Is the Northern Irish Housing Market Efficient: Some preliminary results

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Outline

1. Background
2. Review of the literature
3. Methodology
4. Results
5. Implications and Discussion
Data

- Data on Northern Ireland: Quarterly House Price Data
  
  *Source*: Prof. Stanley Mc Greal, Built Environment University of Ulster Jordanstown

- Data on Republic of Ireland: Quarterly House Price Data
  
  *Source*: Central Statistics Office; Department of the Environment, Heritage and Local Government

- Range: 1990-2011
Market Overview

1980’s
- Underdeveloped housing market
- Lowest rate of house price growth in comparison to any other UK region
- Imbalance between supply and demand emerged

1990’s
- Favourable macroeconomic and microeconomic environment
- Deregulation of the financial sector
- Pro-cyclical government policies
Market Overview

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Northern Ireland's Property Market
Bubbles and Market Efficiency

Main issues:

- Definitional and theoretical issues (O’Hara 2008)
- Mechanisms for detecting, modelling and measuring their extent (Phillips and Yu 2011)
- Reconciling bubble-like behaviour and identifying the causes (Shiller 2000)
- Suitable policy responses (Gau 2007)
The purpose of this presentation is to demonstrate the results of the preliminary exploratory econometric analysis that has been conducted on the Northern Irish property market.

Therefore, the main objectives are to:

- Examine whether the market is operating efficiently and
- Statistically test for the presence of bubble behaviour
Traditional Methods of Testing Market Efficiency

Table: Basic $I(1)/I(0)$ analysis

<table>
<thead>
<tr>
<th>Series</th>
<th>$ADF$ (Prob.$^{(1)}$)</th>
<th>$KPSS^{(2)}$</th>
<th>$ADF - GLS^{(1)}$ (Prob.$^{(1)}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prices</td>
<td>$-1.52$ (0.52)</td>
<td>2.07</td>
<td>$-0.76$ (0.39)</td>
</tr>
<tr>
<td>Returns</td>
<td>$-2.07$ (0.26)</td>
<td>0.24</td>
<td>$-2.06$ (0.04)</td>
</tr>
</tbody>
</table>

1: Probabilities derived from MacKinnon (1996)
2: Null of stationarity 5% critical value 0.466
## Testing for Market Efficiency cont’d

### Table: Fractional Analysis

<table>
<thead>
<tr>
<th>J</th>
<th>$d$ (s.e.)</th>
<th>FADF</th>
<th>LV − Wald</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Full period</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plugin</td>
<td>1.2 (0.13)</td>
<td></td>
<td>−</td>
</tr>
<tr>
<td>Fixed</td>
<td>1.3 (0.13)</td>
<td></td>
<td>−</td>
</tr>
<tr>
<td><strong>1990Q1 - 2007Q3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plugin</td>
<td>0.95 (0.18)</td>
<td>1.4</td>
<td>4.9</td>
</tr>
<tr>
<td>Fixed</td>
<td>0.91 (0.14)</td>
<td>1.5</td>
<td>5</td>
</tr>
</tbody>
</table>
Figure: Results of the Fractional Analysis Sub Period
**Technique:** Phillips and Yu max\(DF_t\) and \(DF_t\) tests

The methodology assumes a series is:

\[ X_t = \mu + \delta X_{t-1} + \epsilon_t, \quad \epsilon_t \sim iid(0, \sigma^2). \]

When a bubble starts \(\delta = (1 + \epsilon)\) where \(\epsilon\) is positive and in the neighbourhood of 0. Phillips and Yu (2011) have found the distribution for the simple DF in this case and suggests the simple construct for confidence values at the right handed

\[ cv_{\beta_n}^{df} = -0.08 + ln(\lceil nr \rceil)/C. \]
Being conservative a value $C = 5$ is used

The start of the bubble can be identified by $\hat{r}_e = \lfloor n\hat{r}_e \rfloor$, where:

$$\hat{r}_e = \inf_{s \geq r_0} s : DF^t_s > cv^{df}_{\beta_n}$$

And the collapse of the bubble by $\hat{r}_f = \lfloor n\hat{r}_f \rfloor$ where:

$$\hat{r}_f = \inf_{s \geq \hat{r}_e + \gamma \ln(n)/n} s : DF^t_s < cv^{df}_{\beta_n}$$
### Testing for the Presence of a Bubble

**Table:** Testing the presence of bubbles and date stamping

<table>
<thead>
<tr>
<th>Series</th>
<th>$\max DF_r^t$</th>
<th>$\hat{\tau}_e(\hat{\tau}_0)$</th>
<th>$\hat{\tau}_f(\hat{\tau}_0)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prices</td>
<td>2.66</td>
<td>2005Q3</td>
<td>2009Q1</td>
</tr>
<tr>
<td></td>
<td>(2007Q2)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Datestamping Northern Ireland’s Property Bubble

Figure: Northern Ireland’s Property Bubble

Recursive values of the ‘t’ statistics: Northern Ireland
Northern Ireland and the Republic of Ireland

Figure: Comparing NI and RoI
Implications and Discussion

- Methods enable the determination of the start, duration and collapse dates of the bubble in NI
- Key focus should be on the 1990’s in RoI
- Overflowed rather than migrated between the two countries

Future work
- Examine migration by area and property type
- Develop explanatory factors

