

**THE RESEARCH ABOUT PROGRAM TRADING STRATEGY OF COMMODITY MARKET CAPITAL FLOW
 BASED ON WACD MODEL**

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ABSTRACT: This paper researched the WACD model based on ACD model about the unique characteristics of high frequency data. This paper studied the duration of the continuous period of the WACD (1, 1) model of all varieties, and computed the continuous equation and corresponding parameters.

1. THEORETICAL RESEARCH

Autoregressive conditional duration model (Autoregressive conditional duration model, referred to as ACD model) put forward by Engle and Russell continuous trading between the model of interval (duration), its main idea is the original ARCH model under the framework of analysis, using a process values point to depict random intervals, the original purpose is mainly to investigate trading interval (duration) between the correlation and cluster phenomenon, its advantage is to convert transaction duration into a point changes with time interval dynamic process.

Consider two consecutive transactions t_i and t_{i-1} , p_{i-1} and p_i the corresponding transaction price, $x_i = t_i - t_{i-1}$ For the time interval of the two transactions, which is the duration of the transaction, $r_i = \log \frac{p_i}{p_{i-1}}$ which corresponds to the logarithmic yield of the first transaction, the yield process of

this realization can be expressed as:

$$P_{a,t} = \alpha + \beta P_{b,t} + \varepsilon_t \quad (1.1)$$

(1) The parameter θ vector that represents the change t_i at the time of occurrence; The duration vector \tilde{x}_{i-1} and the yield vector \tilde{x}_{i-1} until the time $i - 1$ of the transaction, respectively; F_{i-1} represents

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the information set up until t_{i-1} the moment. A very critical assumption of the ACD model established by Engle and Russell is that the continuous time x_i span dependency can be fully characterized by its conditional expectation, and the duration of the condition ψ_i can be expressed as:

$$(x_i, r_i) | F_{i-1} \sim f(x_i, r_i | \bar{x}_{i-1}, \bar{r}_{i-1}; \theta)$$

$$(x_i, r_i), i = 1, 2, 3 \dots \quad (1.2)$$

(2) Suppose it is a non-negative measurable function and is defined as:

$$\psi_i = E(x_i | F_{i-1}) \quad (1.3)$$

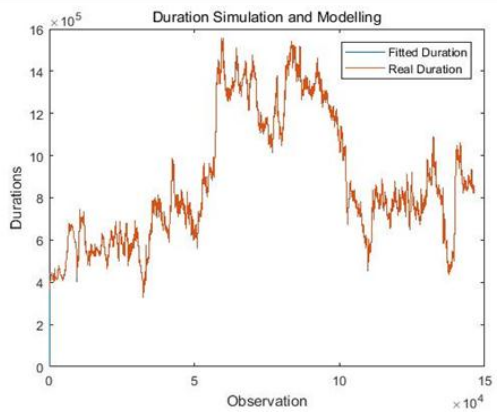
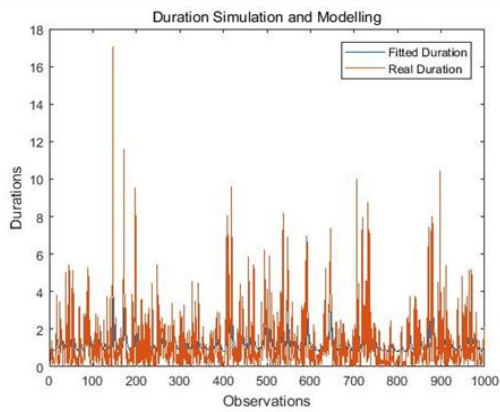
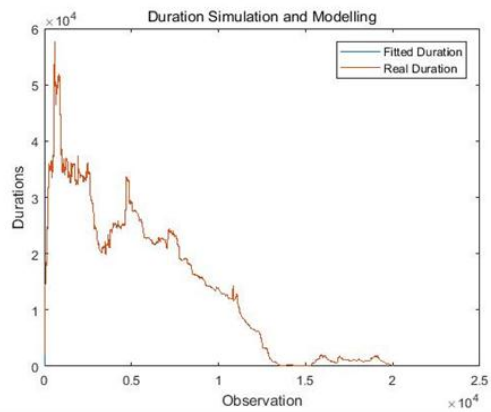
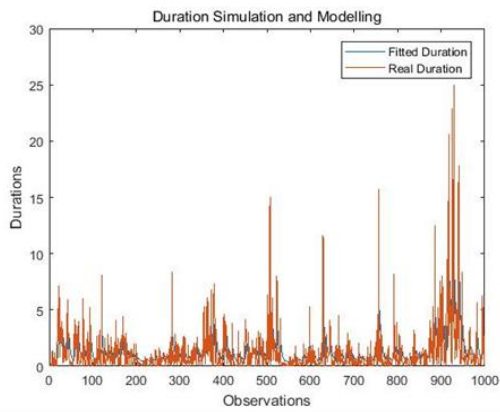
(3) In this paper, $\varepsilon = \{\varepsilon_i, i \in z\}$ of independent and distributed nonnegative random variables is the density function is $p(\varepsilon)$ and satisfied $E(\varepsilon_i) = 1$.

2. Empirical Analysis

In the empirical part of this paper, we selected the minutes data of TA, WH, AI, Ru, and Fg from 2011 to 2013, and establishes the WACD model, and the results were shown in table 2.1.

Table 2.1: WACD (1, 1) model results

Commodity	Maximum Log Likelihood	Equation	Weibull param
TA0000	-1135.3124	$\varphi_i = 0.2518 + 0.1540x_{i-1} + 0.6446\varphi_{i-1}$	0.8102
WH0000	-1196.6198	$\varphi_i = 0.1269 + 0.2253x_{i-1} + 0.6935\varphi_{i-1}$	0.8001
AI0000	-921.1923	$\varphi_i = 0.1012 + 0.1692x_{i-1} + 0.7391\varphi_{i-1}$	0.8069
Ru0000	-1196.4238	$\varphi_i = 0.1304 + 0.2014x_{i-1} + 0.7097\varphi_{i-1}$	0.8490
Fg0000	-1185.5119	$\varphi_i = 0.1075 + 0.2060x_{i-1} + 0.7201\varphi_{i-1}$	0.8526



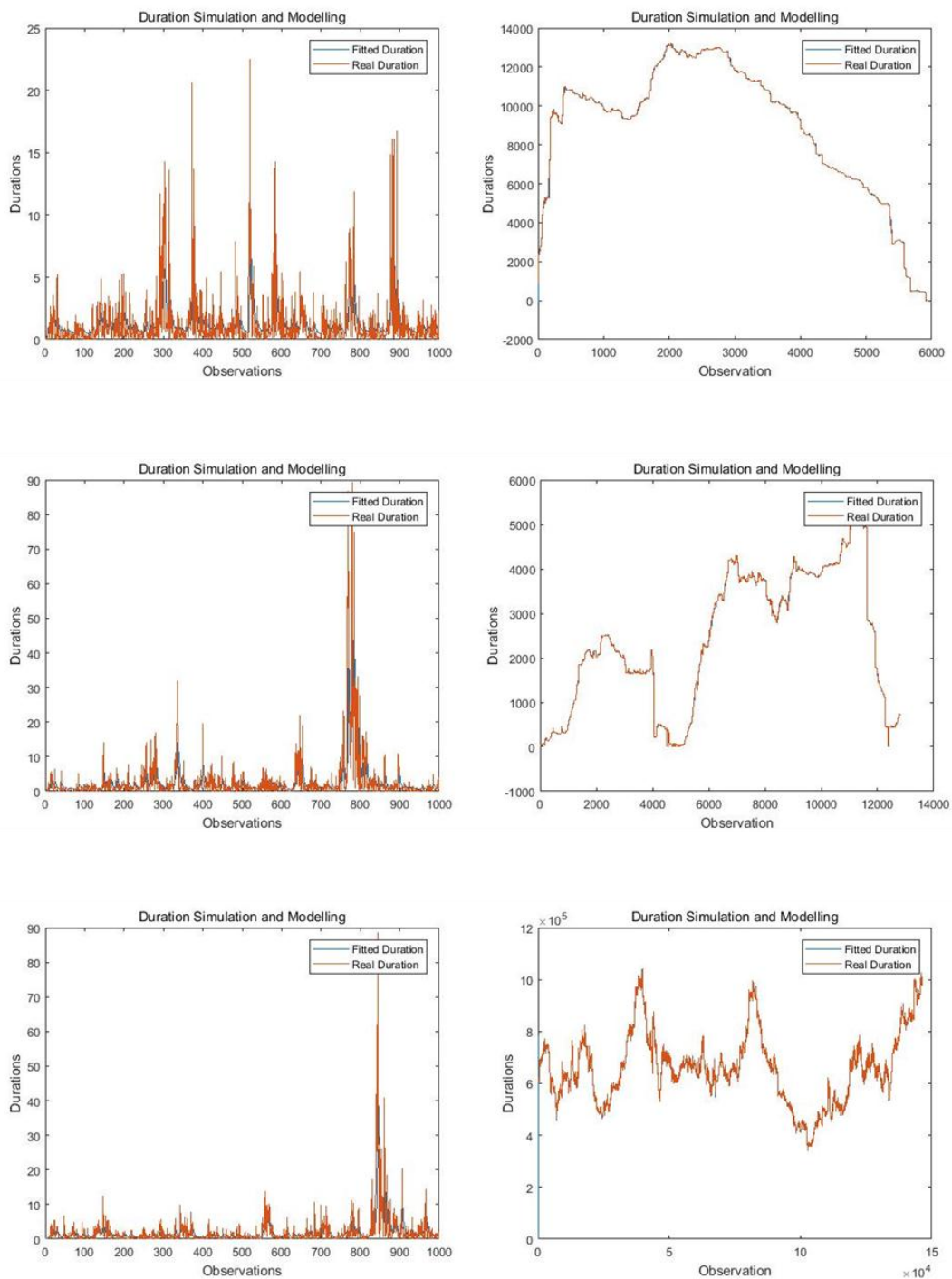


Figure 2.1: The left image WACD (1, 1) model is proposed

The 1000 random observations on the right are worth the WACD (1, 1) model



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