Cryptocurrencies – Preliminary Econometric Analysis

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Growing market

- ☐ First cryptocurrency: Bitcoin in 2009

- ☐ Now: 558 different coins on November 1, 2014 (www.coinmarketcap.com)

- ☐ Coinfloor, London bitcoin exchange, opened yet to new currencies

- ☐ Coinfloor plans to set up an ETF

- ☐ Investment possibilities increase

Characteristics of Cryptocurrencies

⊡ Bitcoin clones

⊡ Improvements compared to Bitcoin

⊡ Same development phase

⊡ Similar effects could run the market

⊡ Related coins

Challenges

- ⊡ Stochastic common trends - Cointegration

- ⊡ Relationships - Granger Causality

- ⊡ Forecasting

Outline

1. Motivation ✓
2. Application
3. Outlook

The Data

- ▣ Data provider: CoinGecko

- ▣ 50 datasets of different coins

- ▣ Time period 07.05.2014 − 19.07.2014

- ▣ Last 7 observations for forecasting

- ▣ Price in USD, daily frequency

- ▣ Social media data

Analysis

- Possibly stochastic (common) trends
  - ▶ ADF test
  - ▶ Bivariate cointegration (Johansen procedure)

- Relationships between log returns of coins
  - ▶ Granger Causality

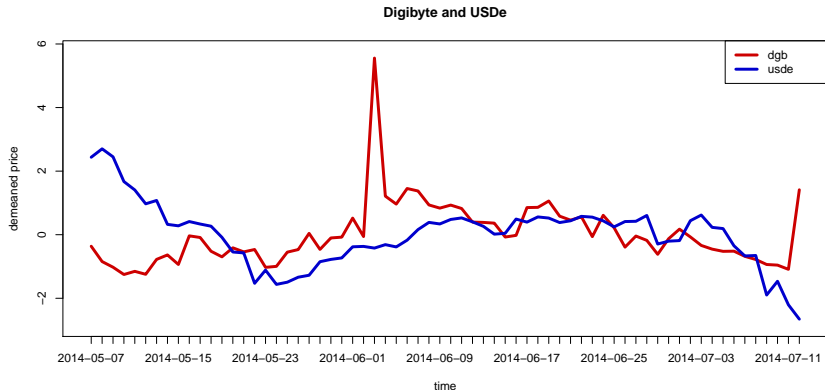- Bootstrap correction of tests

First impression

Figure 1: Demeaned time series Digibyte and USDe

Cointegration

- ☑ Common trends in time series

- ☑ Digibyte, USDe

- ☑ Digibyte founding date: January 10, 2014

- ☑ USDe founding date: January 12, 2014

- ☑ Both coins in same development phase

Implications

☐ Stochastic trend can not be modeled

☐ Solution:

☐ Set up portfolio to eliminate stochastic trend

☐ Get rid of uncertainty
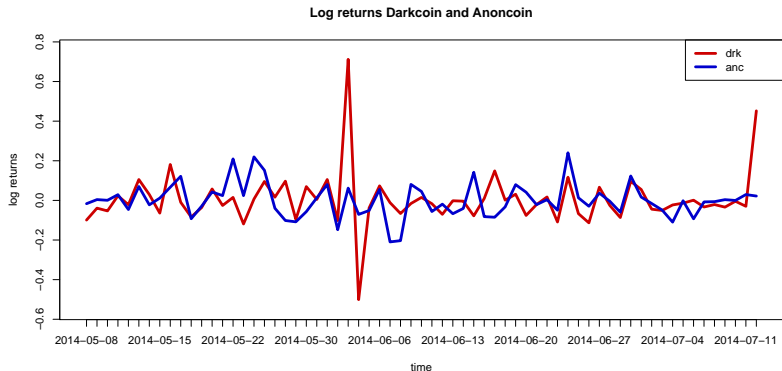
Analysis of Log Returns

Figure 2: Log returns Darkcoin and Anoncoin

Granger Causality

⊡ Influence of one time series to another

⊡ Darkcoin causes Anoncoin: focus on anonymity
  ▶ Darkcoin has positive influence
  ▶ Darkcoin much bigger by market cap

⊡ Bitcoin causes Freicoin: Freicoin is clone of Bitcoin with demurraging
  ▶ Bitcoin has negative influence
  ▶ Possibly same miners due to same algorithm
  ▶ Money switching between both coins

Implications

- ⊡ Movements of some coins related

- ⊡ VAR models for analysis and forecasting

- ⊡ Better forecasts possible

Forthcoming

⊡ Univariate time series analysis

⊡ Volatility analysis

⊡ Optimal models

⊡ Out of sample forecasting

  ▶ Time series models
  ▶ Regression model with social media data

Social Media Data

- ☑ Obtained from Reddit

- ☑ Reddit is a social news aggregating website

- ☑ Data:
  - ▶ Average new Reddit posts on the front page in the last 48 hours
  - ▶ Average new Reddit comments on the front page in the last 48 hours
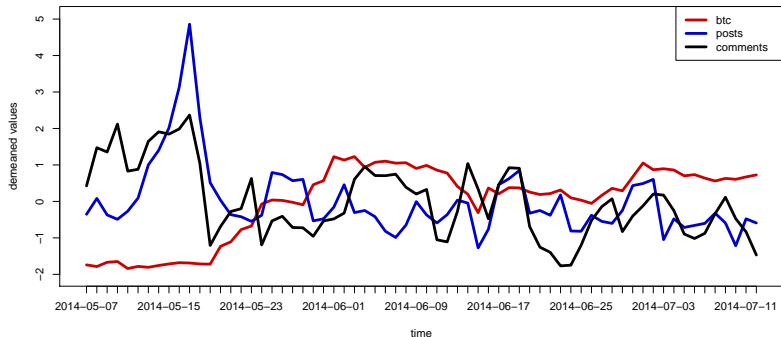- ☑ Model possible relationship

Bitcoin and social media data

Figure 3: Demeaned values of Bitcoin price chart, posts and comments about Bitcoin

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