Business and Credit Cycles in Agriculture

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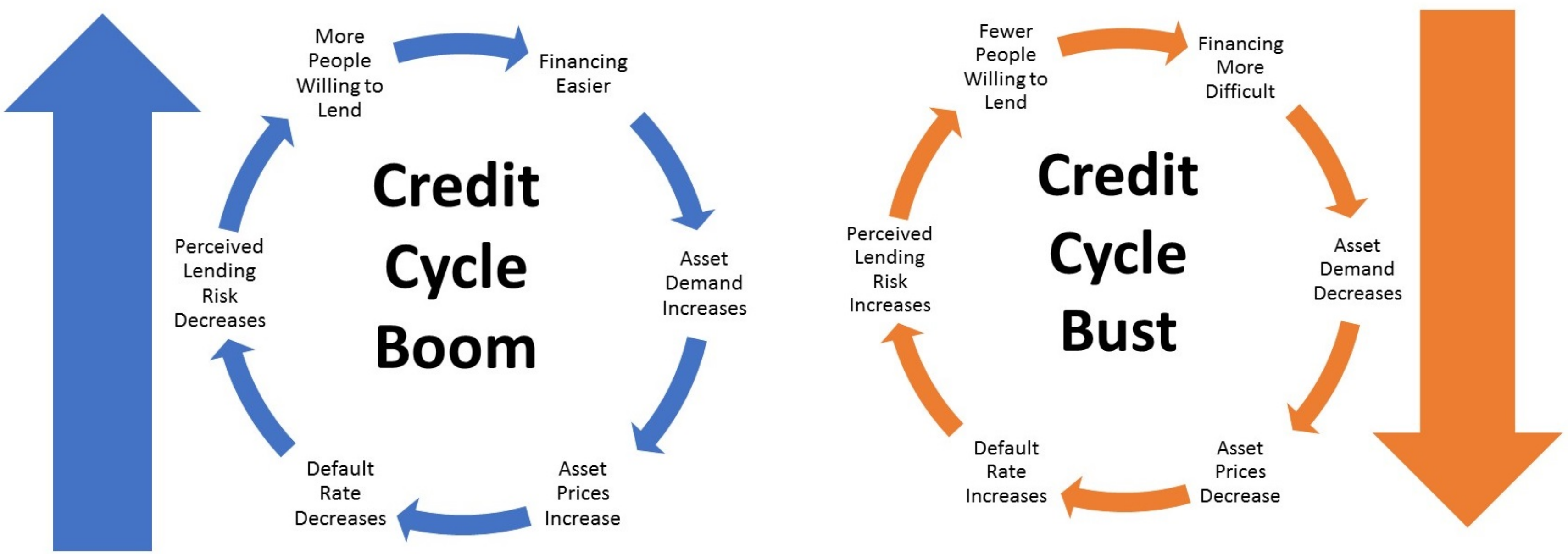
Business and Credit Cycles in Agriculture

- Motivation:
  - Operating margins tightening
  - Potential farmland price decline
  - How does this affect lending?

Based on: Kuethe and Hubbs "Business and Credit Cycles in Agriculture" (under review) – The views expressed are those of the authors and should not be attributed to USDA or ERS.

Linkage between asset values and credit



Keys to credit cycle

- Longer frequency and greater amplitude than business cycle
- Peaks are closely related to banking failures
- Recessions during credit cycle downturns are deeper and longer

Credit cycle in agriculture

- Debt is collateralized by a factor of production
  - Farmland primary source of collateral in farm loans
- Link between assets and credit played a major role:
  - 1920s boom and bust
  - 1980s Farm Financial Crisis

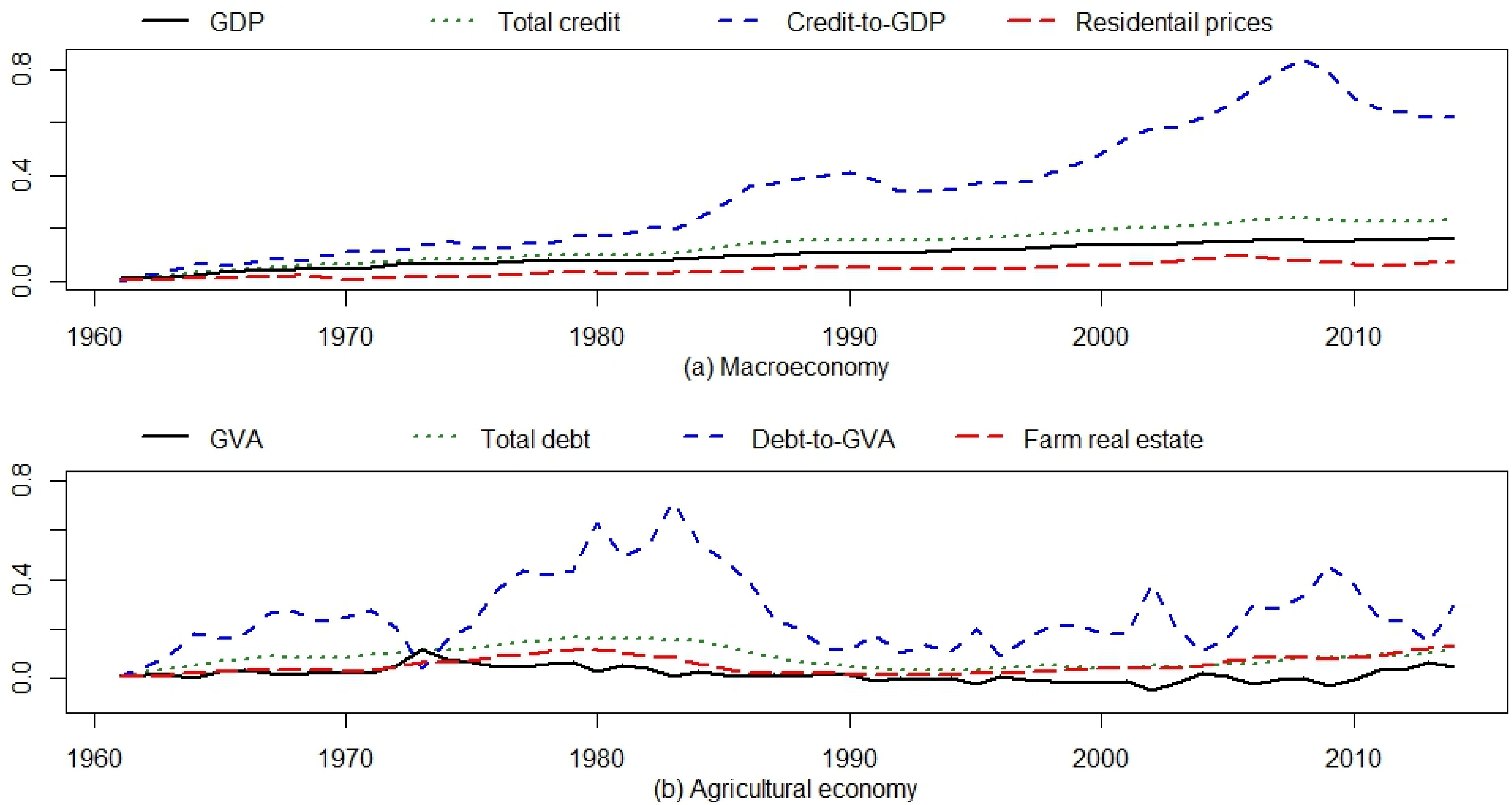
Modeling the credit cycle

- Agricultural sector compliment of macroeconomic model (1960 – 2014)

Aggregate Economy	→	Agricultural Sector
Business Cycle:		
Gross domestic product (GDP)	→	Gross value added (GVA)
Credit Cycle:		
(i) Total credit to private non-financial sector	→	Total farm debt
(ii) Residential property prices	→	Farm real estate values
(iii) Credit-to-GDP ratio	→	Farm debt-to-GVA ratio

Some technical information

Variables


GDP
Total credit
Credit-to-GDP
Residentail prices
0.0
0.4
0.8
1960
1970
1980
1990
2000
2010
(a) Macroeconomy
GVA
Total debt
Debt-to-GVA
Farm real estate
0.0
0.4
0.8
1960
1970
1980
1990
2000
2010
(b) Agricultural economy

The model

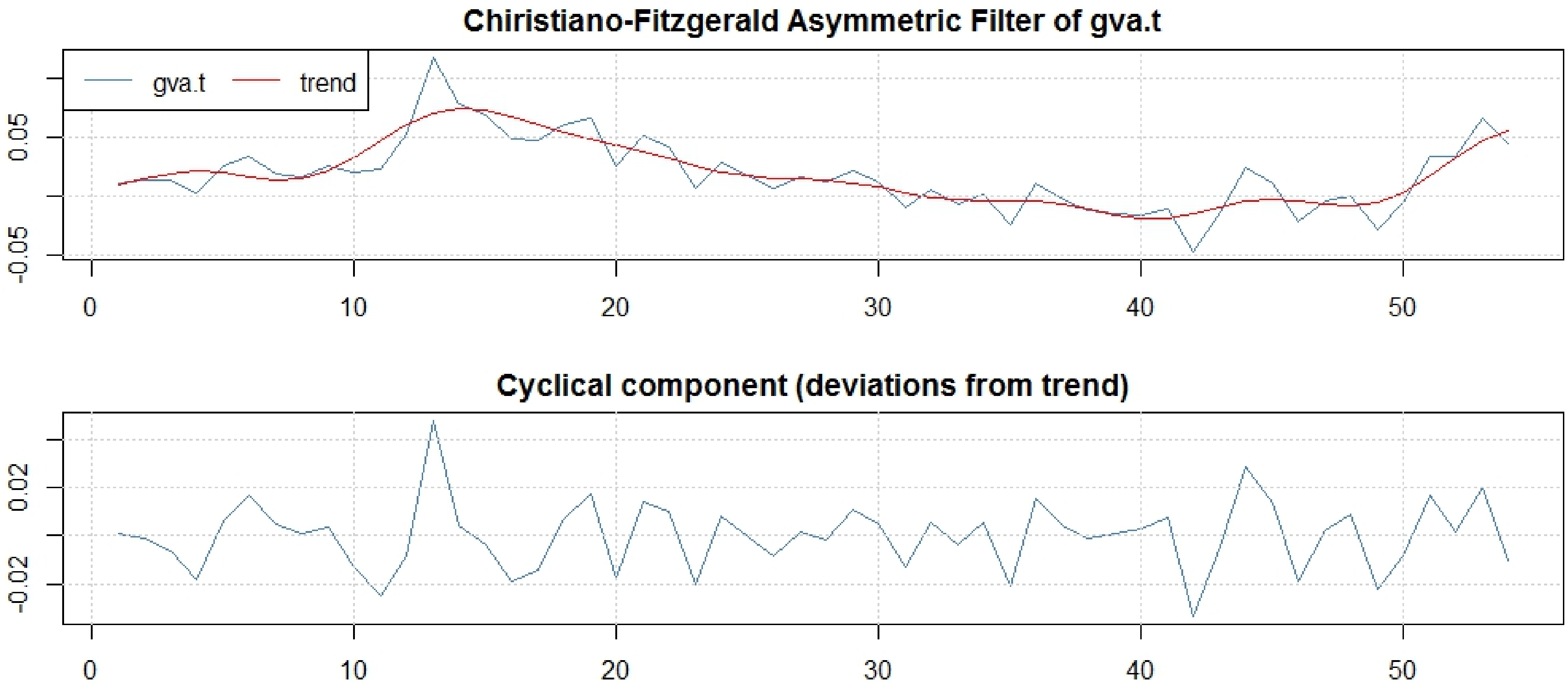
- Decompose series into trend and cyclical component

$$y_t = \tau_t + c_t$$

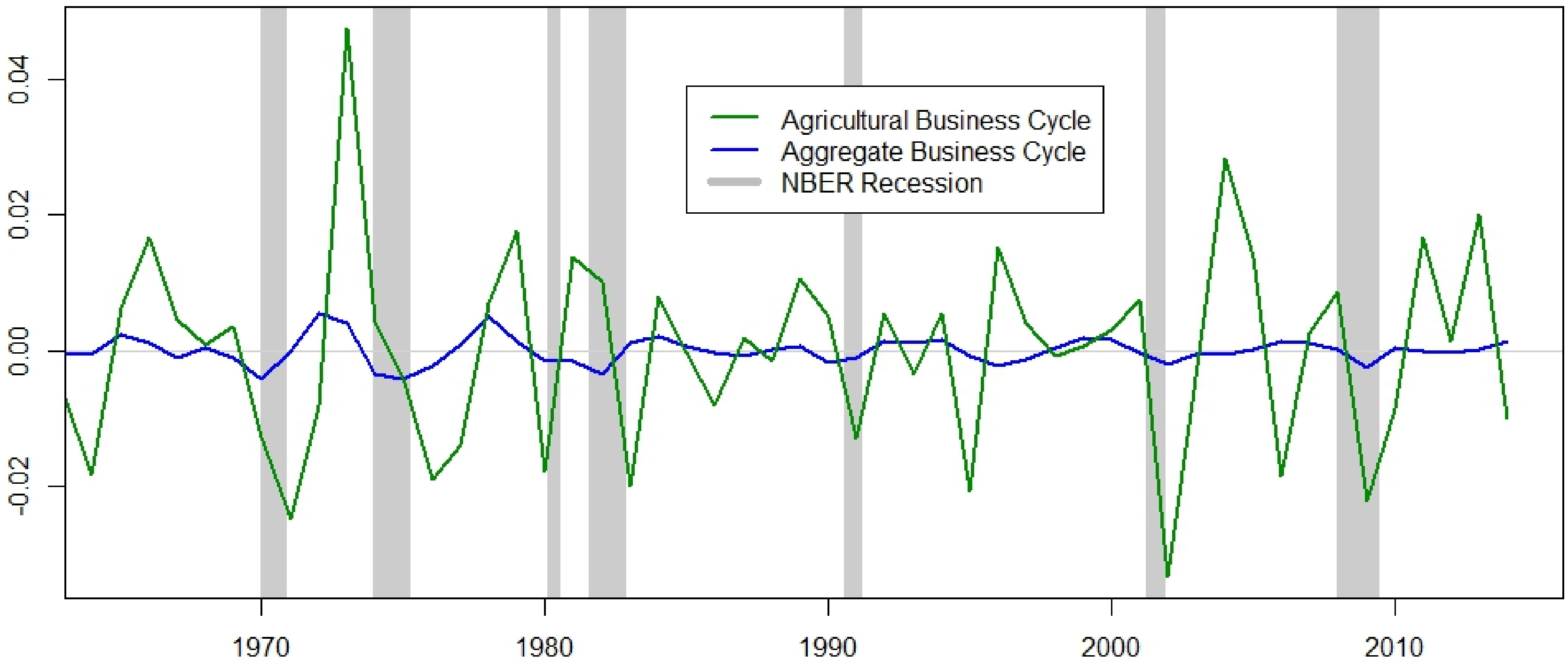
- Business cycle duration: 1 to 8 years
- Credit cycle duration: 8 to 50 years
- Credit cycle is the average of the cyclical components of debt, real estate, and out-to-debt ratios

Some technical information

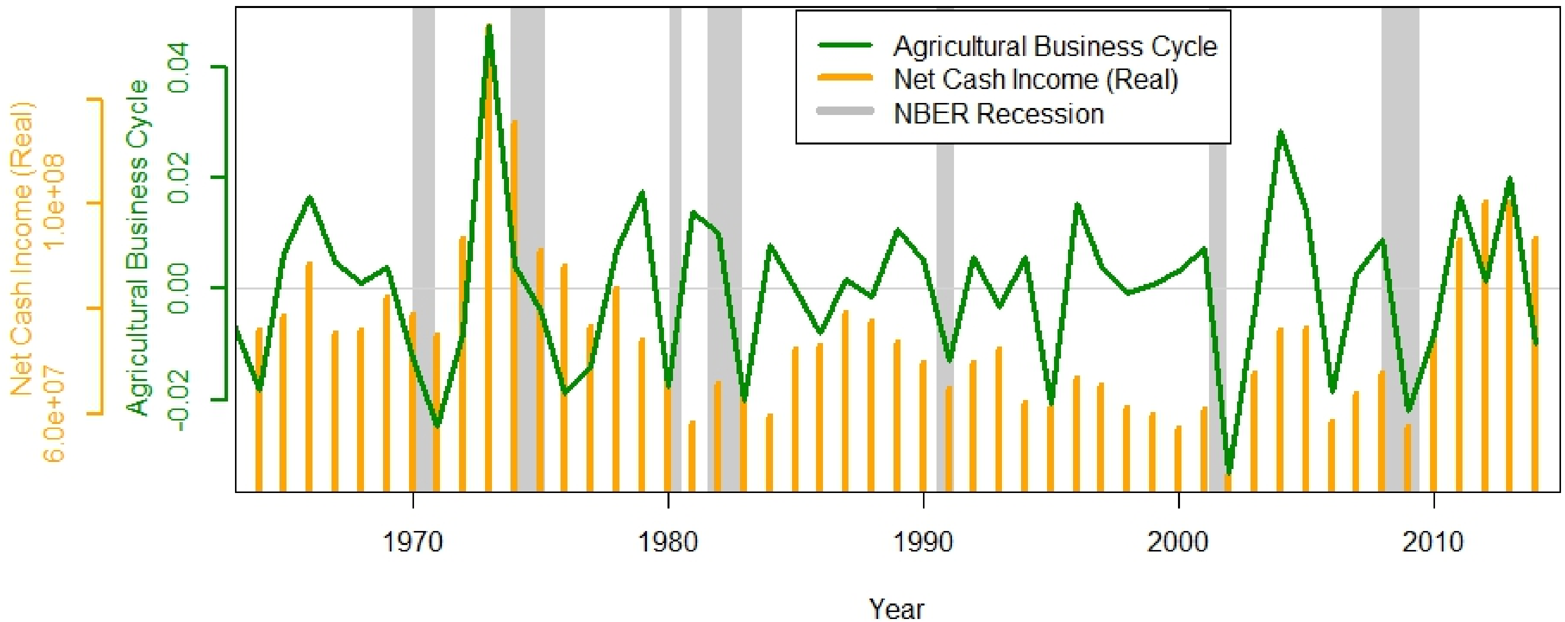
Estimation


Chiristiano-Fitzgerald Asymmetric Filter of gva.t
gva.t
trend
0.05
-0.05
0
10
20
30
40
50
Cyclical component (deviations from trend)
0.02
-0.02
0
10
20
30
40
50

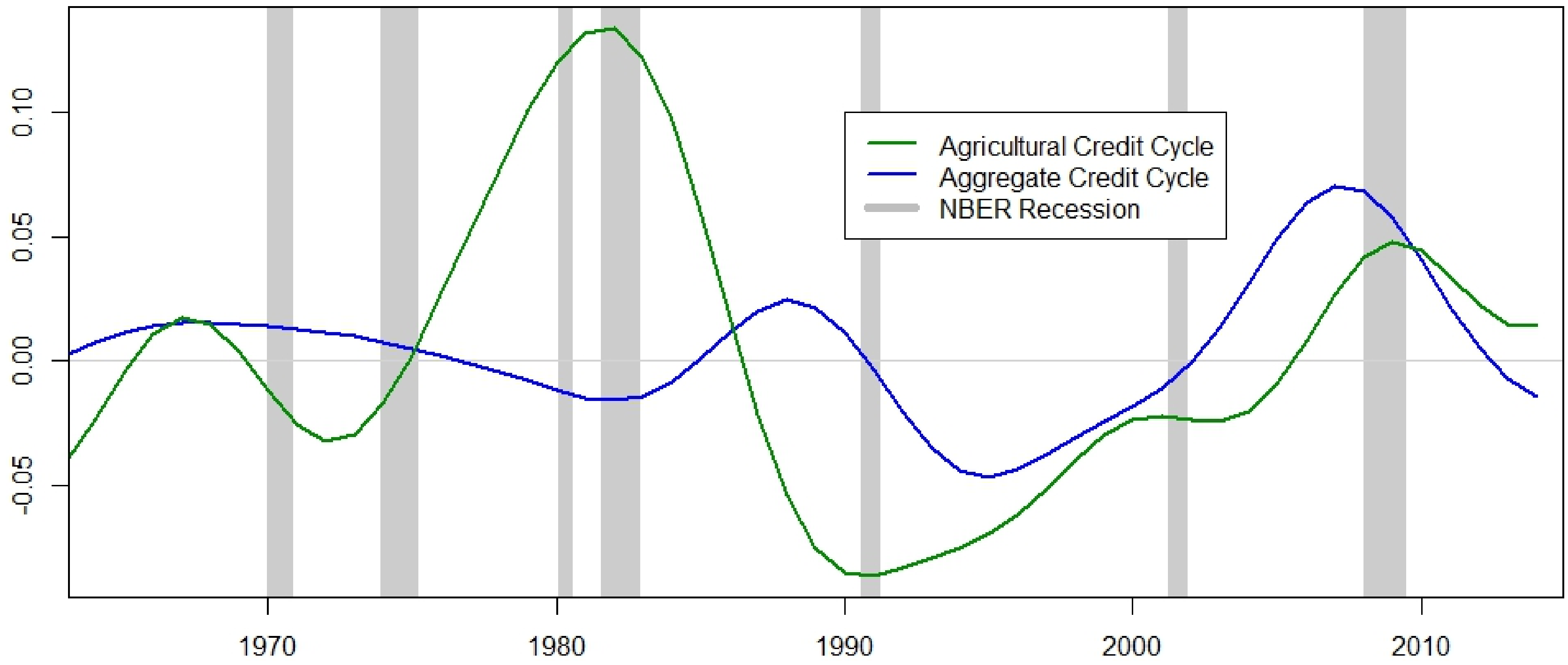
Business cycles in agriculture and the aggregate economy



Agricultural business cycle



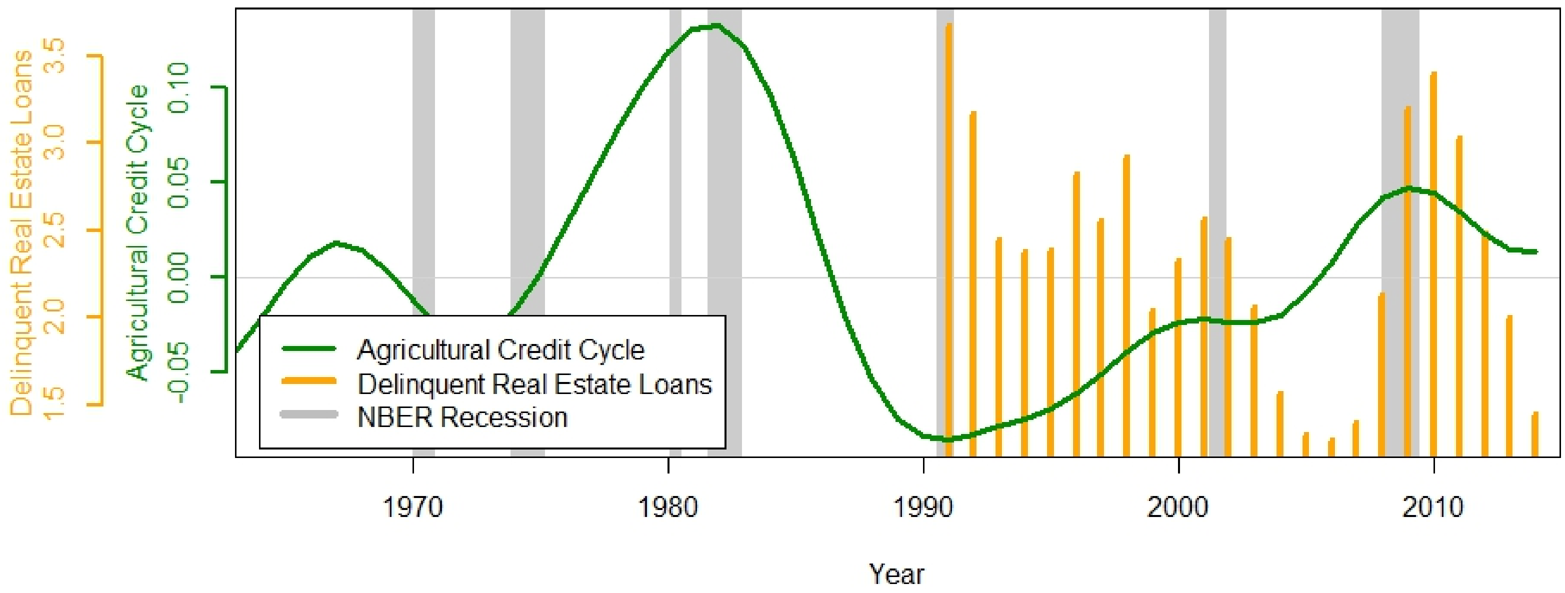
Credit cycles in agriculture and the aggregate economy



Credit cycles in agriculture and the aggregate economy

- The credit cycle is a leading indicator of financial distress
- Federal Reserve “Agricultural Finance Databook”
  - Delinquent real estate loans
  - Nonperforming non-real estate loans
  - Agricultural bank failures
- Farm bankruptcies from USDA-ERS

Delinquent real estate loans



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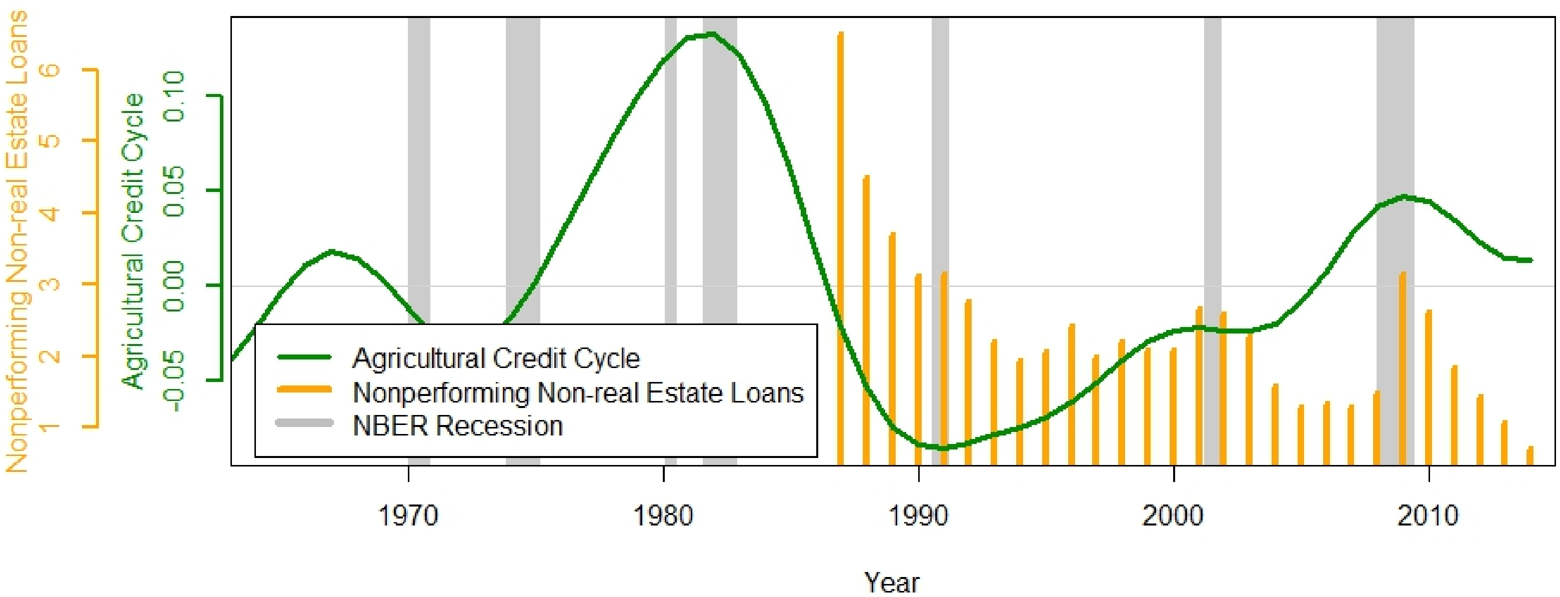
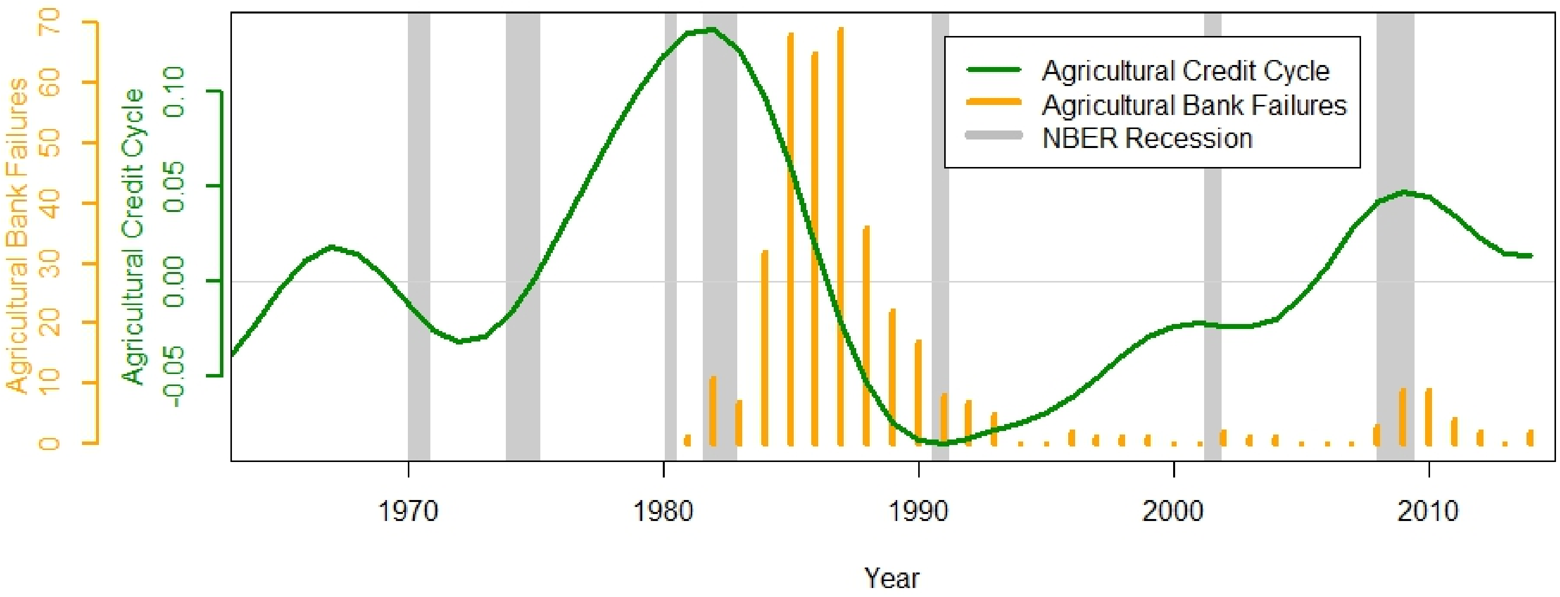
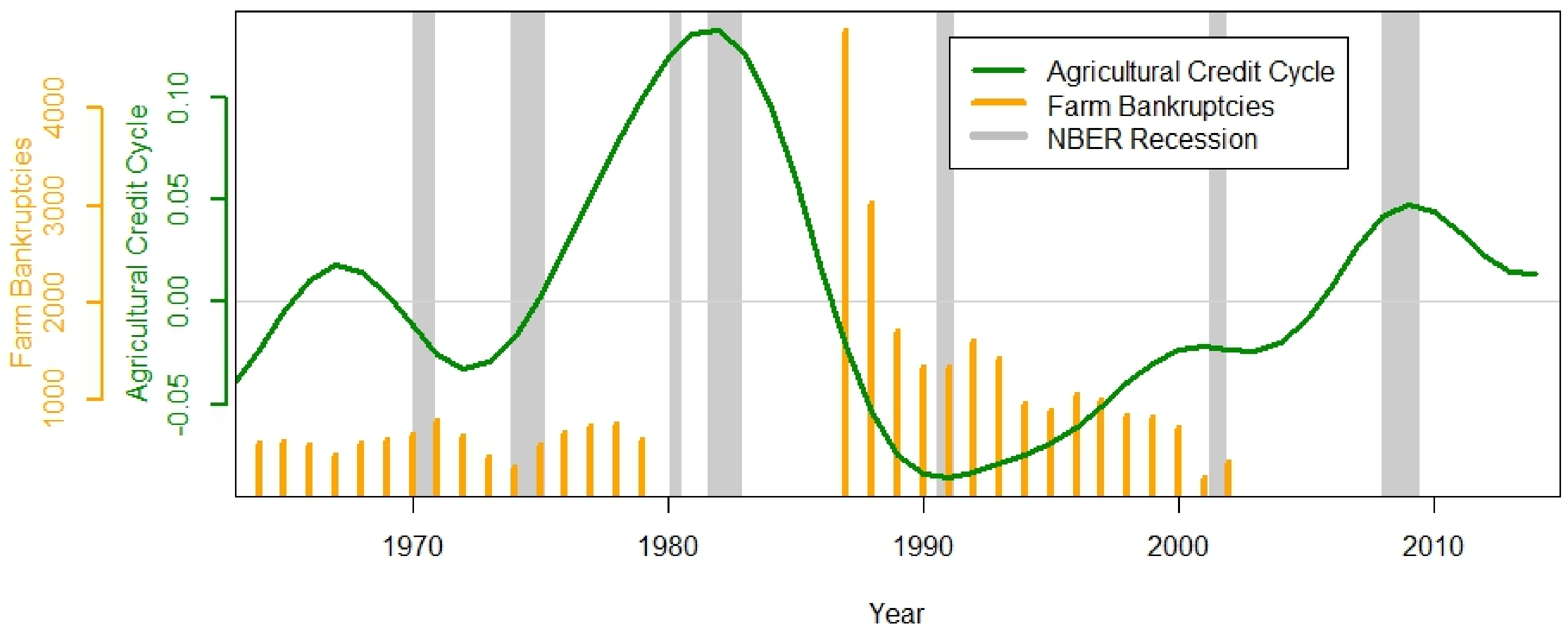
Nonperforming non-real estate loans



Agricultural bank failures

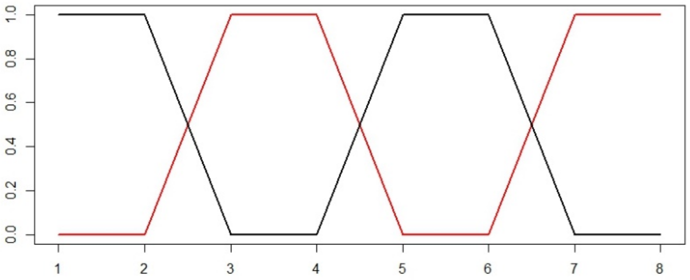


Farm bankruptcies

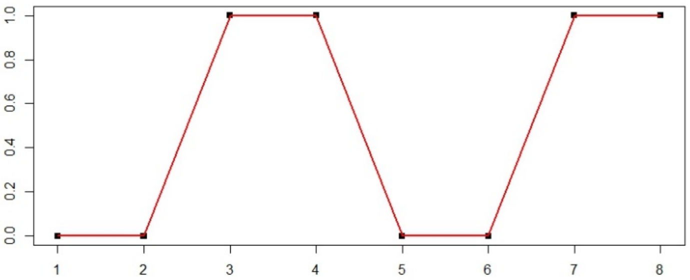


Synchronization of cycles

Exactly counter-cyclical



Exactly procyclical



[Some technical information]

Synchronization of cycles

- Credit and business cycles are *slightly procyclical*
- Agricultural and aggregate **business** cycles are *slightly counter-cyclical*
  – In the short-run, agricultural and aggregate economies move in opposition to one another
- Agricultural and aggregate **credit** cycles are *slightly procyclical*
  – In the long-run, agricultural and aggregate economies move together

Key takeaways

- Asset prices and credit are intrinsically linked
- Agricultural **credit** cycle exhibited three periods of boom and bust since 1960

⬆		⬇
1960 – 1967		1968 – 1972
1973 – 1982		1983 – 1991
1992 – 2010		2011 –

Key takeaways

- Agriculture **credit** cycle currently in a downturn since 2011
  - Previous downturn durations of 5 years (68-72) and 9 years (83-91)
  - Signals increasing risk of financial distress
- Agricultural **business** cycle currently in a recession since 2013
  - Mean duration since 1960 of 1.85 years

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THANK YOU

Technical notes

Data

- All data in real terms (deflated by CPI, 2000 = 100) and normalized to 1985 value
- Expressed as cumulative growth rates beginning in at 0 in 1960

Estimation

- Estimated with Christiano-Fitzgerald Band Pass Filter

Synchronization

- Harding and Pagan (2002) Concordance index