

# Causal Inference, Time Series and Economic History

## 5. Narrative Methods

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# Overview

- The narrative approach
  - Introduction
  - Sources
  - Econometrics
  - Applications
  - Strengths and weaknesses
- *Class discussion paper*: Cloyne, J., 'Discretionary tax changes and the macroeconomy: New narrative evidence from the United Kingdom', *American Economic Review*, 103 (2013), pp. 1507-28

# The Narrative Approach

- The narrative approach is a potential solution to the endogeneity problem
- The approach was pioneered by Friedman and Schwartz (1963)
- Coined by Romer and Romer (1989)
- “Narrative methods involve constructing a series from historical documents to identify the reason and/or the quantities associated with a particular change in a variable” (Ramey, 2016, p. 78)

# Sources

- Retrospective accounts might be biased by knowledge of the subsequent outcome (Romer and Romer, 1989)
- Historical documents used for a contemporaneous or real-time account
- Historical sources should be:
  - Relatively consistent
  - Relatively accurate
- Potential sources:
  - Reports from newspapers (*Business Week*, *Economist* etc.) and non-governmental organisations (*OECD Economic Outlook*)
  - Policymakers' statements and speeches
  - Legislative debates, reports and acts

# What the Narrative Approach Is Not

- “Narrative” is a buzzword at the moment
- Narrative can be used to describe qualitative economic history
- Narrative economics is about how narratives “go viral” with economic impact (Shiller, 2018)
- The narrative approach is distinct

# What the Narrative Approach Is

1. Uses qualitative sources to establish causal effects (reverse causality)
2. Uses real-time data to control for policymakers' information sets (omitted variables)
3. Uses qualitative sources to quantify unobservables (measurement)

# Reverse Causality

- Reverse causality occurs when  $x_t$  not only affects, but is affected by,  $y_t$ :

$$y_t = \alpha + \beta x_t + u_t \quad (1)$$

$$x_t = \delta + \theta y_t + e_t \quad (2)$$

- Consider this simple thought experiment:
  1. Shock the error term in equation (1),  $u_t$
  2.  $y_t$  changes in equations (1) and (2)
  3.  $x_t$  changes in equations (1) and (2)
- Therefore, there is a correlation between  $x_t$  and  $u_t$  that violates the zero conditional mean assumption,  $Cov(u_t, x_t) = 0$

## Reverse Causality and VARs

- In Week 4, we covered the (structural) VAR model, which allows us to understand how  $x_t$  affects  $y_t$  and how  $y_t$  affects  $x_t$  by constraining either  $\beta = 0$  or  $\theta = 0$
- Using theory or institutional knowledge, we shut down one channel of the causality by assumption
- If we constrain  $\theta = 0$ , for example, we assume that  $y_t$  never affects  $x_t$
- This may not be plausible in some contexts



# Reverse Causality and the Narrative Approach

- The narrative approach, however, makes a crucial distinction
- It may not be that  $y_t$  *never* affects  $x_t$ , but that  $y_t$  only *sometimes* affects  $x_t$
- The key idea is that  $x_t$  can be partitioned into an endogenous and an exogenous component

# The Econometrics

- Returning to our simple bivariate example:

$$y_t = \alpha + \beta x_t + u_t \quad (3)$$

$$x_t = \delta + \theta y_t + e_t \quad (4)$$

- Inserting equation (4) into (3):

$$y_t = \alpha + \beta(\delta + \theta y_t + e_t) + u_t$$

- It's clear that  $Cov(u_t, \delta + \theta y_t + e_t) \neq 0$

# The Econometrics

- The narrative approach involves separating variation in  $x_t$  due to  $\mathbf{e}_t$  (exogenous component) from variation in  $x_t$  due to  $y_t$  (endogenous component)
- The model would then take the form:

$$y_t = \alpha + \beta \mathbf{e}_t + u_t$$

- As a result, OLS is unbiased because  $\mathbf{e}_t$  and  $u_t$  are uncorrelated by construction
- Single equation models (FDL, ARDL, LP) are perfectly valid although still common to incorporate narrative shocks in VAR models as the estimates can be more precise in small samples (Cloyne and Hürtgen, 2016)

# Applications

- Monetary policy
  - Romer and Romer (1989)
- Fiscal policy
  - Ramey and Shapiro (1998), Romer and Romer (2010, 2016), Ramey (2011), Cloyne (2013), Crafts and Mills (2013, 2015), Hayo and Uhl (2014), Gujarado et al. (2014), Alesina et al. (2015, 2018), Ramey and Zubairy (2018), Cloyne et al. (2018), Hussain and Liu (2018, 2019), Gil et al. (2019), Carrière-Swallow et al. (2021)
- Financial crises
  - Jalil (2015), Kenny et al. (2020), Esteves et al. (2021)
- Oil
  - Hamilton (1985)
- Credit
  - Fieldhouse et al. (2018)
- Among many others

# Pros and Cons

## *Pros*

- Possible to establish causality

## *Cons*

- Subjective
- Labour intensive
- Sources taken at face value
- Issues of replicability

# What the Narrative Approach Is

1. Uses qualitative sources to establish causal effects (reverse causality)
2. Uses real-time data to control for policymakers' information sets (omitted variables)
3. Uses qualitative sources to quantify unobservables (measurement)

## Omitted Variable Bias

- A second, less-common, form of the narrative approach aims to resolve omitted variable bias
- Policymakers use a large set of information when setting policy
- Including all of the relevant information in a vector autoregression is challenging because of the degrees of freedom consumed
- As the number of endogenous variables increase, the degrees of freedom decrease
- The key contribution is to use historical documents to reconstruct policymakers' information sets
- In the first stage, the policymakers' reaction function is estimated, which allows the policy indicator to be separated into an endogenous component and an exogenous component
- In the second stage, an economic outcome is regressed on the exogenous component of the policy indicator

# Applications

- Monetary policy
  - Romer and Romer (2004), Cloyne and Hürtgen (2016), Lennard (2018)



# What the Narrative Approach Is

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# Measurement

- A third form of the narrative approach aims to measure unobservables
- This involves using qualitative sources to construct a variable

# Applications

- Financial crises
  - Romer and Romer (2017)
- Inflation expectations
- Uncertainty
- Technology
- Sentiment
- Happiness
- Emotions

# Class Discussion Paper: Cloyne (2013)

Research Question

# Class Discussion Paper: Cloyne (2013)

## Data

- Time trend ( $t$ )
- Log of real per capita GDP ( $y_t$ )
- Log of real per capita consumption ( $c_t$ )
- Log of real per capita investment ( $i_t$ )
- Exogenous changes in projected taxes/GDP ( $d_t$ )
- Sample: 1955:I-2009:IV

# Class Discussion Paper: Cloyne (2013)

## Model

$$\mathbf{X}_t = \mathbf{A}_0 + \mathbf{A}_1 t + \mathbf{B}(\mathbf{L})\mathbf{X}_{t-1} + \mathbf{C}(\mathbf{L})d_t + \mathbf{e}_t$$

- where  $\mathbf{X}_t = [y_t, c_t, i_t]'$
- $\mathbf{B}(\mathbf{L})$  is a lag polynomial with 4 lags
- $\mathbf{C}(\mathbf{L})$  is a lag polynomial with the contemporaneous value and 12 lags

## Next Class

- *Class discussion paper:* Velde, F. R., 'Chronicle of a deflation unforecasted', *Journal of Political Economy*, 117 (2009), pp. 591-634

## Further Material

- Ramey, 'Macroeconomic shocks and their propagation'
- Romer, 'The narrative approach to establishing causation in macroeconomics'