

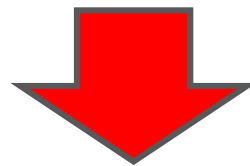
# Correlation between Japanese government bonds and News

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Katori lab, M1, Yoshifumi Tahira

# **MOTIVATION**

**I want to know what kind of News affect  
Japanese government bonds(jgb),  
and jgb how to react.**



**I checked time series of jgb and News.**

2013-05-15,17:47:39.205,"20130515174727nWNBB020LF","STORY\_TAKE\_OVERWRITE",  
"nWNBB020LF","2013-05-15 17:47:27","", "RESEARCH ALERT-Caesars Entertainment: Deutsche Bank  
raises price target","", "May 15 (Reuters) - Caesars Entertainment Corp <CZR.O>:

\* Deutsche Bank raises price target to \$14 from \$6; rating hold

**For a summary of rating and price target changes on U.S. companies:**

Reuters Eikon users, click on [RCH/US]

Reuters 3000Xtra users, double-click [RCH/US]

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**For a summary of rating and price target changes on Canadian companies:**

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saqib.ahmed.thomsonreuters.com@reuters.net) ((Bangalore Newsroom +91 80 4135  
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","E U RNP PCO PCU","RCH BLR GAME CCOS CYCS ENTS CMPNY LEI US AMERS LEN  
RTRS","CZR.O","", "", "S", "FALSE", "RTRS", "EN"

# OUTLINE

News



Japanese government bonds



## ***Formula of volatility***

$u_j = \log \frac{P_j}{P_{j-1}}$ ,  $\langle u \rangle$ :  $u_j$  *average*,  $P_j$ : **j(minute) price in a minute**

$V_i = \sqrt{\langle u^2 \rangle - \langle u \rangle^2}$ ,  $V_i$ : **i(day) volatility**

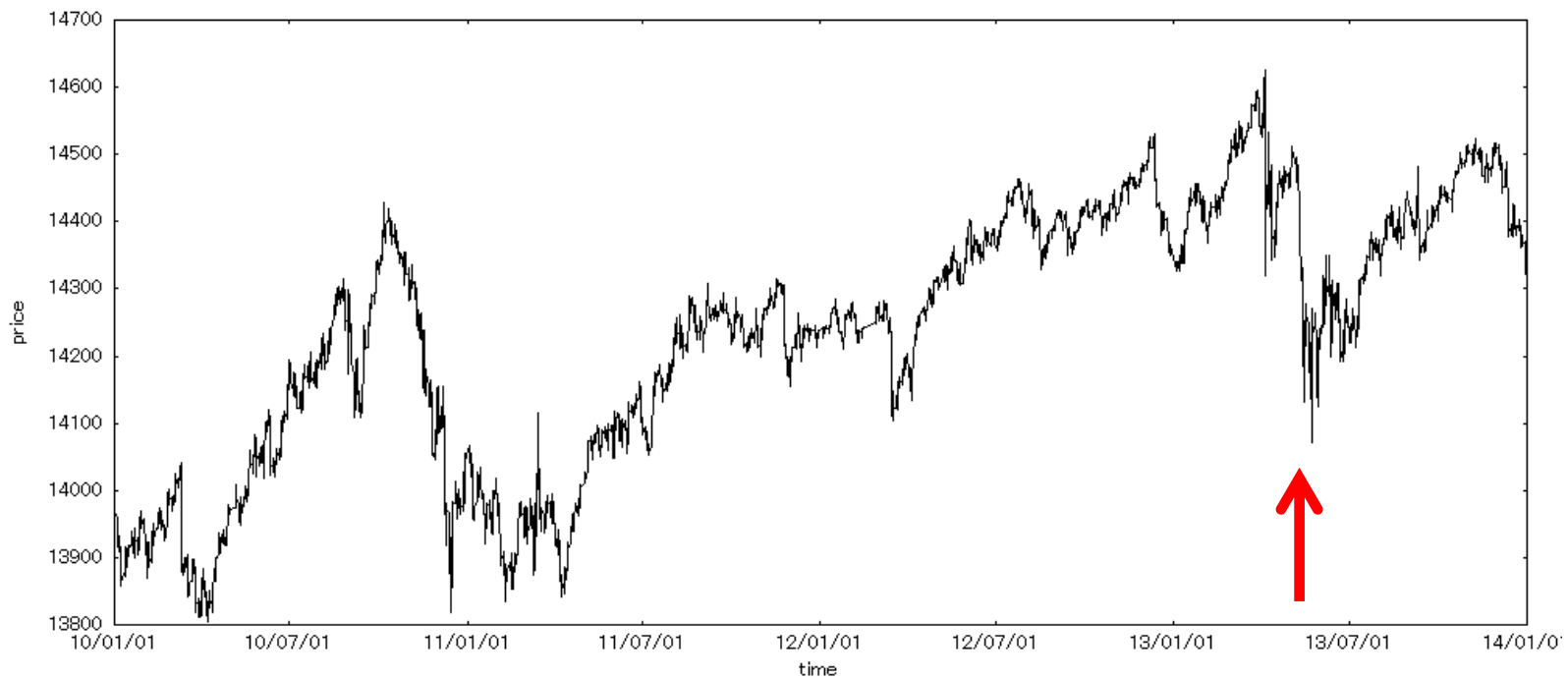


Fig.1 Jgb price time series in 2010-2013

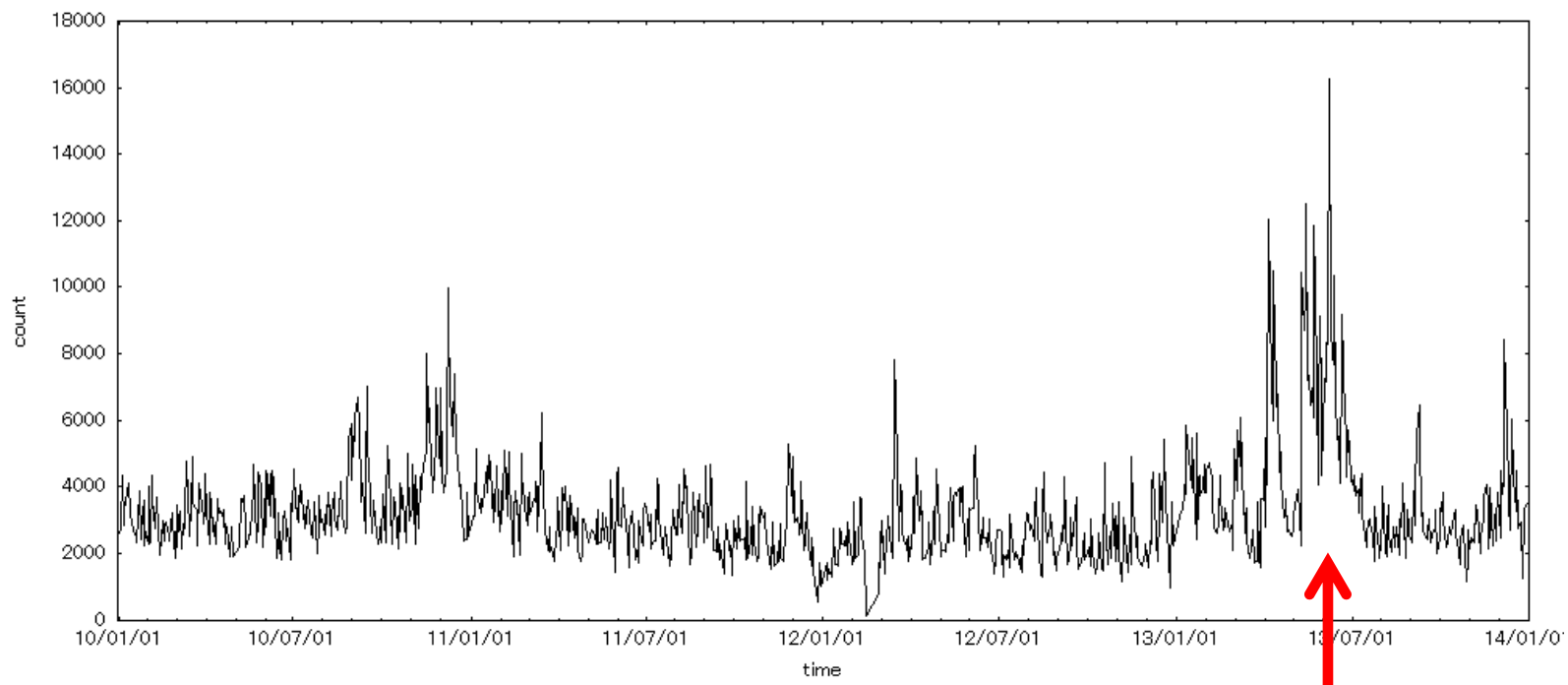


Fig.2 Jgb trading number time series in 2010-2013

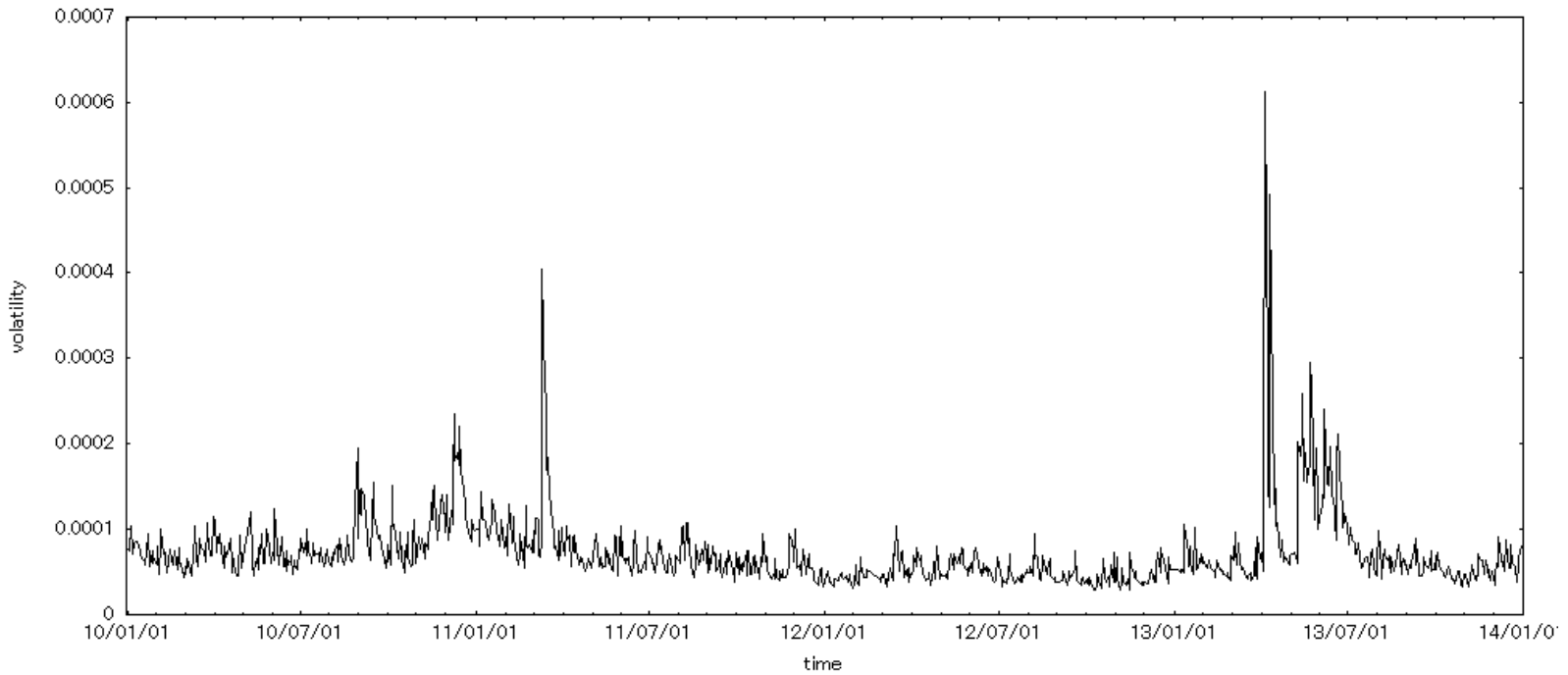


Fig.3 Jgb price volatility time series in 2010-2013



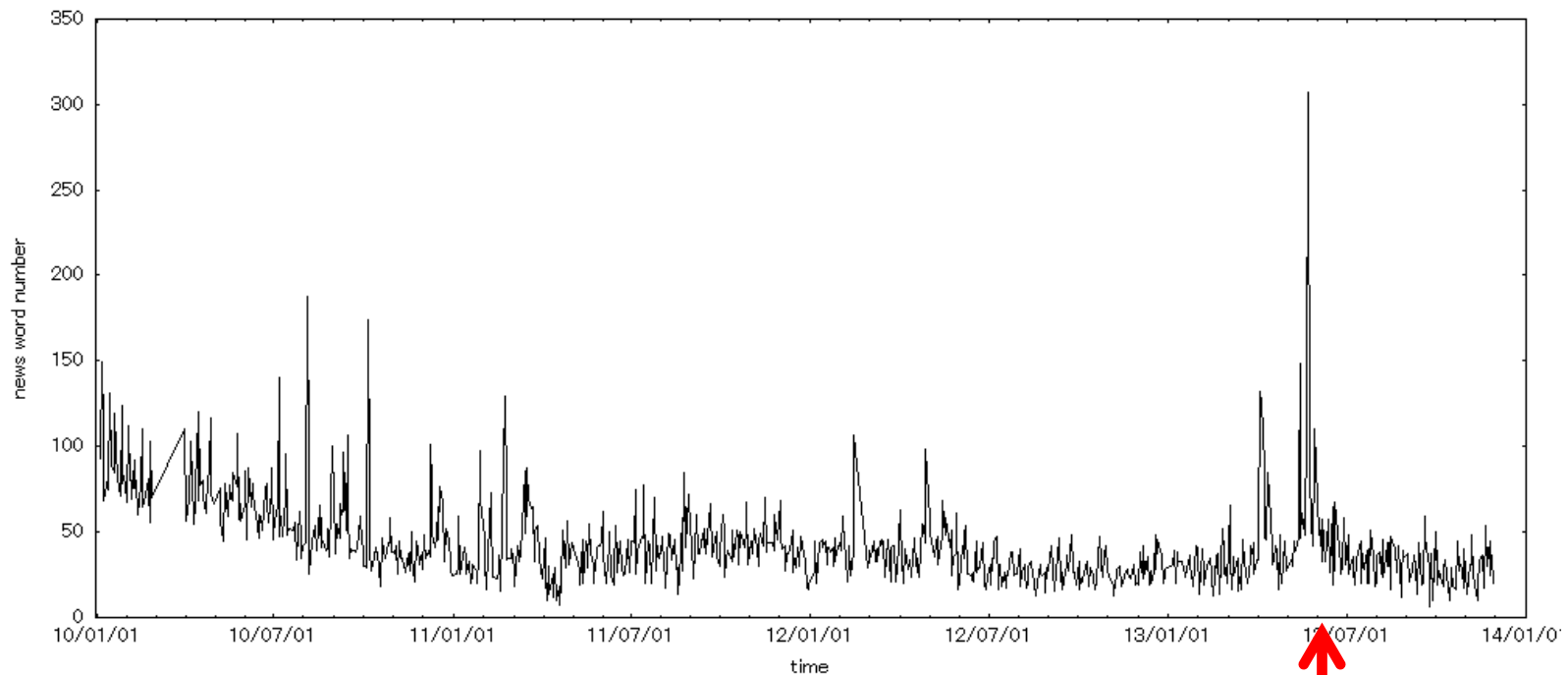
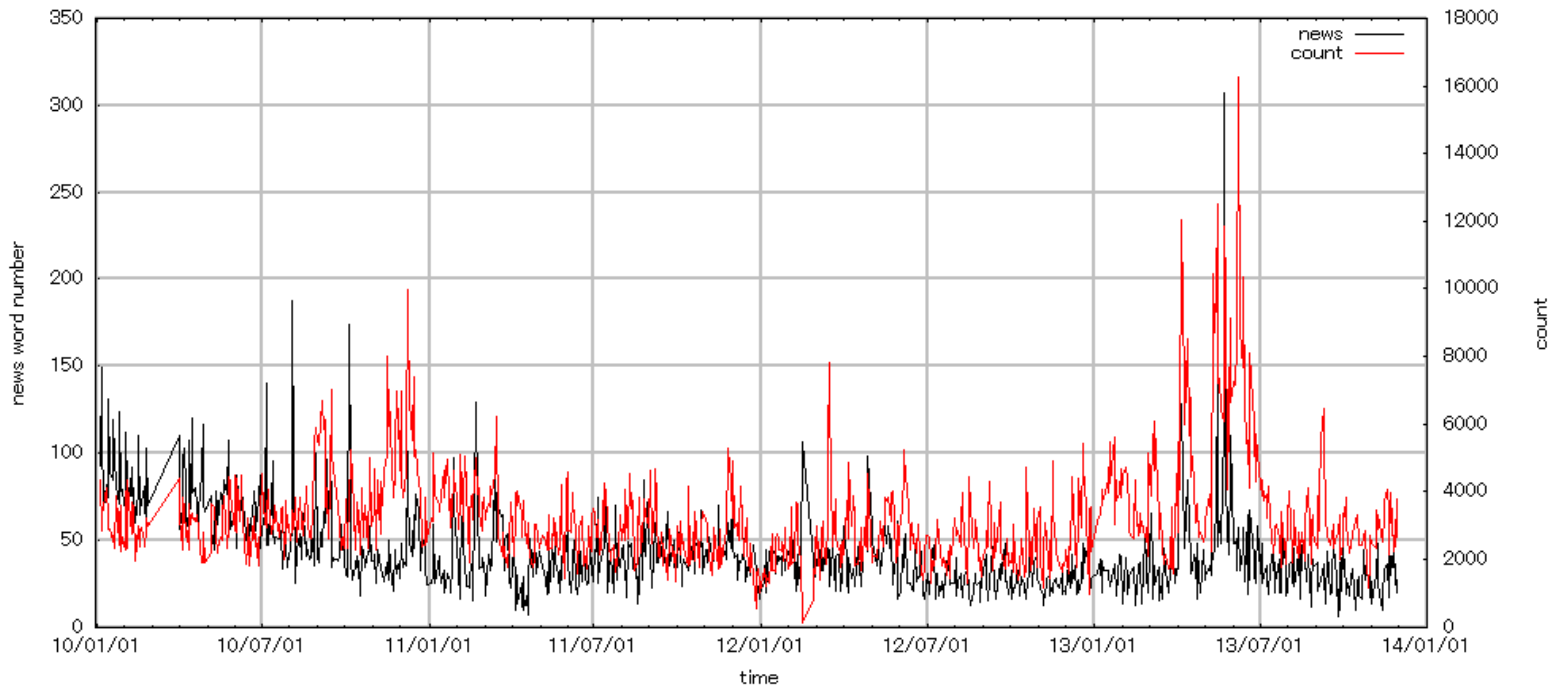


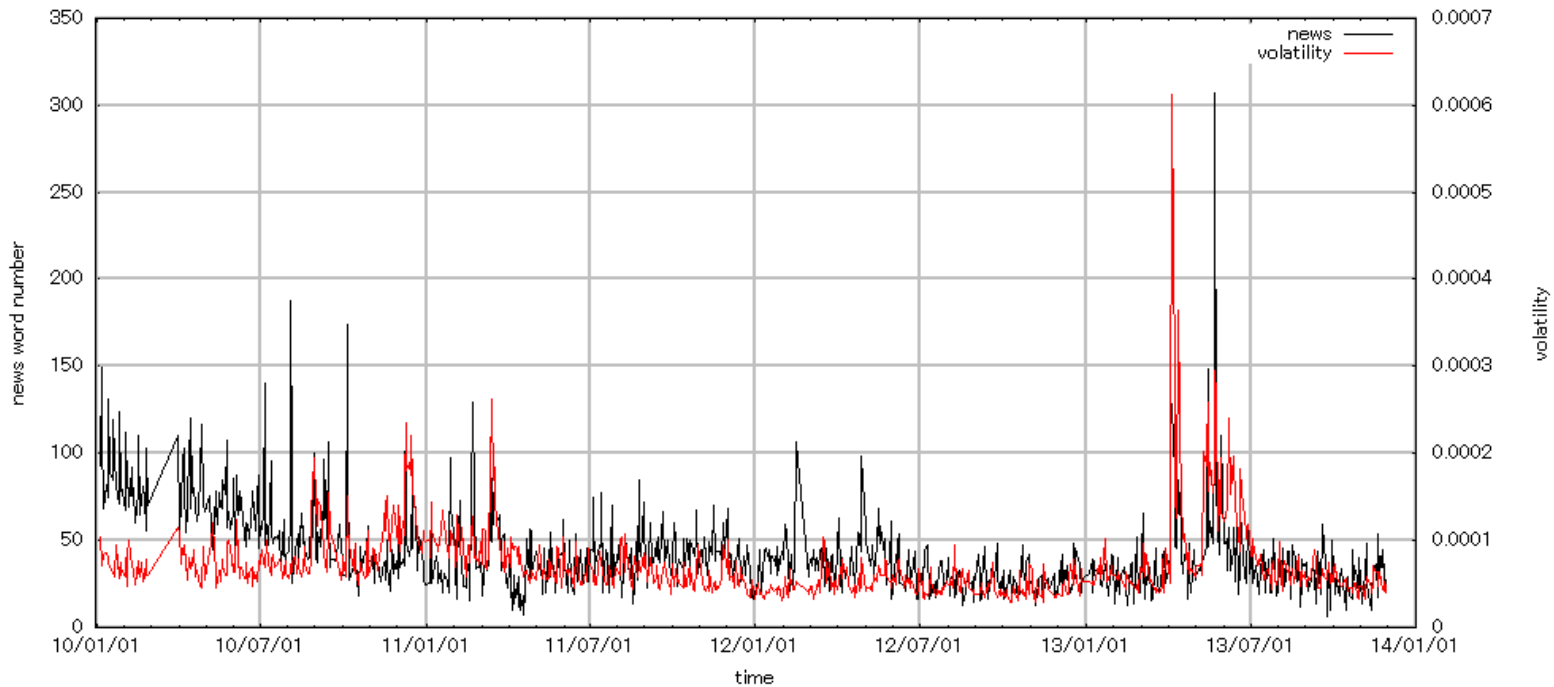
Fig.4 News words number time series in 2010-2013

Number of News words in a day.

News words are “Japanese government bond”, “jgb”, “jgbs”.



Red line is “Fig.2 Jgb trading number time series in 2010-2013”  
Black line is “Fig.4 News word number time series in 2010-2013”



Red line is “Fig.3 Jgb price volatility time series in 2010-2013”

Black line is “Fig.4 News word number time series in 2010-2013”

**Figure of news time series is similar to volatility time series and trading number time series.**



**I checked correlation coefficient of news and volatility,  
and news and trading number**

# Correlation coefficient

**volatility:**  $V_i$

**Trading number:**  $C_i$

**News word number:**  $N_i$

**Correlation coefficient of news and volatility**

$$r_{VN} = \frac{\langle V_i \times N_i \rangle - \langle V_i \rangle \langle N_i \rangle}{\sigma(V_i) \times \sigma(N_i)} \quad \sigma(V_i) \text{ standard deviation}$$

**Correlation coefficient of news and trading number**

$$r_{CN} = \frac{\langle C_i \times N_i \rangle - \langle C_i \rangle \langle N_i \rangle}{\sigma(C_i) \times \sigma(N_i)}$$

$$-1 \leq r \leq 1$$

$r > 0.7$       **strong correlation**

$0.4 \leq r \leq 0.7$       **moderate correlation**

$0.2 \leq r < 0.4$       **little correlation**

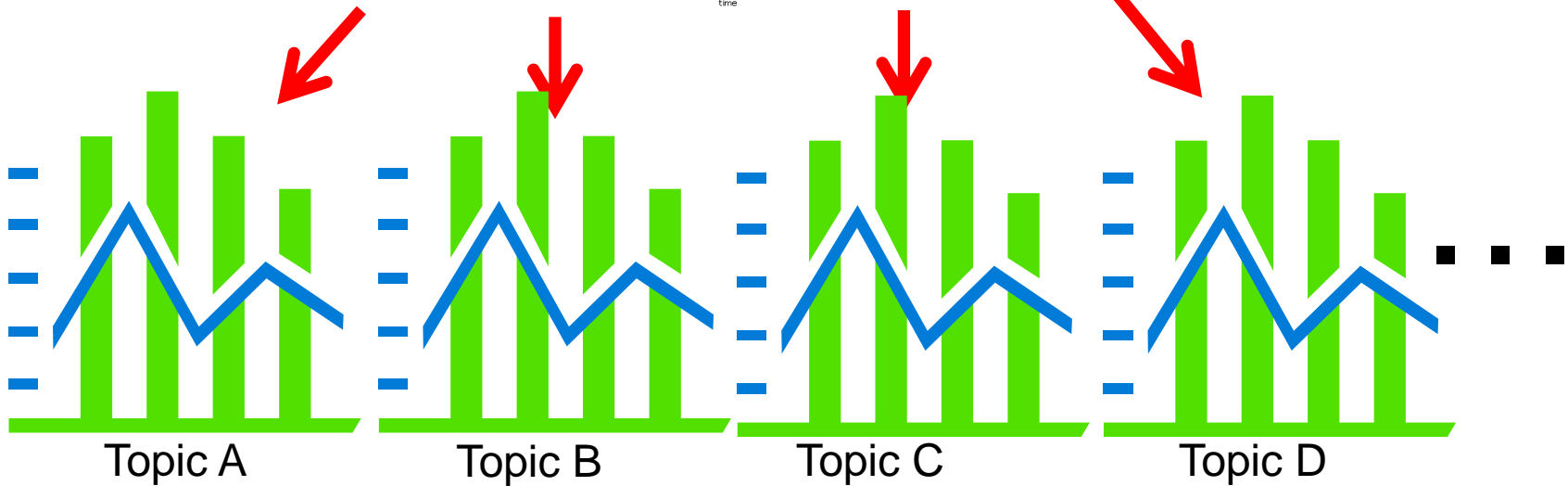
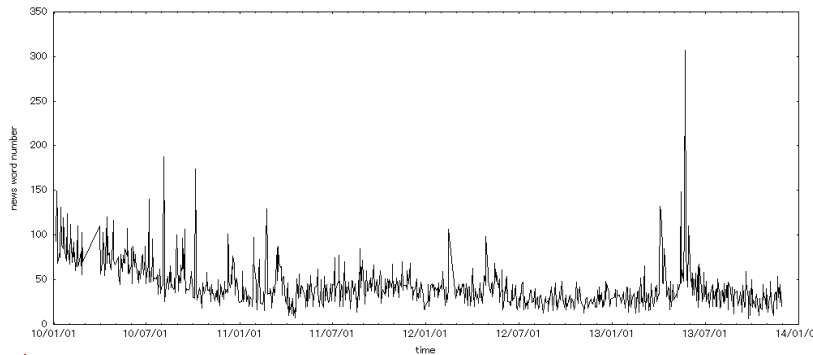
$r < 0.2$       **not correlation**

$$r_{VN} = 0.388821892$$

$$r_{CN} = 0.284503166$$

# IN FUTURE

I want to classify the news into some topics.



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