta STW^2_{n,t-1} \times D_{new}$					0.021	0.044
					(0.209)	(0.213)
$\Delta STW_{n,t} \times \Delta \log(GDP_{n,t})$	0.16	0.175	0.117	0.133	0.104	0.12
	(0.117)	(0.111)	(0.139)	(0.111)	(0.134)	(0.102)
$\Delta STW_{n,t-1} \times \Delta \log(GDP_{n,t-1})$			-0.014	-0.022	-0.013	-0.019
			(0.036)	(0.032)	(0.034)	(0.027)
GDP Growth & Institutional Controls	Yes/No	Yes/Yes	Yes/No	Yes/Yes	Yes/No	Yes/Yes
Number of observations	312	312	286	286	286	286
Number of instruments	16	20	18	22	21	25
Hansen test	0.846	0.843	0.969	0.964	0.97	0.966
AB-test AR(2)	0.172	0.208	0.19	0.187	0.184	0.176

	Quadratic	New STW	STW-Variable Lags		Both	
$\Delta U_{n,t-1}$	0.717	0.705	0.687	0.709	0.701	0.731
	(0.122)***	(0.177)***	(0.103)***	(0.114)***	(0.129)***	(0.152)***
$\Delta STW_{n,t}$	-0.915	-0.977	-0.833	-0.877	-0.766	-0.815
	(0.252)***	(0.319)***	(0.454)*	(0.416)**	(0.449)*	(0.436)*
$\Delta STW_{n,t-1}$			0.06	0.112	0.056	0.121
			(-0.28)	(-0.22)	(0.283)	(0.218)
$\Delta STW^2_{n,t}$	0.119	0.126	0.112	0.117	0.103	0.108
	(0.026)***	(0.038)***	(0.053)**	(0.055)**	(0.052)*	(0.059)*
$\Delta STW^2_{n,t-1}$			-0.011	-0.017	-0.011	-0.019
			(0.035)	(0.031)	(0.036)	(0.031)
$\Delta STW_{n,t} \times D_{new}$	0.942	0.856	0.34	0.382	0.325	0.45
	(0.367)**	(0.543)	(0.243)	(0.199)*	(0.555)	(0.625)
$\Delta STW_{n,t-1} \times D_{new}$			0.238	0.208	0.186	0.096
			(0.221)	(0.179)	(0.628)	(0.623)
$\Delta STW^2_{n,t} \times D_{new}$	-0.089	-0.052			-0.001	-0.038
	(0.149)	(0.216)			(0.227)	(0.266)
$\Delta STW^2_{n,t-1} \times D_{new}$					0.021	0.044
					(0.209)	(0.213)
$\Delta STW_{n,t} \times \Delta \log(GDP_{n,t})$	0.16	0.175	0.117	0.133	0.104	0.12
	(0.117)	(0.111)	(0.139)	(0.111)	(0.134)	(0.102)
$\Delta STW_{n,t-1} \times \Delta \log(GDP_{n,t-1})$			-0.014	-0.022	-0.013	-0.019
			(0.036)	(0.032)	(0.034)	(0.027)
GDP Growth & Institutional Controls	Yes/No	Yes/Yes	Yes/No	Yes/Yes	Yes/No	Yes/Yes
Number of observations	312	312	286	286	286	286
Number of instruments	16	20	18	22	21	25
Hansen test	0.846	0.843	0.969	0.964	0.97	0.966
AB-test AR(2)	0.172	0.208	0.19	0.187	0.184	0.176

	Quadratic New STW		STW-Variable Lags		Both	
$\Delta U_{n,t-1}$	0.717	0.705	0.687	0.709	0.701	0.731
	(0.122)***	(0.177)***	(0.103)***	(0.114)***	(0.129)***	(0.152)***
$\Delta STW_{n,t}$	-0.915	-0.977	-0.833	-0.877	-0.766	-0.815
	(0.252)***	(0.319)***	(0.454)*	(0.416)**	(0.449)*	(0.436)*
$\Delta STW_{n,t-1}$			0.06	0.112	0.056	0.121
			(-0.28)	(-0.22)	(0.283)	(0.218)
$\Delta STW^2_{n,t}$	0.119	0.126	0.112	0.117	0.103	0.108
	(0.026)***	(0.038)***	(0.053)**	(0.055)**	(0.052)*	(0.059)*
$\Delta STW^2_{n,t-1}$			-0.011	-0.017	-0.011	-0.019
			(0.035)	(0.031)	(0.036)	(0.031)
$\Delta STW_{n,t} \times D_{new}$	0.942	0.856	0.34	0.382	0.325	0.45
	(0.367)**	(0.543)	(0.243)	(0.199)*	(0.555)	(0.625)
$\Delta STW_{n,t-1} \times D_{new}$			0.238	0.208	0.186	0.096
			(0.221)	(0.179)	(0.628)	(0.623)
$\Delta STW^2_{n,t} \times D_{new}$	-0.089	-0.052			-0.001	-0.038
	(0.149)	(0.216)			(0.227)	(0.266)
$\Delta STW^2_{n,t-1} \times D_{new}$					0.021	0.044
					(0.209)	(0.213)
$\Delta STW_{n,t} \times \Delta \log(GDP_{n,t})$	0.16	0.175	0.117	0.133	0.104	0.12
	(0.117)	(0.111)	(0.139)	(0.111)	(0.134)	(0.102)
$\Delta STW_{n,t-1} \times \Delta \log(GDP_{n,t-1})$			-0.014	-0.022	-0.013	-0.019
			(0.036)	(0.032)	(0.034)	(0.027)
GDP Growth & Institutional Controls	Yes/No	Yes/Yes	Yes/No	Yes/Yes	Yes/No	Yes/Yes
Number of observations	312	312	286	286	286	286
Number of instruments	16	20	18	22	21	25
Hansen test	0.846	0.843	0.969	0.964	0.97	0.966
AB-test AR(2)	0.172	0.208	0.19	0.187	0.184	0.176

Additional STW Variables

- **none** of the additional coefficients is close to **significance**
- irrespective of whether we reduce the **instrument count** by excluding institutional controls or not