PETERSON INSTITUTE FOR INTERNATIONAL ECONOMICS

The Synchronization of U.S. Regional Business Cycles: Evidence from Retail Sales, 1919-1962

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PIIE

Introduction

- Importance of synchronized business cycles for a well-functioning currency union
- Earlier literature
  - Compare degrees of synchronization between regions of the US and between countries of the Eurozone
  - Rely exclusively on postwar data

Outline

Retail Sales by Federal Reserve Districts

- Soon after beginning operations, the Federal Reserve established a nationwide network for collecting information about the economy
- In 1919, it began tabulating data about Retail Sales, which it viewed as a fundamental measure of consumption
- Park and Richardson (2010) were the first to use Retail Sales by Federal Reserve Districts to proxy regional economic activity during interwar

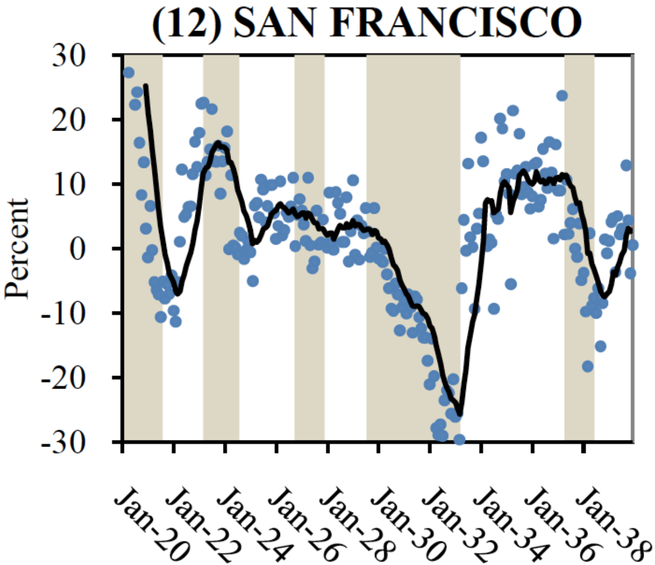
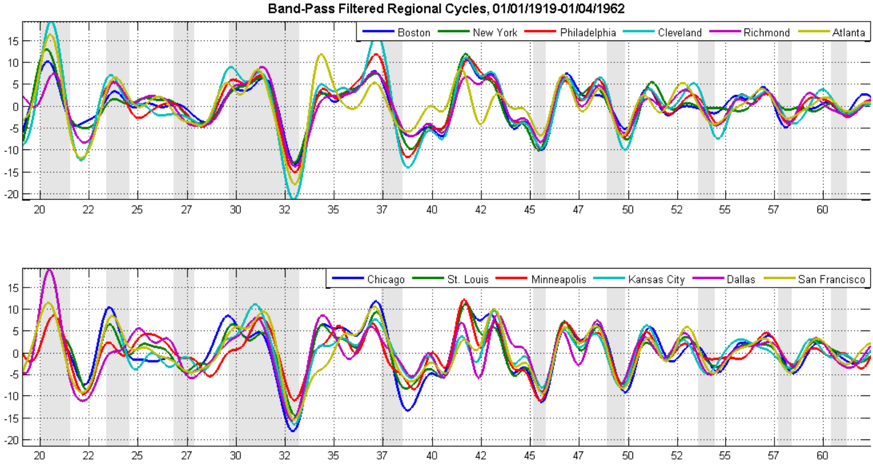


Figure: Retail Sales growth, Source: Park and Richardson (2010)

Isolate business-cycle components



Synchronization index

We follow Cerqueira (2014) to construct a synchronization index that corrects for changes in volatility

1. Find breaks in volatility of our series for the US

$$\frac{Y^{US}_{Cyclical,t}}{Y^{US}_{Trend,t}}$$

2. Normalize each regional series by estimated volatility for the respective segment d

$$y^*_{i,t} = \left(\frac{Y^{i}_{Cyclical,t}}{Y^{i}_{Trend,t}} \right) \Big/ \sigma^d$$

3. Calculate synchronization index on corrected series

$$Synch_{i,US,t} = -\left| y^*_{i,t} - y^*_{US,t} \right|$$

Figure: Synchronization index 1924-1962

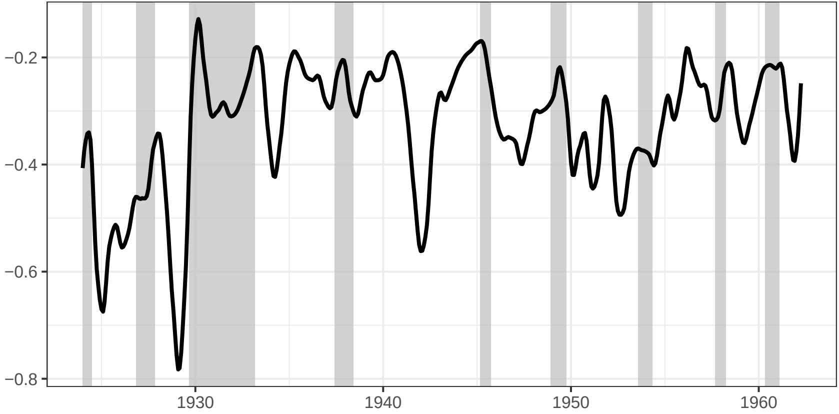
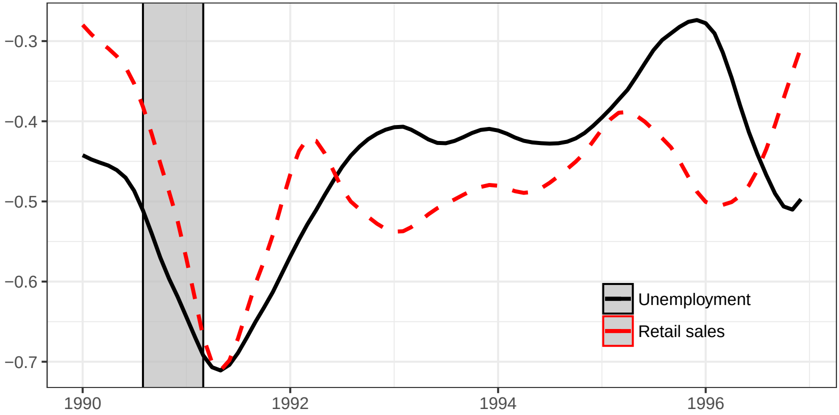


Figure: Synchronization index for Retail Sales vs. Unemployment Rates



Principal component analysis

- PCA is a statistical tool useful to separate variation of time times into separate contributions
- First principal component explains the biggest portion of variation. We interpret it as capturing the aggregate cycle

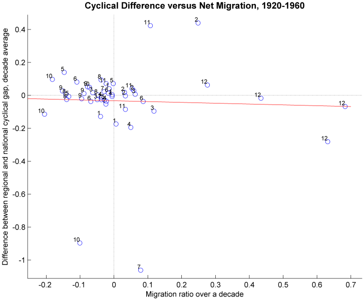
Table: Contribution of aggregate cycle to regional cycles

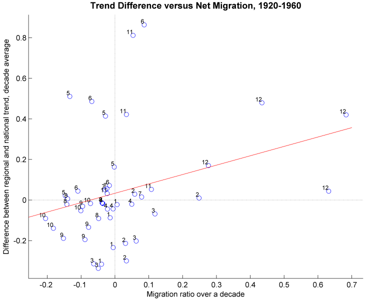
Sample period	% of variance explained
1919-1929	79
1933-1941	86
1945-1962	96

Possible drivers

- Change in sectoral structure or types of shocks
- Better adjustment mechanisms (wage/price flexibility, migration)
- Decrease in financial fragmentation
- Income transfers from regions that are doing well to regions that are not

Migration


Cyclical Difference versus Net Migration, 1920-1960
Difference between regional and national cyclical gap, decade average
Migration ratio over a decade
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-0.2
-0.1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7


Trend Difference versus Net Migration, 1920-1960
Difference between regional and national trend, decade average
Migration ratio over a decade
0.8
0.6
0.4
0.2
0
-0.2
-0.2
-0.1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7

Size of Federal Government

Figure: Synchronization and Federal Non-Defense Spending

	(1) Synchronization	(2) Synchronization	(3) Change in Synchronization	(4) Change in Synchronization
Federal expenditures	0.0282***	0.0333***		
	(0.00739)	(0.00690)		
NBER recessions		0.0766***		0.0347
		(0.0284)		(0.0398)
Change in federal expenditures			0.0341**	0.0313*
			(0.0167)	(0.0177)
Constant	-0.481***	-0.532***	-0.00282	-0.0130
	(0.0491)	(0.0464)	(0.0153)	(0.0151)
Observations	44	44	43	43
R-squared	0.312	0.422	0.073	0.098

Conclusion

- The 1930s as a “defining moment”: this is when regional synchronization reached postwar levels
- Changes in market adjustment mechanisms do not appear related to the increase in regional synchronization
- Fiscal transfers and decrease in financial fragmentation appear to have been instrumental in dampening the importance of region-specific shocks