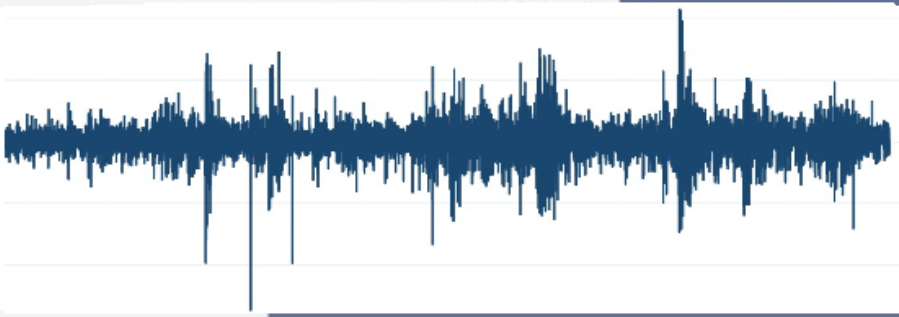
Philipps Universität Marburg

Stock Market Reactions to Legislated Tax Changes:

Evidence from the United States, Germany, and the United Kingdom



Bernd Hayo & **Sascha Mierzwa**

ASSA 2022 Annual Meeting

Data

- Daily Data, December 1978 – January 2018
- **Identification** via narrative approach (Romer & Romer, 2010)
  - Discretionary legislated tax changes
  - Taken from official governmental records
- Daily stock market returns of S&P 500, DAX, FT30

Method

- GARCH(1,1) (Bollerslev, 1986)
- We estimate
  - $r_{it} = \gamma + \delta \Delta \tau_t + \varepsilon_t$
  - $\varepsilon_t = e_t h_t$
  - $h_t = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \beta h_{t-1}^2$
- r_{it} = daily closing (log-)returns of S&P500, DAX, or FT30
- $\Delta \tau_t$ is a vector of domestic and foreign tax shocks

→ general-to-specific testing down procedure (Hendry, 1993)

What does $\Delta \tau_t$ contain?

- Important legislative steps
  - USA: Committee on Ways and Means, Senate Committee, Joint Committee on Taxation, Implementation
  - Germany: Draft, Federal Finance Committee, Mediation Committee, Implementation
  - UK: Budget Day, Implementation

→ Revenues figures are allowed to **change between steps**

→ (future) tax changes precisely dated and quantified

Hypotheses

- **H1a:** Stock market returns react the first time information about tax changes is available
- **H1b:** There is no reaction at the implementation of tax changes.
- **H2:** News about tax decreases raises stock market returns.
- **H3a:** Stock market returns increase with news about lower business taxes.
- **H3b:** Stock market returns increase with news about lower personal income taxes.
- **H3c:** Stock market returns increase with news about lower indirect taxes.
- **H4:** News about foreign income tax decreases increases domestic stock market returns

Results

Table 1: Aggregated Tax Cuts

	(I) S&P 500	(II) DAX	(III) FT 30
USA			
House Committee	0.15*	0.14*	
Senate Committee			
Joint Committee	0.25		
Implementation			
Germany			
Draft			
House Committee			0.66*
Joint Committee			
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No. of obs.	9858	9854	9844

* $p < 0.01$, ** $p < 0.001$

Table 2: Disaggregated Tax Cuts

	Type	(I) S&P 500	(II) DAX	(III) FT 30
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House Committee	Business			
	Personal	0.17*	0.16**	0.29**
Senate Committee	Business			
	Personal	-0.30		
Joint Committee	Business			
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Conclusion

We find evidence for:

1. discretionary tax legislation to often matter for returns.
2. significant reactions to early steps but also various other steps.
3. the US House Committee stage to be the most important step.
4. S&P 500 returns to react to earlier stages than do DAX returns, FT30 returns to barely react to domestic tax changes.
5. many more significant effects during the financial crisis (not shown in this poster).

Content

- Introduction
- Data
- Method
- Results
- Conclusion

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Literature on the effect of tax changes on financial markets:
$\Rightarrow$ **quantification vs. timing**

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Identification Hypotheses

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		2012	2013	2014	2015	2016	2012-16	2012-21	2012-22	2012	2013	2014	2015	2016	2012-16	2012-21	2012-22
1. Increase bonus depreciation from 50% to 100% for 2012	ppisa 12/31/11	-38,299	-17,648	15,174	10,730	8,430	-21,613	-6,005	-5,122	*No Provision*							
2. Expansion of election to accelerate AMT credits in lieu of bonus depreciation for 2012	tyea 12/31/11	-1,526	-801	32	32	42	-2,221	-1,899	-1,828	*No Provision*							
3. Extension of payroll tax reduction {H} (sunset 12/31/12); {S} (sunset 2/29/12) [2]	[3]	-74,831	-24,640	---	---	---	-99,471	-99,471	-99,471	2,097	-1,415	---	---	---	682	682	682
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Difference between House and Senate around $110bn

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$\Rightarrow$ might call for more transparent communication in times of crisis

$\Rightarrow$ investors should not only monitor monetary policy

Thank you!

Thank you for your attention & feedback!

In case of further questions or comments:
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Appendix

Example: LuftVStG

Empfehlung des Finanzausschusses zur Änderung des Luftverkehrsteuergesetzes (LuftVStG)

Zudem wirkt sich die vom Finanzausschuss vorgesehene Änderung des Luftverkehrsteuergesetzes (Artikel 3 – neu) wie folgt als Steuermindereinnahme des Bundes aus:

Steuermehr- (+)/Mindereinnahmen (–) in Mio. Euro

lfd. Nr.	Maßnahme	Volle Jahreswirkung[1, 2]	Kassenjahr			
			2012	2013	2014	2015
Artikel 3 Nummer 4 Buchstabe a	§ 11 Absatz 1 LuftVStG[2]	–40	0	–40	–40	–40
Artikel 3 Nummer 4 Buchstabe b	§ 11 Absatz 2 LuftVStG	0	0	+35	0	0
Finanzielle Auswirkungen insgesamt		–40	0	–5	–40	–40

1 Wirkung für einen vollen (Veranlagungs-)Zeitraum von zwölf Monaten.

2 Die endgültigen finanziellen Auswirkungen stehen in Abhängigkeit des Passagieraufkommens im Luftverkehr in den o. g. Jahren und können damit nicht hinreichend präzise prognostiziert werden.

Appendix

Summary Statistics, Tax Shocks

Table: Size, Variation, and Frequency of Tax Shocks

	Type	Mean	Std. Dev.	Observations
USA				
Committee on Ways and Means	Personal	0.439	0.987	31
	Business	0.072	0.318	28
Implementation	Personal	0.152	0.394	58
	Business	-0.007	0.139	68
Germany				
Draft	Personal	0.176	0.379	45
	Business	0.027	0.146	32
	Indirect	-0.196	0.266	29
Implementation	Personal	0.101	0.239	78
	Business	0.012	0.125	54
	Indirect	-0.100	0.203	50
UK				
Draft	Personal	0.043	0.319	78
	Business	0.002	0.120	96
	Indirect	-0.077	0.290	99
Implementation	Personal	0.023	0.195	174
	Business	-0.001	0.078	204
	Indirect	-0.024	0.142	317

Notes:Summary statistics of (a subset of) tax shocks, in per cent of current nominal GDP.

Appendix

Identification (from literature on central bank communication)

Cornell (1983, p. 644):
"[a]t the time it is announced, the reported figure does not depend on the Fed policy, asset prices, or inflation. This means, that if significant correlations are found between money supply announcements and changes in the prices of [...] assets, the direction of causation must run from the announcements to asset prices rather than vice versa."

Knot de Haan (1999, p. 560):
"[o]ne of the advantages of the announcement effect approach is that it precludes the necessity of specifying a structural model for interest rates."

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Appendix

Hypotheses

H1a: Stock market returns react the first time information about tax changes is available.

H1b: There is no reaction at the implementation of tax changes.

H2: News about tax decreases raises stock market returns.

H3a: Stock market returns increase with news about lower business taxes.

H3b: Stock market returns increase with news about lower personal income taxes.

H3c: Stock market returns increase with news about lower indirect taxes.

H4: News about foreign income tax decreases increases domestic stock market returns.

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Results Financial Crisis

Table: Financial Crisis: Cumulative Effects of Tax Decreases

	Type	(I) S&P 500	(II) DAX	(III) FT 30
USA				
Cumulative Effect	Business			
	Personal			
Germany				
Cumulative Effect	Business			
	Personal			
	Indirect			
UK				
Cumulative Effect	Business			
	Personal			
	Indirect			
No. of obs.				

* $p < 0.01$, ** $p < 0.001$, values in italics give the effects for average-size tax changes

Results Financial Crisis

Table: Financial Crisis: Cumulative Effects of Tax Decreases

	Type	(I) S&P 500	(II) DAX	(III) FT 30
USA				
Cumulative Effect	Business	8.05** *1.81*		
	Personal	-1.82** *-1.08*		
Germany				
Cumulative Effect	Business	80.48** *6.58*		
	Personal	-10.65** *-0.96*		
	Indirect	-98.98** *-4.25*		
UK				
Cumulative Effect	Business	23.33** *0.62*		
	Personal	-1.93		
	Indirect	-13.58** *-0.03*		
No. of obs.		610		

* $p < 0.01$, ** $p < 0.001$, values in italics give the effects for average-size tax changes

Results Financial Crisis

Table: Financial Crisis: Cumulative Effects of Tax Decreases

	Type	(I) S&P 500	(II) DAX	(III) FT 30
USA				
Cumulative Effect	Business	8.05** *1.81*		
	Personal	-1.82** *-1.08*		
Germany				
	Business	80.48** *6.58*	32.05** *2.26*	
Cumulative Effect	Personal	-10.65** *-0.96*	-5.50** *-0.50*	
	Indirect	-98.98** *-4.25*	8.95	
UK				
	Business	23.33** *0.62*		
Cumulative Effect	Personal	-1.93		
	Indirect	-13.58** *-0.03*	2.32	
No. of obs.		610	613	

* $p < 0.01$, ** $p < 0.001$, values in italics give the effects for average-size tax changes

Results Financial Crisis

Table: Financial Crisis: Cumulative Effects of Tax Decreases

	Type	(I) S&P 500	(II) DAX	(III) FT 30
USA				
Cumulative Effect	Business	8.05** *1.81*		5.93* *1.20*
	Personal	-1.82** *-1.08*		-3.25
Germany				
	Business	80.48** *6.58*	32.05** *2.26*	24.98** *1.68*
Cumulative Effect	Personal	-10.65** *-0.96*	-5.50** *-0.50*	7.14** *-0.36*
	Indirect	-98.98** *-4.25*	8.95	39.92** *1.95*
UK				
	Business	23.33** *0.62*		9.00* *0.24*
Cumulative Effect	Personal	-1.93		-5.47** *-0.23*
	Indirect	-13.58** *-0.03*	2.32	1.58
No. of obs.		610	613	610

* $p < 0.01$, ** $p < 0.001$, values in italics give the effects for average-size tax changes