Proj 5:

Usually, economic bubbles are associated with price series showing explosive behavior for a short period, and once the bubble bursts, there is a return to a lower level(Philip hans Franses,, 2013).

(Homm and Breitung,2012) evaluate various methods using time series.

1. one-step-ahead simple test (to test and monitor for deviations from stability). “Are we in a bubble? A time-series-based diagnostic”

* 1. Monte-carlo simulation indicate that the empirical power of this test is high.
  2. Based on the notion of the balance between acceleration(second difference) and growth(first difference).
     1. Positive growth and acceleration drives the data to explosive behavior. (1-B)yt, and (1-B)^2\*yt are both positive at the same moment.
     2. When growth and acceleration are at balance, it can be shown that a specifically transformed time series should be stable and not show bubble-like patterns.

1. Unit root testing
2. <http://www.capitalspectator.com/bubble-investigations/>

Inspired by the Bank of Finland’s research, I kicked the tires on the idea of applying an ADF Test on the US stock market

To put this into plain English, when the p-value is elevated, that’s a robust signal for thinking that we’re in bubble territory.

ADF coefficient test

Finland Bank.

Using rent-price ratios, the bubble-concept also becomes easier to define: the developments in house prices or rents should not differ greatly from each other; otherwise this would mean that a bubble is developing in the housing markets

The rolling OLS-regressions are applied to log rent/price series to get the least squares estimates to AR- and ADF- coefficients (presented in proposition 1 and 2). In regressions the lag was defined by the AIC (here 1), trend was not included, but constant was allowed. Window lengths used were varied, but the results presents here are all based on sample size 36.

4. Roling ADF test

Peng HUANG ,2008

J max  int{12(*T* /100)1/4}

In Phillips (2007), *j* is chosen to be 10% of the NASDAQ sample. We will follow this setting in the empirical part.

Thus, Monte Carlo simulations for critical values under the above sam- ple size are implemented first

we conventionally use the 95 percentile critical values to evaluate explosive evidence in recursive and rolling ADF tests











> RPratio[RPreg>=0]

[,1]

1990-01-01 0.9406742

1990-02-01 0.9406034

1993-10-01 1.0552571

1993-11-01 1.0578675

1993-12-01 1.0624626

1994-01-01 1.0639852

1994-02-01 1.0690674

1994-03-01 1.0710640

1994-04-01 1.0674620

1994-08-01 1.0575001

1994-09-01 1.0610467

1994-10-01 1.0646191

1994-11-01 1.0690233

1994-12-01 1.0702246

1995-01-01 1.0747177

1995-02-01 1.0776714

1995-03-01 1.0796453

1995-04-01 1.0787897

1995-05-01 1.0783055

1995-06-01 1.0765312

1995-07-01 1.0744106

1995-08-01 1.0743769

1995-09-01 1.0764457

1995-10-01 1.0809461

1995-11-01 1.0852614

1995-12-01 1.0899871

1996-01-01 1.0935629

1996-02-01 1.0958454

1996-03-01 1.0953463

1996-04-01 1.0912095

1996-05-01 1.0879579

1996-06-01 1.0839073

1996-07-01 1.0821584

1996-08-01 1.0816229

1996-09-01 1.0832850

1996-10-01 1.0867603

1996-11-01 1.0901118

1996-12-01 1.0928581

1997-01-01 1.0953879

1997-02-01 1.0975214

1997-03-01 1.0952916

1997-04-01 1.0928625

1997-05-01 1.0889161

2002-03-01 0.9202104

2002-04-01 0.9133257

2002-05-01 0.9034908

2002-06-01 0.8946193

2002-07-01 0.8872576

2002-08-01 0.8814959

2002-09-01 0.8790033

2002-10-01 0.8765656

2003-01-01 0.8725229

2003-02-01 0.8690923

2003-03-01 0.8636894

2003-04-01 0.8562702

2003-05-01 0.8486632

2003-06-01 0.8398090

2003-07-01 0.8328471

2003-08-01 0.8262627

2003-09-01 0.8214330

2003-10-01 0.8182937

2003-11-01 0.8154736

2003-12-01 0.8111817

2004-01-01 0.8064060

2004-02-01 0.8002920

2004-03-01 0.7906765

2004-04-01 0.7818150

2004-05-01 0.7718587

2004-06-01 0.7623233

2004-07-01 0.7545555

2004-08-01 0.7490025

2004-09-01 0.7437118

2004-10-01 0.7390288

2004-11-01 0.7343699

2004-12-01 0.7302410

2005-01-01 0.7254494

2005-02-01 0.7193206

2005-03-01 0.7089785

2005-04-01 0.6996212

2005-05-01 0.6906443

2005-06-01 0.6816168

2005-07-01 0.6748995

2005-08-01 0.6690773

2005-09-01 0.6641472

2005-10-01 0.6610163

2005-11-01 0.6593354

2006-03-01 0.6557972

2006-04-01 0.6550837

2015-03-01 0.8587288

2015-04-01 0.8514546

2015-05-01 0.8440728

2015-06-01 0.8391541

2015-07-01 0.8364029

2015-08-01 0.8361841