Turning points of the Financial and the Real Estate Market

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Agenda

- Introduction
- Motivation
- Data
- Methodology
- Results
- Conclusion

Introduction

- Importance of determining Business cycles
- Turning Points : peak and trough
- Non parametric approach : Bry-Boschan algorithm (1971)
- Parametric approach : Markov Switching Model (Hamilton, 1989)
- Housing as Business cycle (Leamer, 2007)
- Housing as an important indicator to measure economic expansions(Angello and Schuknecht, 2009, Detken and Alessi, 2009).
- Analysis of the Housing market and the financial market by applying the BB algorithm (Bunda and Ca'Zorzi , 2009)

Motivation

- Applying the parametric and the non-parametric approaches to analyse the starting dates of the recessions
- Which method identify better the turning points in the Financial Market and the Real Estate Market
- Analysing the difference between the turning points in the commercial, residential, Real Estate Investment Trust and Stock markets

Data

- Sample length: from 01/1987 to 01/2010

- **UK**

Residential: Halifax Price index

Commercial: Investment Property Databank index (IPD)

REIT index: Real Estate Investment Trust

Stock market: FTSE 500

- **USA**

Commercial: SP/Case Shiller 10 composite index

REIT index

Stock market: S&P500

Methodology

- Parametric approach Markov Switching Model Hamilton (1980, 1990)

$$\begin{cases} s_t = 1 \text{ regime in expansion} \\ s_t = 2 \text{ regime in recession} \end{cases} \quad (1)$$

The transition probabilities are :

$$\begin{aligned} p(s_t = 1 | s_{t-1} = 1) &= p_{11} \\ p(s_t = 2 | s_{t-1} = 1) &= 1 - p_{11} = p_{21} \\ p(s_t = 2 | s_{t-1} = 2) &= p_{22} \end{aligned} \quad (2)$$

$$\begin{cases} \Delta y_t = \mu_{s_t} + \varepsilon_t \\ \mu_{s_t} = \mu_0 (1 - S_t) + \mu_1 S_t \end{cases} \quad \text{where} \quad \varepsilon_t \sim iid\ \mathrm{N}(0, \sigma^2) \quad (3)$$

- Non parametric approach Bry-Boschan (1971)

- Step 1: Determination of extreme values.

- Step 2: Determination of cycles in 12-month moving average. For this step and the subsequent steps, consider the alternation of turns by selecting highest of multiple peaks and lowest of multiple troughs.

- Step 3: Application of Spencer curve on the series resulting from the step 2,“update” the turning points and elimination of the too short cycles.

- Step 4: Detection of turning points on the resulted series of step 3 with a new moving average filter and elimination of short cycles.

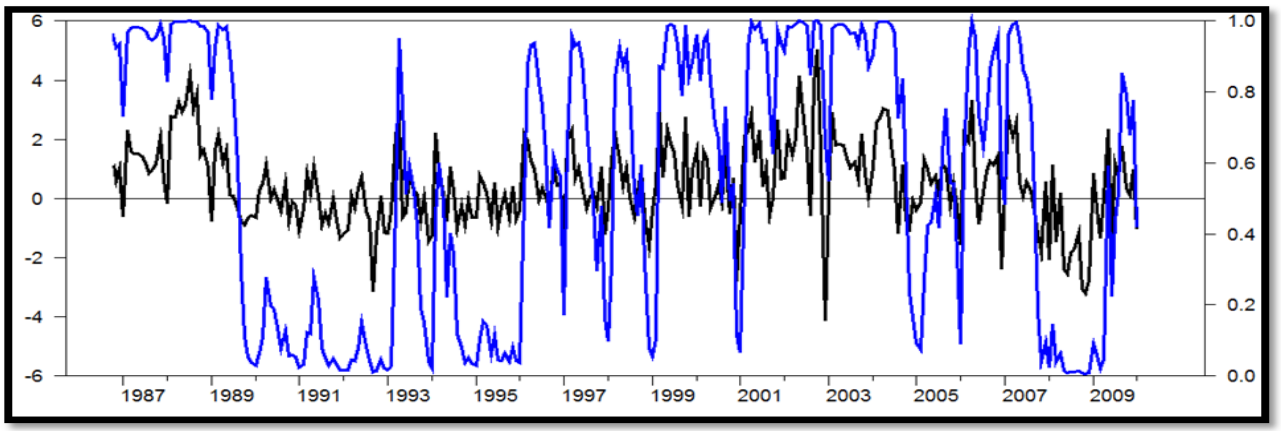
- Step 5: Determination of turning points in the original series taking into account information obtained through the step 4 and elimination of the too short cycles.

- Step 6: Statement of final turning points.

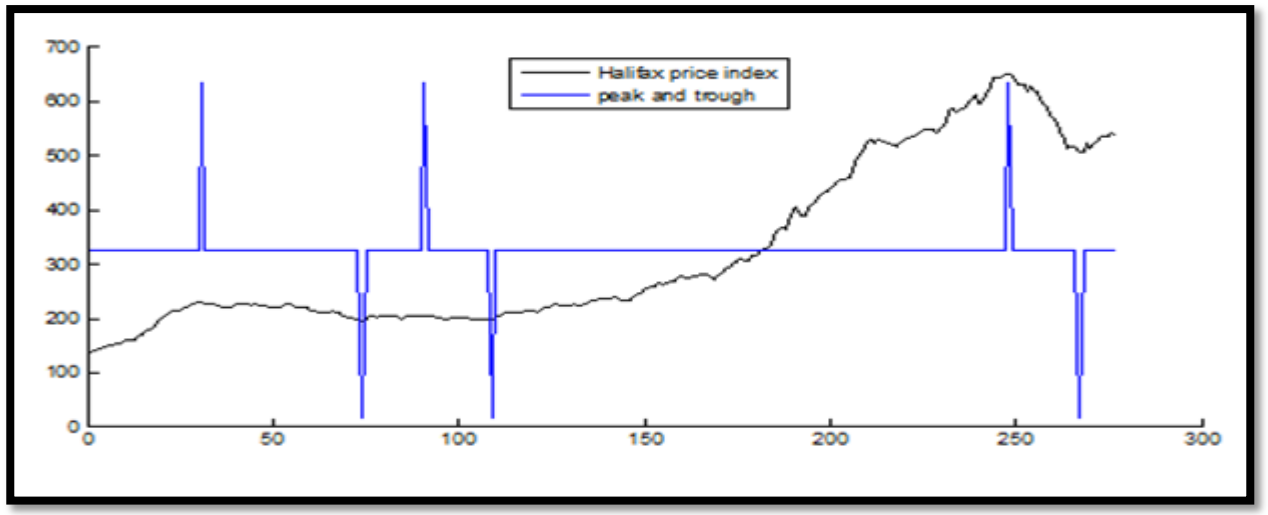
Table 1 . Estimates of the Markov Switching Model for returns

	UK				USA		
	Halifax	REIT	IPD	FTSE 500	REIT	SP/CS 10	S&P500
p_{12}	0.0458 (0.0432)	0.0128 (0.0095)	0.0253 (0.0177)	0.0464 (0.0317)	0.0302 (0.0361)	0.0228 (0.0080)	0.0369 (0.0162)
p_{21}	0.0558 (0.0708)	0.0531 (0.0325)	0.0430 (0.0161)	0.0240 (0.0219)	0.1015 (0.0547)	0.0176 (0.0123)	0.1023 (0.0512)
μ_1	1.1243 (0.0680)	0.7120 (0.4243)	0.9757 (0.0759)	1.1168 (0.1969)	1.0515 (0.5822)	0.9509 (0.0524)	1.2287 (0.1925)
μ_2	-0.2711 (0.1212)	-1.4333 (2.0668)	0.1002 (0.3850)	-0.0001 (0.4203)	-1.8654 (1.3938)	-0.3415 (0.0682)	-1.4158 (1.2053)
σ_1	0.2340 (1.6046)	0.6717 (0.2252)	0.4505 (0.0667)	0.0766 (0.2169)	0.9514 (0.8428)	0.4808 (0.0271)	0.3301 (0.1685)
σ_2	1.0261 (3.4432)	1.3977 (0.2848)	1.8343 (0.1595)	1.5997 (0.5404)	1.6582 (3.0275)	1.7540 (0.0639)	1.8968 (0.7478)

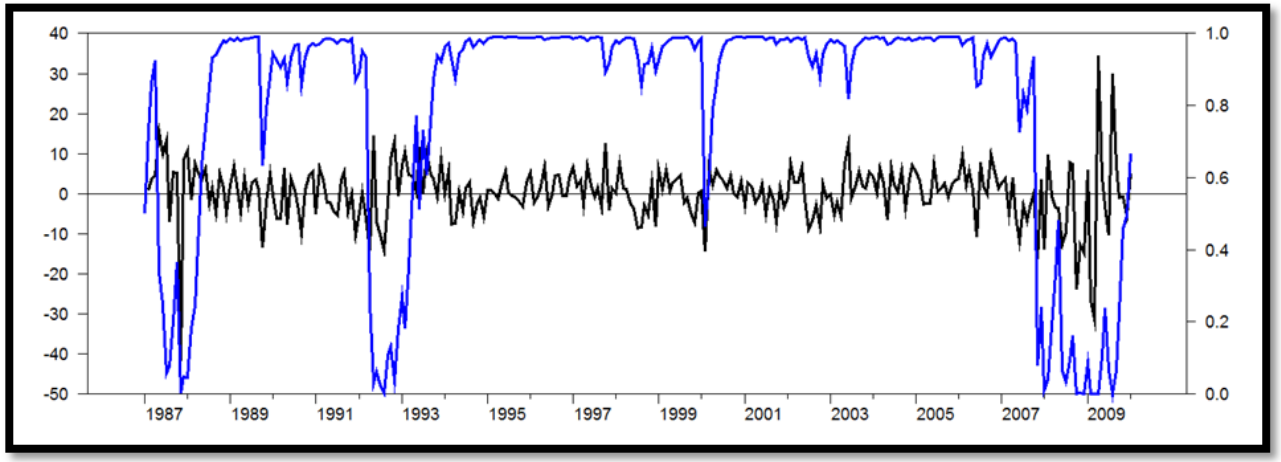
Results on UK Markets



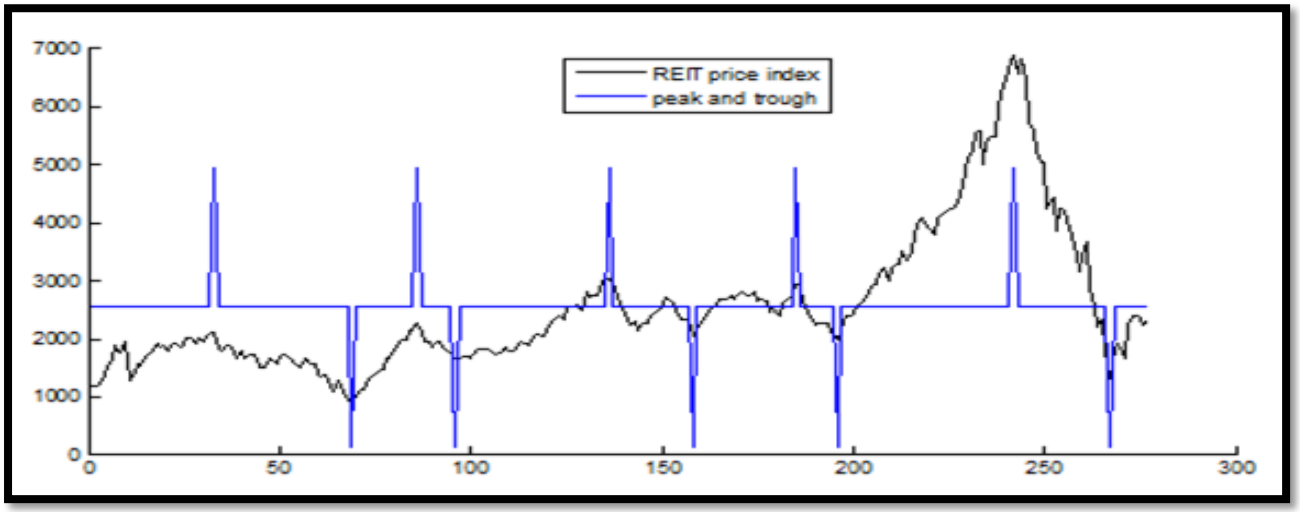
Halifax return and probability of being in expansion



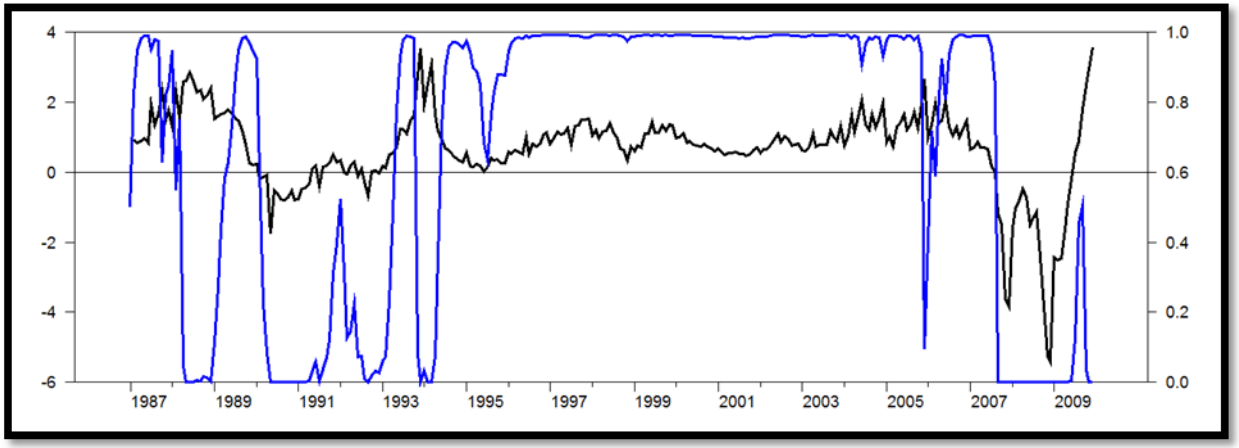
BB algorithm on the Halifax price index



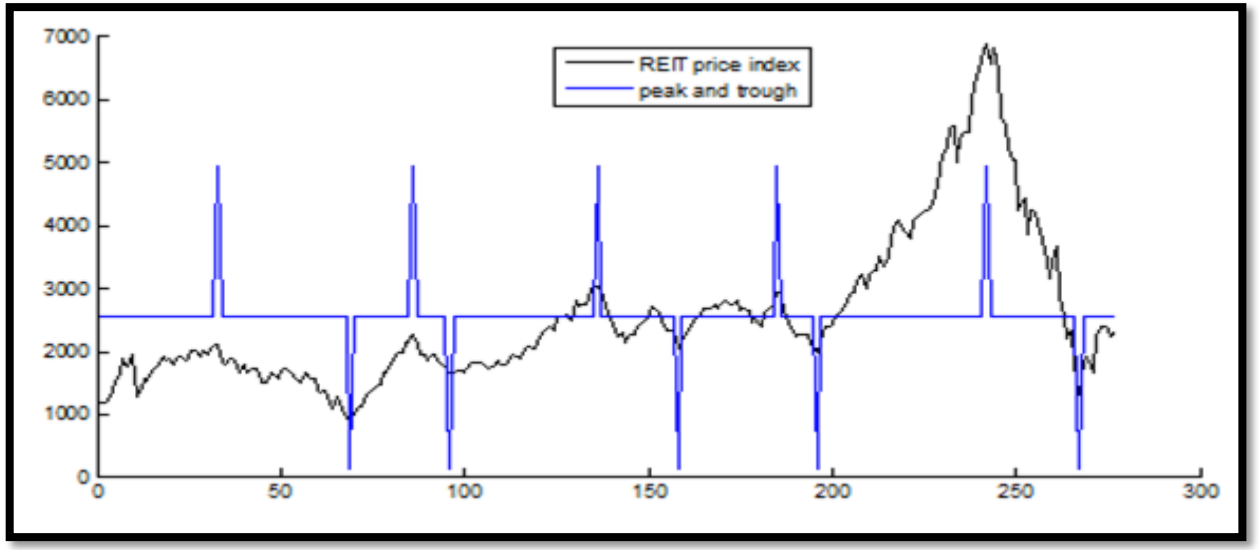
REIT return and probability of being in expansion



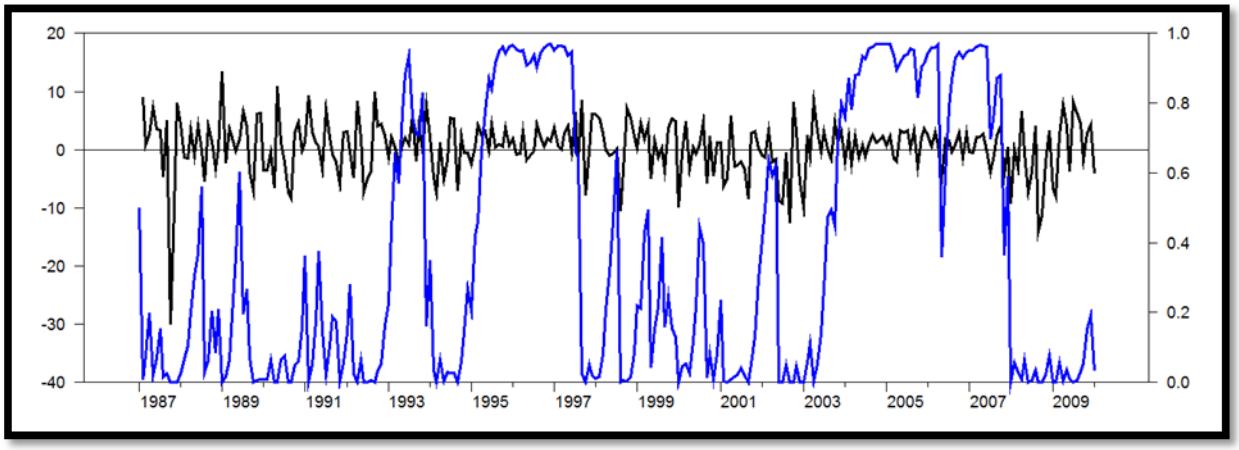
BB algorithm on the REIT UK price index



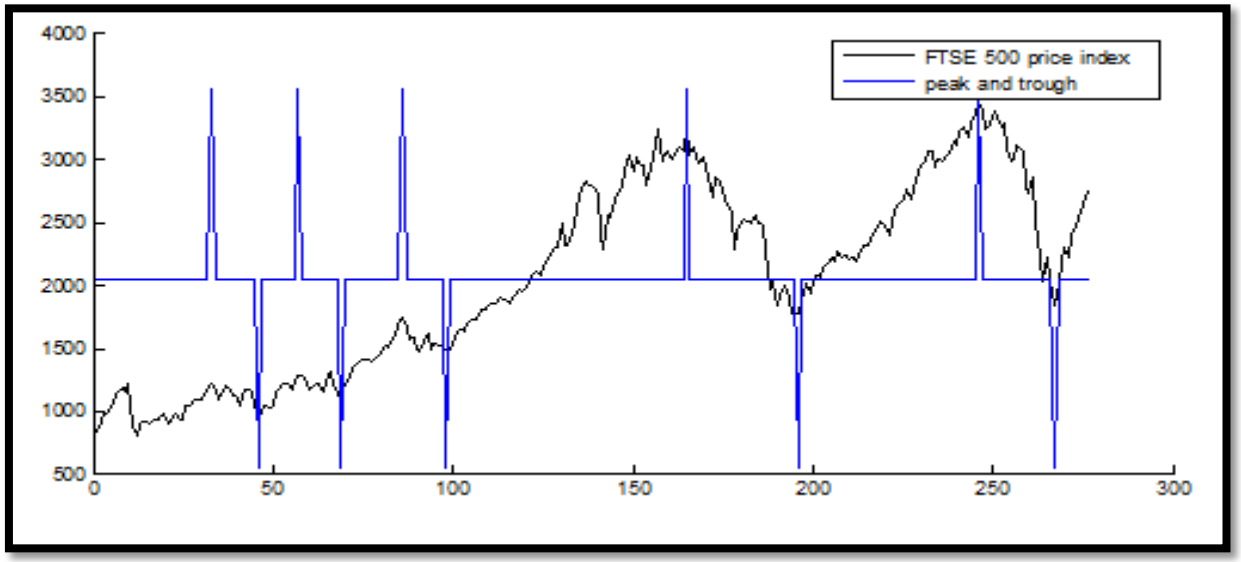
IPD return and probability of being in expansion



BB algorithm on the IPD

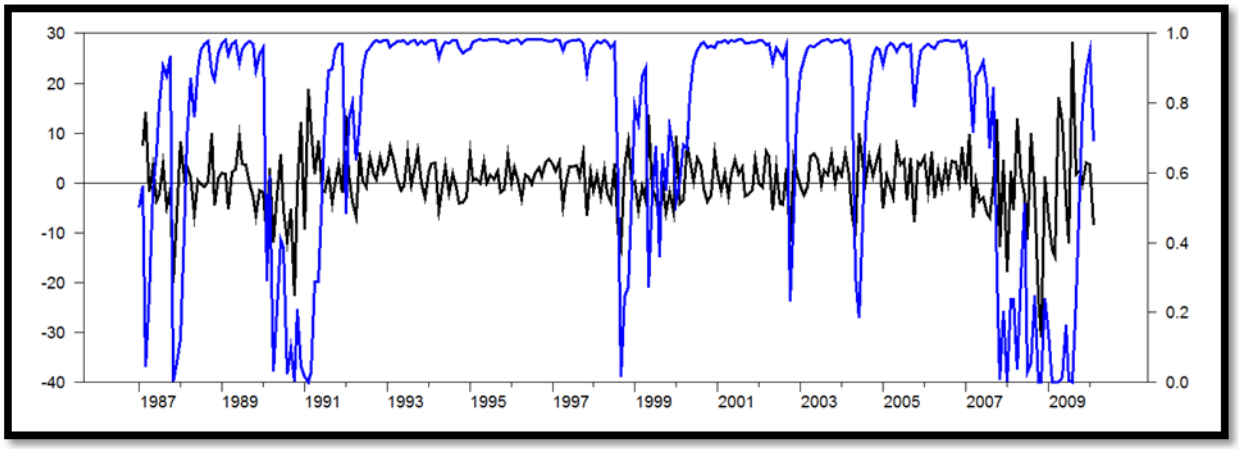


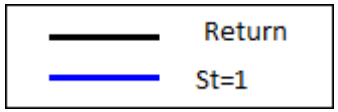
FTSE 500 return and probability of being in expansion



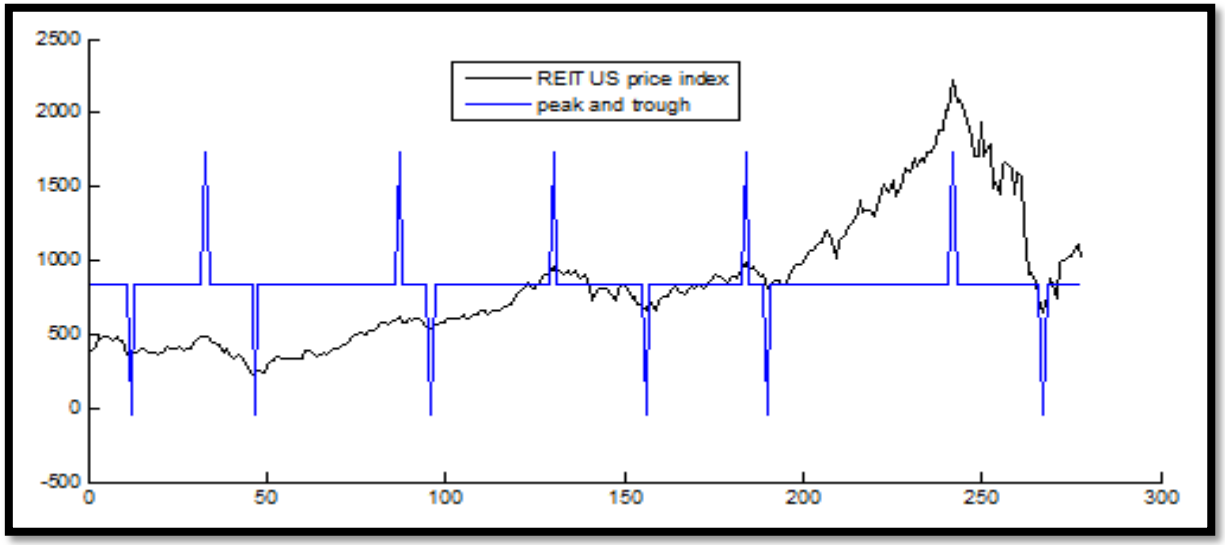
BB algorithm on FTSE 500 price index

Results on US Markets

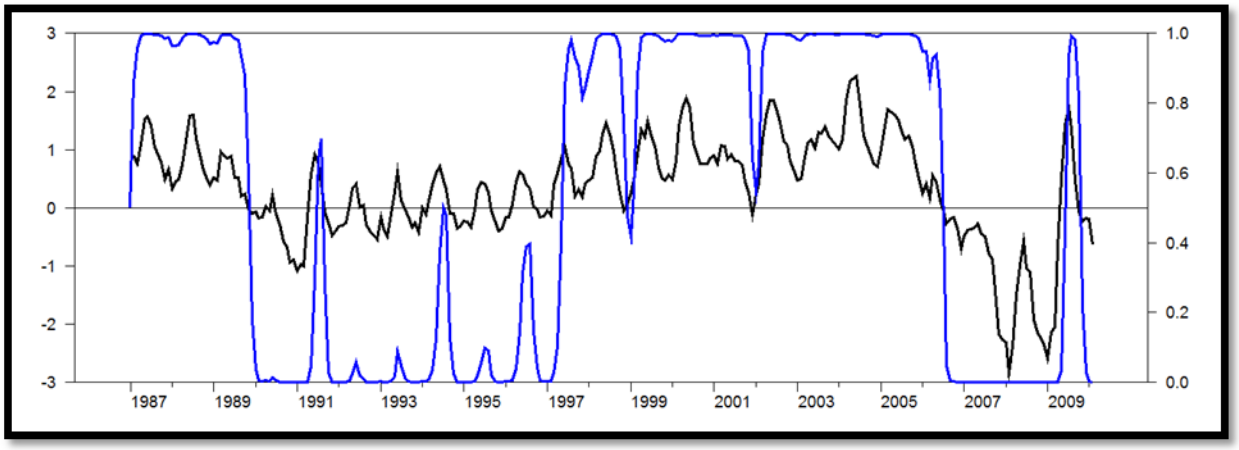




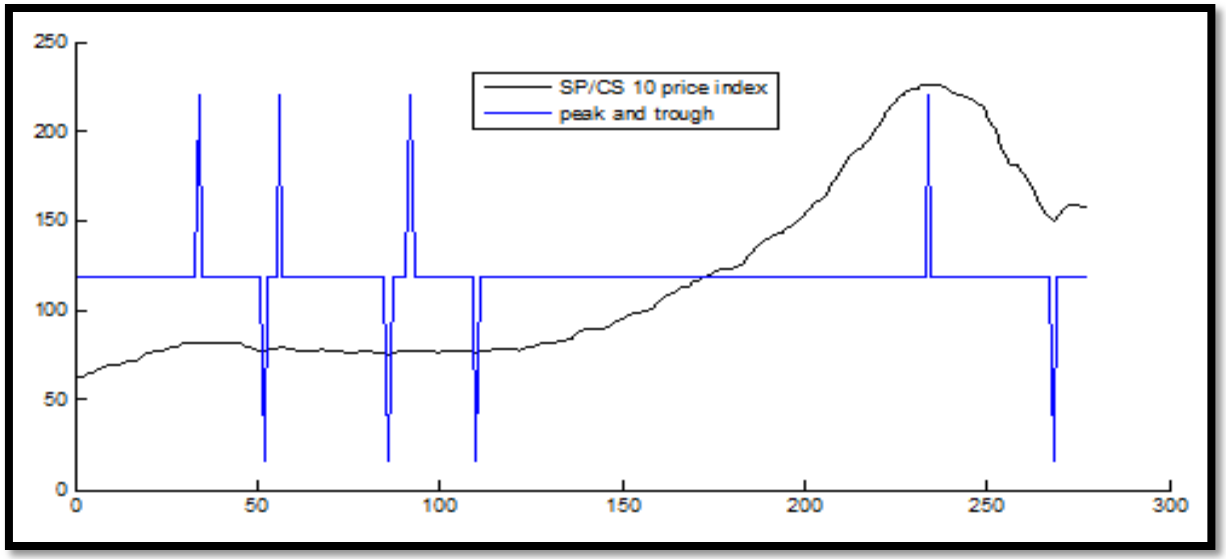
REIT return and probability of being in expansion



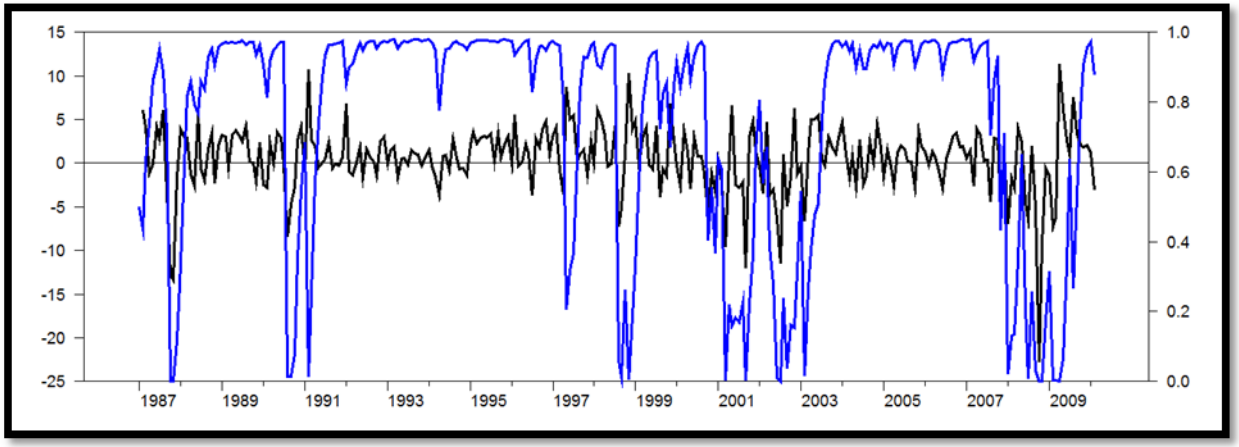
BB algorithm on the REIT US price index



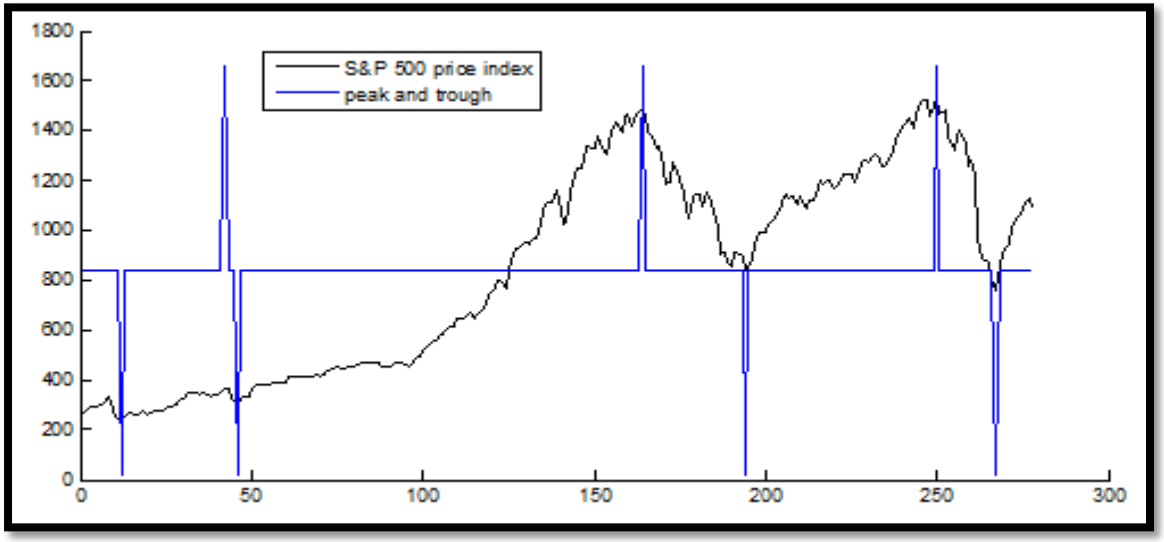
SP/CS 10 composite return and probability of being in expansion



BB algorithm on the SP/CS 10 composite price index



S&P 500 return and probability of being in expansion



BB algorithm on the S&P 500 price index

Table 2. Dating recessions using the BB algorithm (UK data)

Halifax		REIT		IPD		FTSE 500	
Start**	End***	Start**	End***	Start**	End***	Start**	End***
07/1989	02 /1993	09/1989	09/1992	01/1990	07/1991	12/1989	09/1990
						08/1991	08/1992
07/1994	01/1996	02/1994	12/1994			01//1994	06/1994
		04/1998	02/2000			12/1999	01/2003
		05/2002	04/2003				
08/2007	03/2009	02/2007	03/2009	07/2007	06/2009	05/2007	02/2009

** Identify a peak in the graphs of the BB algorithm
***Identify a trough in the graphs of the BB algorithm

Table 3. Dating recessions using the MSM (UK data)

Halifax		REIT		IPD		FTSE 500	
Start	End	Start	End	Start	End	Start	End
10/1989	02/1993	07/1987	03/1988	05/1988	01/1989	01/1987	12/1992
11/1993	01 /1996	05/1992	12/1992	05/1990	04/1994	03/1994	10/1994
						09/1997	05/2003
05/2007	04/2009	11/2007	09/2009	01/2007	06/2009	02/2008	08/2009'

- Start dates for UK recessions

Halifax
IPD
REIT
FTSE500

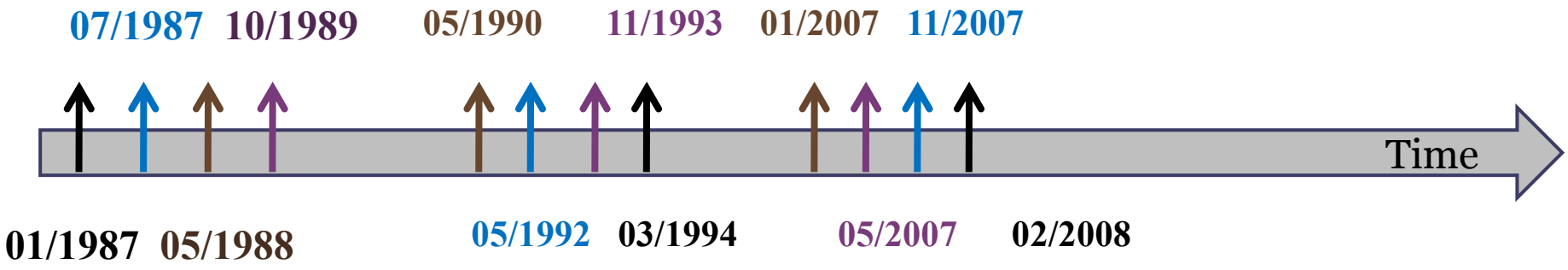


Table 3. Dating recessions using the BB algorithm (US data)

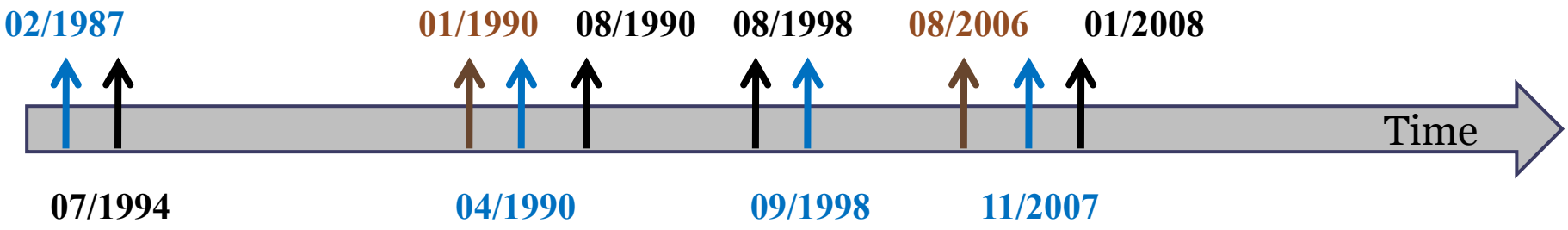
REIT		SP/CS10		S&P 500	
Start**	End***	Start**	End***	Start**	End***
XXXX	12/1987			XXXX	12/1987
09/1989	11/1990	10/1989	04/1991	06/1990	10/1990
		08/1991	02/1994		
03/1994	12/1994	08/1994	02/1996		
10/1997	12/1999				
04/2002	10/2002			08/2000	02/2003
02/2007	03/2009	06/2006	04/2009	10/2007	03/2009

Table 4. Dating recessions using the MSM (US data)

REIT		SP/CS10		S&P 500	
Start	End	Start	End	Start	End
02/1987	01/1988			07/1987	03/1988
04/1990	04/1991	01/1990	03/1997	08/1990	06/1991
09/1998	03/2000			08/1998	02/2003
11/2007	08/2009	08/2006	05/2009	01/2008	05/2009

- Start dates for US recessions

SP/CS 10
REIT
S&P 500



Conclusion

- Since the BB algorithm detects local minima and maxima, this is the main reason behind the many turning points resulting from this approach

- The Markov switching model gives better results than the Bry-Boschan model. For the latter, assuming that the expansions and contractions of minimum duration can conduct to misleading interpretations

- REIT detects better the turning points of the Real Estate market.
- Detect linear and non linear causality between the two markets.

Thank you !