Fiscal Policy Uncertainty and Its Macroeconomic Consequences

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What is fiscal policy?

- Government alters **fiscal variables** to influence economic outcomes.
- **Fiscal variable examples:** government expenditures, taxes, transfers (unemployment benefits, Medicare, SNAP).

Automatic vs Discretionary Policy

- **Automatic fiscal policy:** fiscal variables are designed to move *automatically* in response to macroeconomic outcomes Examples: tax collections, unemployment, Medicare, SNAP
- **Discretionary fiscal policy:** When elected officials identify economic problems, pass new legislation that adjusts fiscal variables. Examples: Unemployment benefit extension, tax rebate, government expenditure program.

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Suppose unemployment is up, production and incomes are down

- Government spending increases (discretionary to stimulate consumer spending)
- Tax collections should decrease.
- Transfers should increase.
- Government debt should increase.

Suppose government debt to GDP is higher

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Expectations for fiscal policy matter

- Consumers' decisions influenced by expectations for future taxes, transfer benefits, government debt accumulation.
- Businesses' investment decisions influenced by expectations for future taxes, government spending, transfers.
- Degree of confidence / uncertainty in their expectations matter.

Some questions

- How might economic agents figure out fiscal behavior?
- Can we measure how confidence they are?
- Has uncertainty about fiscal policy changed over time?
- What are the economic consequences to fiscal uncertainty?

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Present Paper

- How well do economic agents understand the behavior of fiscal policy?
- Every period, agents estimate behavioral equations describing fiscal policy behavior.
- Projection uncertainty: Fiscal uncertainty equal to unexplained movements in fiscal policy.

Existing Contributions

- DSGE (crazy mathematical) model with changing fiscal volatility:
  Fernández-Villiverde et. al. (2011), Born and Pfeifer (2011).
- Index based on newspaper headlines and other real world stuff:
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Fiscal Policy Variables

1. Government Spending
2. Tax Revenue
3. Net Transfers
4. Government Debt

- *Construct an uncertainty measure for each.*
- *Construct an index for overall fiscal uncertainty*

Impact on Macroeconomy

Incorporate measures of fiscal uncertainty in ARDL models for:

1. Consumption
2. Investment
3. Real GDP
4. Employment
5. Unemployment
6. Inflation

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Historical Economic and Political Crises

- Financial crisis and historic economic downturn.
- Large monetary and fiscal policy responses, fiscal policy multiplier debate is still active.
- U.S. Government Debt to GDP reaching historical levels.
- Simultaneous calls from left and right calling for opposing fiscal responses.

Ben Bernanke - July 2012 Monetary Policy Report to Congress

"The most effective way that the Congress could help to support the economy right now would be to work to address the nation's fiscal challenges.... **Doing so earlier rather than later would help reduce uncertainty and boost household and business confidence.**"

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- Born and Pfeifer (2011):
  - Significant evidence for time-varying volatility in fiscal shocks.
  - Not a significant driver for business cycles.
- Johannsen (2012): Matters more at ZLB.

Fiscal Uncertainty

- Baker (2013): Uncertainty reduces economic activity
- Hollmayr and Matthes (2013):
  - Fiscal behavior changes / evolves over time
  - Economic agents have to learn it
  - Permanent fiscal changes have a *relatively* small impact
  - More macroeconomic volatility

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Fiscal contractions uncertainty

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- Davig, Leeper, and Walker (2010): Uncertainty re: unfunded entitlement programs is stagflationary

Possibly expiring tax provisions

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Consequences for Fiscal Uncertainty

- lower real GDP,
- lower consumption,
- lower investment.

Specific fiscal variables

- Government expenditures, transfers, and debt associated with labor market contractions.
- Tax uncertainty associated with increases in investment and real GDP

Consequences during the Great Recession

- Responsible for a 1% to 3% decrease in real GDP
- Decreased consumption by about 1% of real GDP
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Constant gain learning mechanism

- Every period, run a least-squares regression for each fiscal policy variable, using data from previous periods.
- Weighted least squares - more recent observations have more weight.
- Regression predicted value serves as expected fiscal policy.
- Root (weighted) mean squared error serves as *fiscal policy uncertainty*.

Ideal situations for constant gain learning

- Precedence of structural changes
- No a-priori knowledge on menu or evolution of structural changes and probability distributions
- Forecasting rule, but no knowledge of parameter values, or the structure of the whole economy.

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Four regressions

Fiscal policy variables: $f_t = [g_t \ r_t \ n_t \ b_t]$
Govt Spending (g_t), Tax Revenue (r_t),
Net Transfers (n_t), Government Debt / GDP (b_t)

Regression equation:

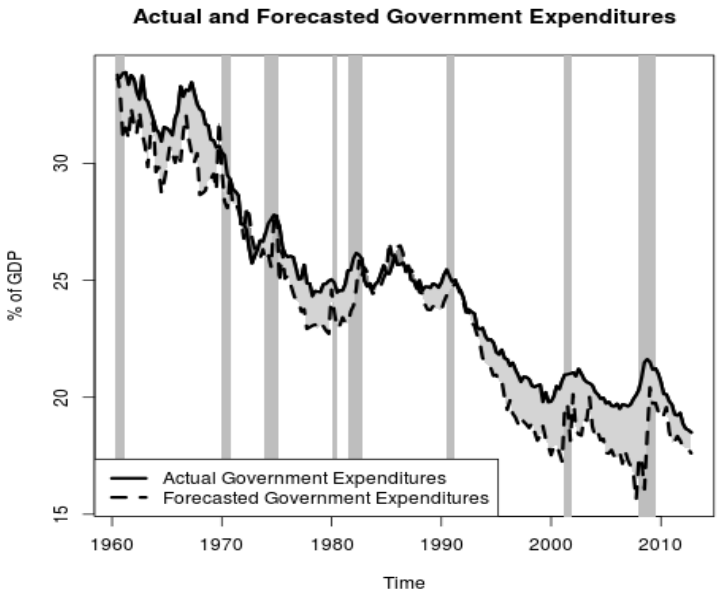
$$f_{i,t} = \alpha_{t,0} + \alpha'_{t,f} f_{t-1} + \alpha_{t,y} y_t + \alpha_{t,c} c_t + \alpha_{I,t} I_t + \alpha_{t,u} u_t + \epsilon_t$$

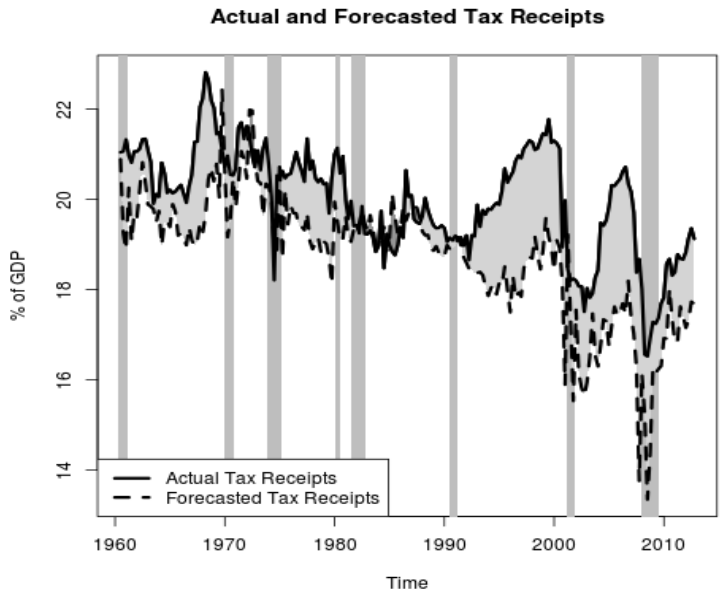
Empirical Model for Fiscal Policy Behavior

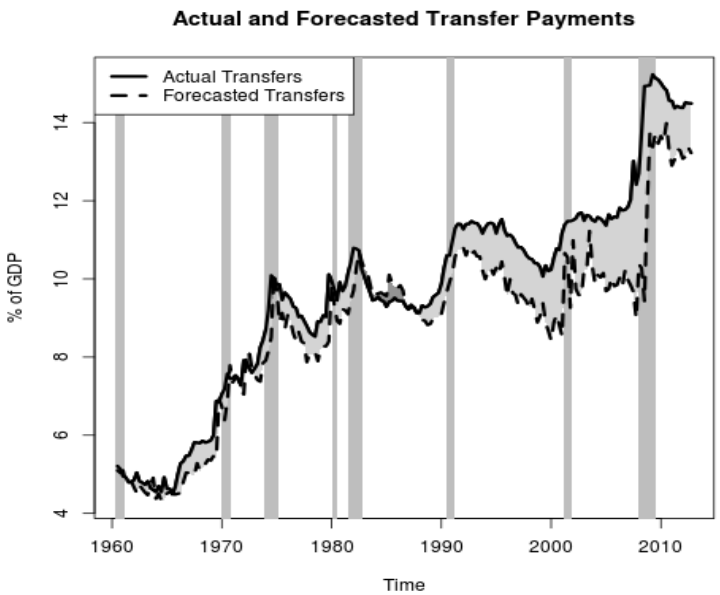
Each fiscal policy variable ($f_{i,t}$) responds to:

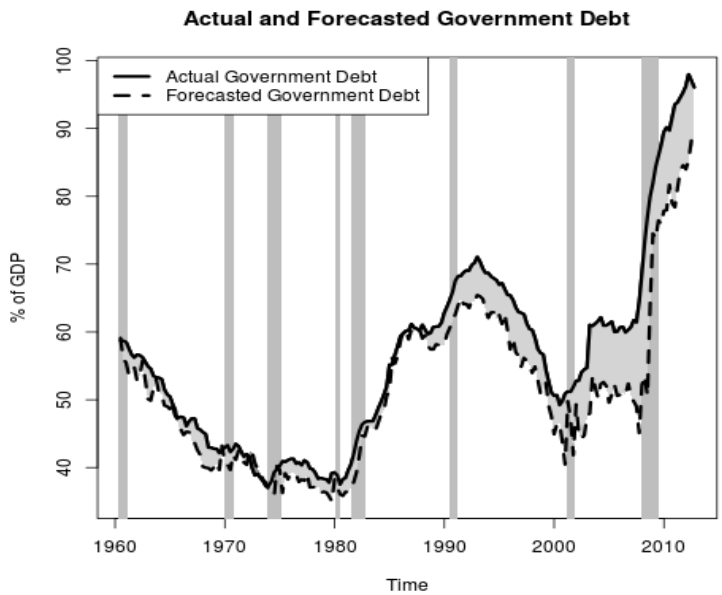
- Lag of all fiscal policy variables (f_{t-1}).
- Above includes lag of government debt (b_{t-1}).
- Macro outcomes: real GDP (y_t), consumption (c_t), investment (I_t), and unemployment (u_t).
- All quantities real, per capita, ratio of past real GDP.

Fiscal Policy - Actual and Predicted

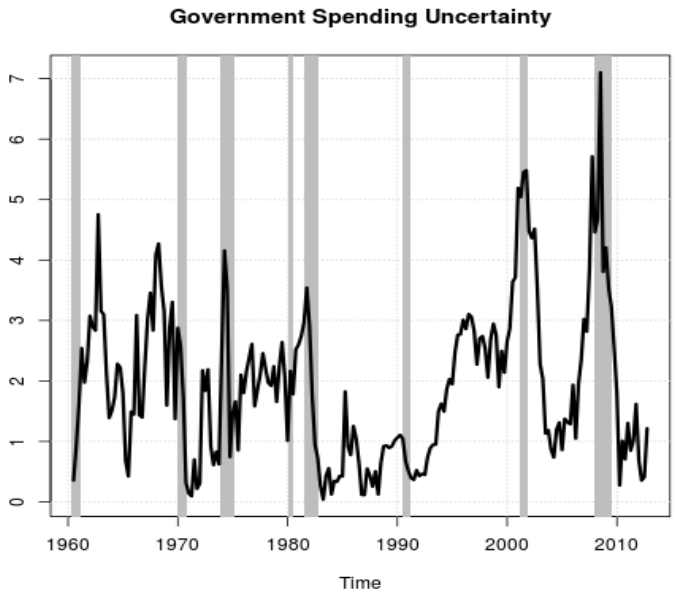


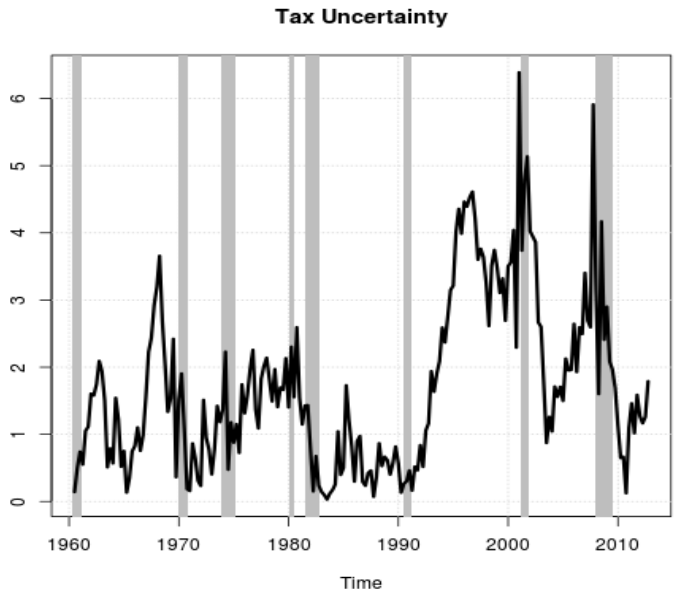


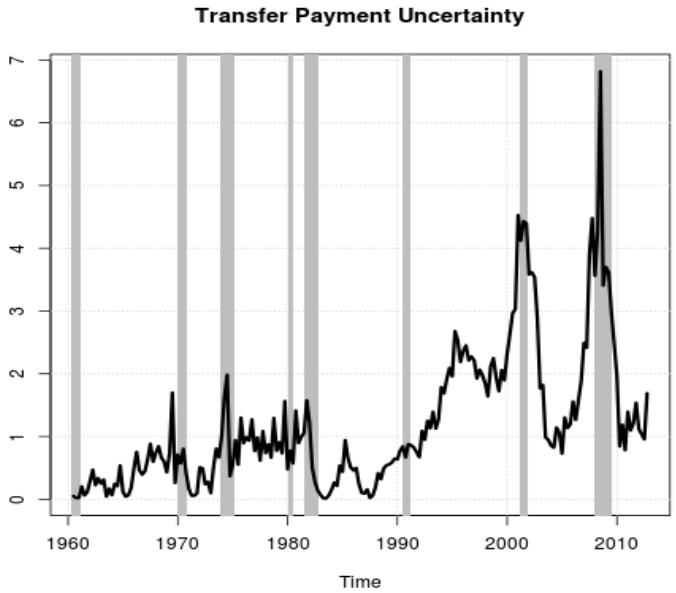


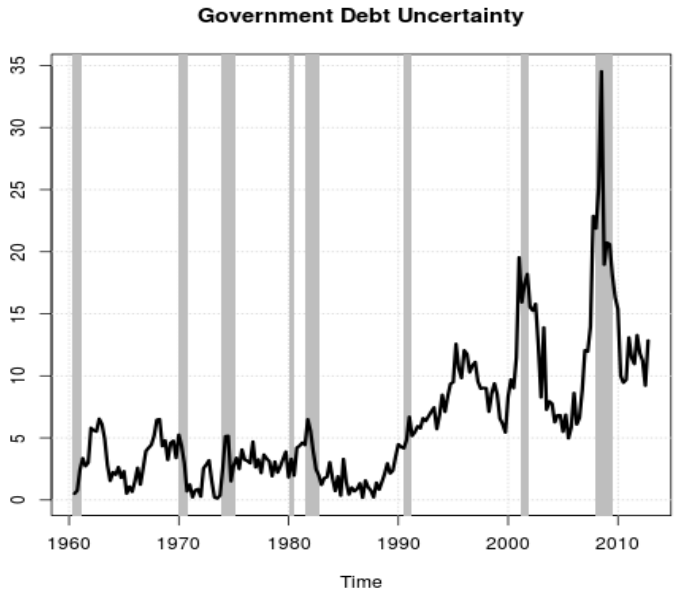


Fiscal Policy Uncertainty









Unprecedented levels during Great Recession

- Government expenditures uncertainty: Nearly 7% of GDP
- Tax uncertainty: Nearly 6% of GDP
- Transfers uncertainty: Nearly 7% of GDP
- Government debt uncertainty: Nearly 35% of GDP

Run up for several years preceding recessions

- Early 1980s, 2001, 2007.
- Not the rule though (eg: declines prior to 1970s, little volatility prior to 1991)

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Pearson Correlation Coefficient

	Gov Spending	Tax Revenue	Transfers	Government Debt
Gov Spending	1.00	-	-	-
Tax Revenue	0.75	1.00	-	-
Transfers	0.74	0.78	1.00	-
Government Debt	0.64	0.65	0.90	1.00

- All highly correlated.
- Common (latent) factor?

Objective

- Strip out the common component of fiscal uncertainty
- Construct a general measure of fiscal uncertainty
- Take care of potential multicolinearity problem
- Compare to Baker, Bloom, and Davis (2013) (BBD)

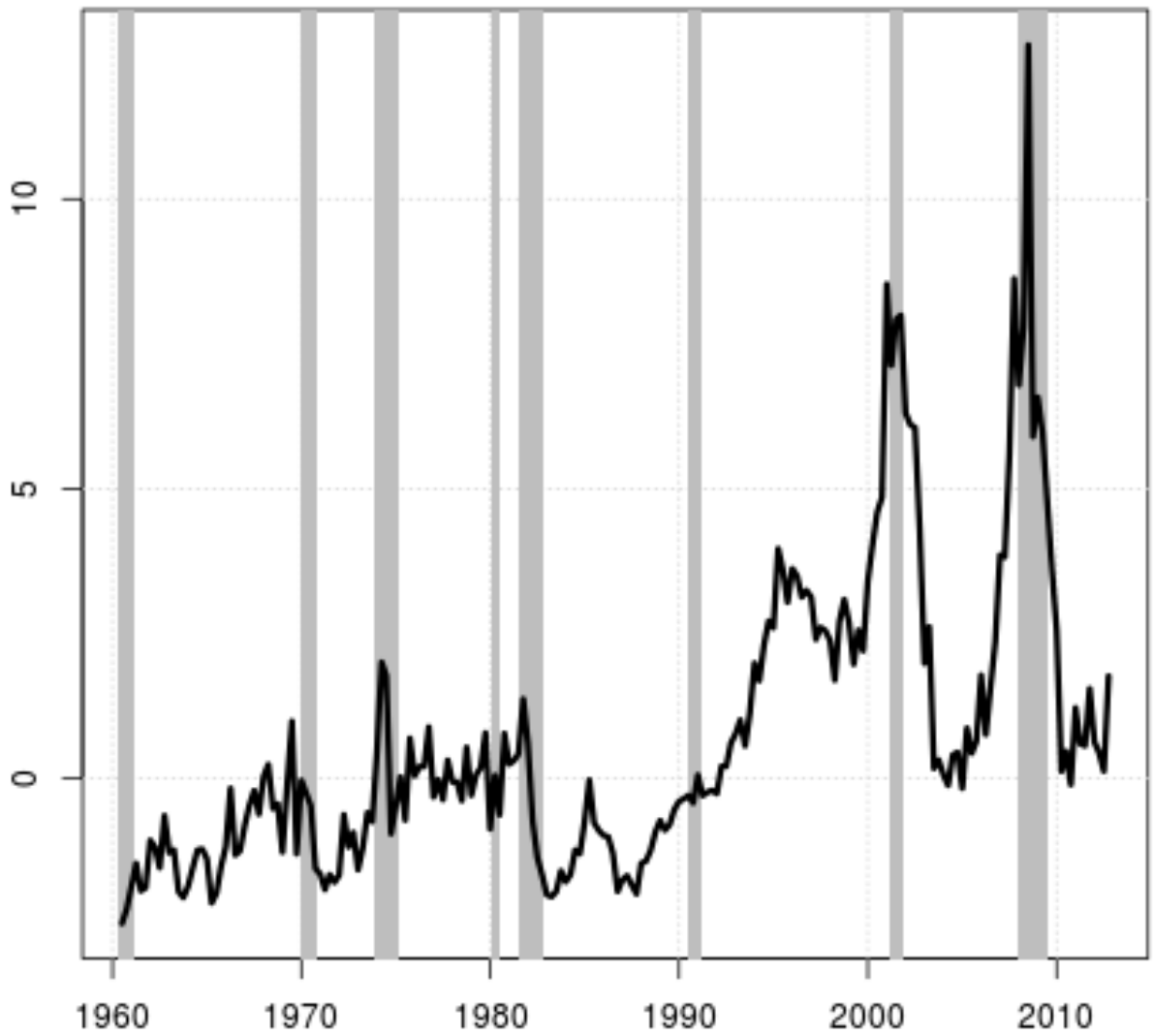
Stock and Waston (1989) coincident indicator model

- Latent variable: General fiscal uncertainty

$$m_t = m_0 + A\lambda_t + e_t$$
$$\lambda_t = b_1\lambda_{t-1} + b_2\lambda_{t-2} + \upsilon_t$$
$$e_t = Ce_{t-1} + \eta_t$$

  - m_t: 4x1 vector of fiscal uncertainty variables
  - λ_t: general fiscal uncertainty
  - $m_0 + e_t$: idiosyncratic component of fiscal uncertainty.

Coincident Indicator: General Fiscal Uncertainty



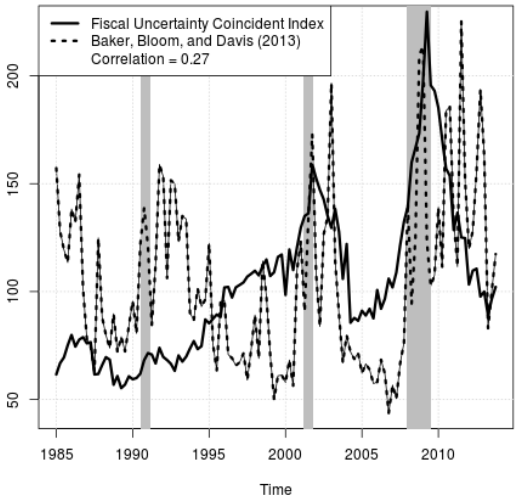
Idiosyncratic Fiscal Uncertainty - Pearson Correlations

	Gov Spending	Tax Revenue	Transfers	Government Debt
Gov Spending	1.00	-	-	-
Tax Revenue	0.40	1.00	-	-
Transfers	-0.17	-0.23	1.00	-
Government Debt	-0.21	-0.32	-0.18	1.00

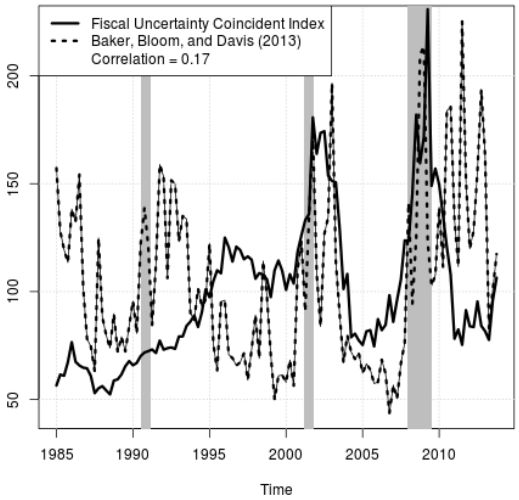
Correlation of RMSE with Coincident Index

	Gov Spending	Tax Revenue	Transfers	Government Debt
Coincident Index	0.75	0.78	0.99	0.91

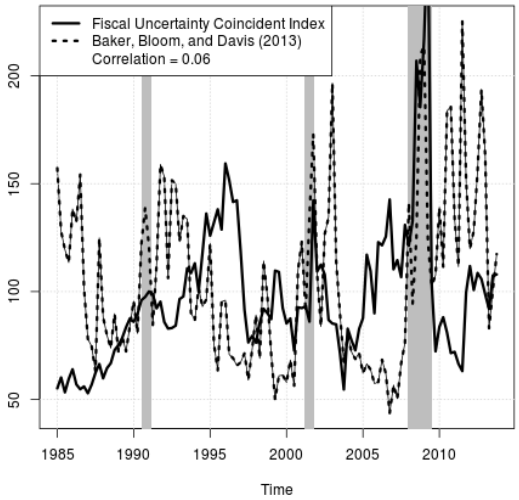
Relationship with Baker et. al. (2013)



Learning Gain = 0.01
Correlation = 0.27



Learning Gain = 0.02
Correlation = 0.17



Learning Gain = 0.04
Correlation = 0.06

- Close match post-2000
- Higher correlation with more empirically plausible learning gains
- BBD - Headline news is likely endogenous
- BBD - Tax policy expiration is forward looking
- BBD is a general economic policy uncertainty index

Dependent Variables: Macroeconomic Outcomes

- Real GDP
- Consumption
- Investment
- Inflation
- Employment
- Unemployment

Explanatory Vars: Common and Idiosyncratic Fiscal Uncertainty

- Government Exp
- Tax Receipts
- Transfer Payments
- Government Debt
- Coincident Index

(First lag to avoid endogeneity)

Controls

- Lags of all the dependent variables in every model.
- Lags of all the fiscal policy variables

ARDL Results (Learning Gain = 0.02, Lags = 2)

Fiscal Uncertainty - Row Headings -	**Dependent Variables (Column Headings)**					
	Real GDP	Consumption	Investment	Employment	Unemployment	Inflation
Government Exp	−0.04	0.06	−0.06	−0.68**	0.55***	0.02
(Standard Error)	(0.11)	(0.07)	(0.08)	(0.28)	(0.13)	(0.25)
Tax Receipts	0.36***	0.07	0.26***	0.39	−0.22	0.05
(Standard Error)	(0.11)	(0.06)	(0.09)	(0.28)	(0.14)	(0.15)
Transfer Payments	−0.01	−0.03	0.01	−0.49**	0.19***	0.01
(Standard Error)	(0.08)	(0.04)	(0.04)	(0.23)	(0.06)	(0.12)
Government Debt	0.05	−0.03	0.09	−1.27	0.25	0.12
(Standard Error)	(0.10)	(0.06)	(0.06)	(0.88)	(0.16)	(0.17)
Coincident Index	−0.41***	−0.21***	−0.19***	0.13	−0.22*	−0.36**
(Standard Error)	(0.10)	(0.05)	(0.07)	(0.38)	(0.14)	(0.16)
Joint Wald	4.02***	3.80***	2.54**	3.21***	4.27***	1.29
Adjusted R-square	0.32	0.98	0.96	0.83	0.87	0.81
AIC	466.15	198.35	257.72	666.99	398.54	632.69
BIC	549.83	282.03	341.40	750.67	482.22	716.37

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1. Fiscal uncertainty influences everything but inflation

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2. Common fiscal uncertainty dampens aggregate demand

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3. Transfers and Spending uncertainty drags on employment

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(Standard Error)	(0.11)	(0.07)	(0.08)	(0.28)	(0.13)	(0.25)
Tax Receipts	0.36***	0.07	0.26***	0.39	−0.22	0.05
(Standard Error)	(0.11)	(0.06)	(0.09)	(0.28)	(0.14)	(0.15)
Transfer Payments	−0.01	−0.03	0.01	−0.49**	0.19***	0.01
(Standard Error)	(0.08)	(0.04)	(0.04)	(0.23)	(0.06)	(0.12)
Government Debt	0.05	−0.03	0.09	−1.27	0.25	0.12
(Standard Error)	(0.10)	(0.06)	(0.06)	(0.88)	(0.16)	(0.17)
Coincident Index	−0.41***	−0.21***	−0.19***	0.13	−0.22*	−0.36**
(Standard Error)	(0.10)	(0.05)	(0.07)	(0.38)	(0.14)	(0.16)
Joint Wald	4.02***	3.80***	2.54**	3.21***	4.27***	1.29
Adjusted R-square	0.32	0.98	0.96	0.83	0.87	0.81
AIC	466.15	198.35	257.72	666.99	398.54	632.69
BIC	549.83	282.03	341.40	750.67	482.22	716.37

4. Debt uncertainty drags on employment (significant in most other specifications)

ARDL Results (Learning Gain = 0.02, Lags = 2)

Fiscal Uncertainty - Row Headings -	**Dependent Variables (Column Headings)**					
	Real GDP	Consumption	Investment	Employment	Unemployment	Inflation
Government Exp	−0.04	0.06	−0.06	−0.68**	0.55***	0.02
(Standard Error)	(0.11)	(0.07)	(0.08)	(0.28)	(0.13)	(0.25)
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5. Tax uncertainty (mostly unexpectedly low) boosts investment and real GDP

Magnitude of Extreme Change in Coincident Fiscal Uncertainty (Learning Gain = 0.02)

Largest Value Coincident Fiscal Uncertainty = 4.77	Date: 2009 Quarter 2
Smallest Value in Decade Preceding = -0.34	Date: 2005 Quarter 4

Estimated Impact - ARDL(2)

Variable	Impact	95% Lower Bound	95% Upper Bound
Real GDP	−2.07***	−3.04	−1.11
Consumption	−1.06***	−1.57	−0.54
Investment	−0.96***	−1.64	−0.29
Employment	0.65	−3.15	4.45
Unemployment	−1.14*	−2.49	0.21
Inflation	−1.85**	−3.50	−0.20

Consequences for Fiscal Uncertainty

- lower real GDP,
- lower consumption,
- lower investment.

Specific fiscal variables

- Government expenditures, transfers, and debt associated with labor market contractions.
- Tax uncertainty associated with increases in investment and real GDP

Consequences during the Great Recession

- Responsible for a 1% to 3% decrease in real GDP
- Decreased consumption by about 1% of real GDP
- Decreased investment by about 1% of real GDP

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