

(total 10 points) Determine whether each of the following statements is True or False and explain your reason.  
The answer without any explanation will be granted zero point. 0\_0!!

ARIMA(0,0,1) process is possible when rejecting the Dickey-Fuller Test.

ARIMA (0,0,1) is stationary process  
 $\hookrightarrow I(0)$

$\therefore$  True : we have to reject  $H_0$  ( $\sim$  Accept  $H_1$  = stationary) ✓

An AIC cannot exceed one.

$$\text{From } AIC = \log \hat{\sigma}_u^2 + \frac{2(p+q)}{T}$$

$\therefore$  False

Heteroskedasticity is possible when Hausman Test for fixed effect is rejected.

If reject Hausman Test, means that FE fits the data.

But FE has no Heteroskedasticity problem.

$\therefore$  False

2SLS estimator is unbiased for a regression model with simultaneous equation problem.

A model with simultaneous equation problem, mean there will be endogeneity problem in the model. ✓

$\therefore$  True

Failing to reject the Hausman Test implies that the Fixed Effects estimator is inconsistent.

If fail to reject Hausman test, means that RE fits the data. Consistent

Therefore, we can estimate the data using any estimators.

(Because the  $\beta$  is unbiased and consistent since the beginning)

$\therefore$  False (True) ←

ถ้าป้อนว่า Reject  $\rightarrow$  False

2SLS estimator is consistent for a regression model with reversed causality problem.

2SLS estimator is used to solve endogeneity problem.

Reversed causality problem ✓

$\therefore$  True

Failing to reject the Hausman Test implies that the Random Effects estimator is inconsistent.

If fail to reject Hausman test, means that RE fits the data. consistent

Therefore, we can estimate the data using any estimators.

$\therefore$  False (True) ←

An ACF cannot exceed one.

From ACF Formula

$$= \text{corr}(y_t, y_{t-k}) \rightarrow -1 \leq \text{corr} \leq 1$$

$\therefore$  True

Failing to reject the Hausman Test implies that the Between Effects estimator is inconsistent.

If fail to reject Hausman test, means that RE fits the data. ✓

Therefore, we can estimate the data using any estimators.

$\therefore$  False → ถ้า RE

Rejecting the Hausman Test implies that the Random Effects estimator is inconsistent. ← FE model

If reject Hausman Test, means that FE fits the data.

But FE model doesn't eliminate the  $\alpha_i$ .

$\therefore$  True ✓

Reject the Hausman Test implies that the Between Effects estimator is inconsistent.

If reject Hausman test, means that FE fits the data.

But FE model doesn't eliminate the  $\alpha_i$ .

$\therefore$  True

Heteroskedasticity is possible when Breusch-Godfrey is rejected.

If reject Breusch-Godfrey, there is serial correlation problem.

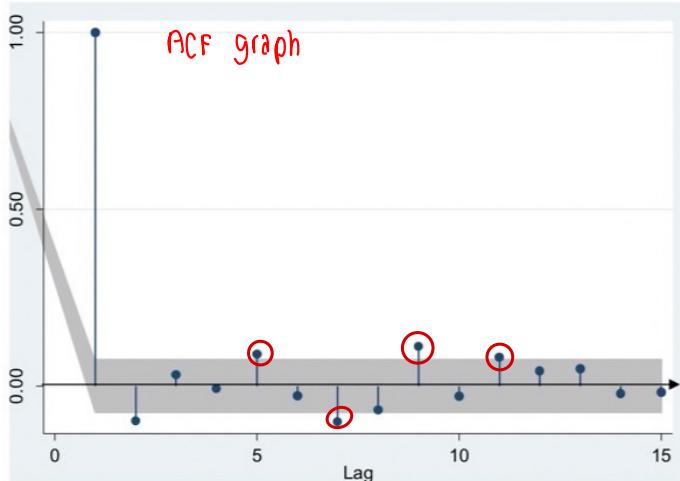
$\therefore$  True ←

### FACT SHEET A

Suppose a researcher wants to find a model to predict stock market return which is measured in unit of percentage point per month. He starts by conducting the Dickey Fuller test and getting the following result:

Test statistic		Interpolated Dickey-Fuller		
	1% Critical value	5% Critical value	10% Critical value	
Z(t)	-4.280	< -3.960	-3.410	-3.120
since TS < C → Reject H <sub>0</sub>			⇒ reject = stationary {Y <sub>t</sub> } is stationary	

Then, he examines the correlogram of the return and get the following pictures, where the grey band indicates a 95% confidence interval that each of the estimates is zero.



### FACT SHEET B

#### หัวข้อ Probit/Logit ท่องเที่ยว

A researcher wants to study factors contributing to the probability that working-age Thai people invest in the Stock Exchange of Thailand (SET). Suppose that he has a sample of working-age Thai people with college degrees. The database contains the following variables:

*SET* is a dummy variable taking value 1 if a person invests in Stock Exchange of Thailand.

*inc* is the person's monthly income in units of thousand Baht.

*exper* is the person's working experience in years.

*age* is the person's age in years.

*fin* is a dummy variable taking 1 if the person graduated with a finance-related degree.

Suppose that he gets the following estimated results:

$$Y_i^* = -5.4590 + 1.5553 \ln inc_i + 0.0532 exper_i + 0.0073 age_i + 0.3738 fin_i + U_i$$

$$SET_i = 1 \text{ if } Y_i^* > 0 \text{ and } SET_i = 0 \text{ if } Y_i^* \leq 0$$

where the error term  $U_i$ , conditional on all the regressors, follows iid Standard Normal Distribution.

= PROBIT Model

### FACT SHEET C

Use the following information to answer question 28 to 33. Suppose that the dataset contains a sample of 50 countries, each of which has data covering the period from 2010 to 2013. The result estimated by the first difference model using this dataset is

T=4

N

PD

$$\Delta \ln(PC_{it}) = 1.48 + 3.23 \Delta \ln(GDP_{it}) + 2.30 \Delta \ln(SES_{it}) + 5.67 \Delta d2012_t - 0.77 \Delta d2013_t$$

$$(0.24) \quad (1.11) \quad (1.15) \quad (2.11) \quad (0.30)$$

where  $PC_{it}$  denotes per-capita private credit of country  $i$  in year  $t$ ;  $GDP$  denotes GDP per capita;  $SES$  denotes size of the country's stock exchange market measured by average capital value;  $d2012$  and  $d2013$  are dummy variables taking value 1 if the year is 2012 and 2013 respectively. The numbers in the parentheses are White robust standard errors.

เลขนัยต์ =  $SE(\beta)$  กรณี hetero ลักษณะ

----- END OF THE FINAL EXAMINATION -----



ปัจจัยที่ทำให้เกิด hetero + serial for model?

### TEST HETEROskEDASTICITY

It is possible to fail to reject both Breusch-Pagan test and Breusch-Godfrey test for the same model and dataset.

- The statement is true
- The statement is not always true

### TEST serial correlation

Q1 Prob var 1 - Prob var 0

dummy variable

Based on the information given in FACT SHEET B, what is the effect of finance-related degree on the probability that that a 30 years old person with 5 years of work experience who earns 20,000 Baht a month would invest in SET?

Case : Fin = 1  
 $\hat{x}\beta = 0.06$

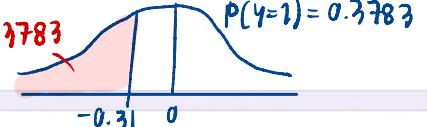
$$Y_i^* = -5.4590 + 1.5553 \ln(income_i) + 0.0532 \text{exper}_i + 0.0073 \text{age}_i + 0.3738 \text{fin}_i + U_i$$

$$SET_i = 1 \text{ if } Y_i^* > 0 \text{ and } SET_i = 0 \text{ if } Y_i^* \leq 0$$

Case: Fin = 0

$\hat{x}\beta = -0.31$

0.093



$$P(Y=1) = 0.3783$$

$$\therefore \text{effect Fin} = 0.5239 - 0.3783 = 0.1456$$

มีผลต่อหุ้น SET มาก

Let  $X_1, \dots, X_n$  iid Bernoulli( $\lambda$ ) but  $\lambda$  is unknown. The MLE for  $\lambda$  is unbiased.

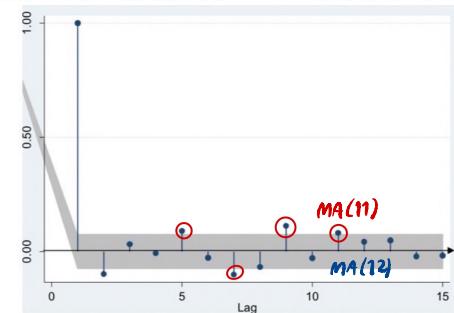
- The statement is true
- The statement is not always true

โจทย์/ใบงาน

Based on the information given in FACT SHEET A, and suppose that the given correlogram picture is ACF, what could be an appropriate model to predict return?

- MA(11)
- AR(11)
- AR(12)
- MA(12)

ปัจจัย Lag ของ MA(q)



The 2SLS estimator is unbiased for a regression model with simultaneous equation problem.

หากใช้

= Endogeneity problem

- The statement is true
- The statement is not always true

Marginal impact of a regressor in Tobit model can depend on another regressor.

- The statement is true
- The statement is not always true

= การยกเว้น model w/ interaction term  
 impact var X ตัวอื่นๆ สามารถ  
 depends on X ตัวอื่นๆ ด้วย

## All parameters in Model

Based on the information given in FACT SHEET C, what is the degree of freedom of the distribution of the t-statistics in a hypothesis test?

$$= N(T-1) - K$$

- 195
- 96
- 95
- 145

Use the following information to answer question 28 to 33. Suppose that the dataset contains a sample of 50 countries, each of which has data covering the period from 2010 to 2013. The result estimated by the first difference model using this dataset is

$$\Delta \ln(PC_{it}) = 1.48 + 3.23\Delta \ln(GDP_{it}) + 2.30\Delta \ln(SES_{it}) + 5.67\Delta d2012_t - 0.77\Delta d2013_t$$

T=4

$$= 50(4-1) - 5 = 145$$

F-test, Chi-square → ก้ามรักษา 1 ก្នុង

A critical value of Chow Test cannot exceed one.

- The statement is true
- The statement is not always true

Homoskedasticity is possible when Breusch-Godfrey is rejected.

- The statement is true
- The statement is not always true

កំណត់

RE fits the model

Failing to reject the Hausman Test implies that the Fixed Effects estimator is inconsistent.

- The statement is true
- The statement is not always true

error of sample model

term

Which of the 3 following things are random? (A) Residual (B) Standard Error (C)

Confidence Interval

- (A) and (B)
- (B) and (C)
- (A) and (C)
- (A), (B), and (C)

អាតីវិនិ fixed

នូវសម្រាប់សម្រាប់ sample

បុរាណរាយ parameter  
(គួរលាងហាត់នូវសម្រាប់)

Based on the information given in FACT SHEET A, which of the following is correct?

- He can conclude that the return does not fit well with an Autoregressive model
- He can conclude that the return does not follow an integration process of order 1  
= stationary process
- He can conclude that the return is not stationary
- He can conclude that the return does not fit well with a Moving Average model

X នូវការនាំរាយការ

A valid instrument is uncorrelated with the exogenous variables.

- The statement is true
- The statement is not always true

IV តើងការនាំរាយការ X នូវការនាំរាយការ  
នៃការ តើងការនាំរាយការ X កំណត់នូវការ

- **Instrumental exogeneity:**  $\text{Cov}(Z, U) = 0$
- **Instrumental relevance:**  $\text{Cov}(Z, X_1 | X_2, \dots, X_k) \neq 0$

Based on the information given in FACT SHEET A, and suppose that the given correlogram picture is PACF, what could be an appropriate model to predict return?

- ARMA(0,12)
- ARMA(11,0)
- ARMA(12,0)
- ARMA(0,11)

ກະນົດການລົວ  
Log នວຍ AR

(= AR 11, MA 0 )

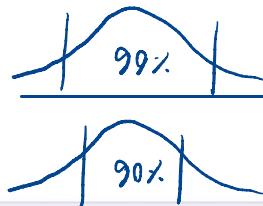
Clear selection

=  $\rho$  correlation  
An ACF cannot exceed one.

- The statement is true
- The statement is not always true

99% confidence interval is wider than 90% confidence interval if using the same dataset and estimator.

- The statement is true
- The statement is not always true



Always be stationary  
= MA(4)

= Non-stationary process

ARMA(0,4) model can be used if failing to reject Dickey-Fuller test.

- The statement is true
- The statement is not always true

Based on the information given in FACT SHEET C, and suppose you want to test the null hypothesis that size of stock exchange market has no impact on the private credit. What is a 99% confidence interval for the elasticity of private credit with respect to stock exchange size?

- (3.23-1.11×2.326, 3.23+1.11×2.326)
- (3.23-1.11×2.575, 3.23+1.11×2.575)
- (2.30-1.15×2.326, 2.30+1.15×2.326)
- (2.30-1.15×2.575, 2.30+1.15×2.575)

Use the following information to answer question 28 to 33. Suppose that the dataset contains a sample of 50 countries, each of which has data covering the period from 2010 to 2013. The result estimated by the first difference model using this dataset is

$$\Delta \ln(PC_{it}) = 1.48 + 3.23\Delta \ln(GDP_{it}) + 2.30\Delta \ln(SES_{it}) + 5.67\Delta d2012_i - 0.77\Delta d2013_i,$$

$T=4$

$$\hat{\theta} \pm \text{critical value} \times \text{se}(\hat{\theta})$$

$$= 2.3 \pm 2.576 (1.15)$$

99%

Test for Heteroskedasticity នີ້  
(var ໃຫຍ່ອື່ນໝູ)

ARCH model is not appropriate if failing to reject White test.

- The statement is true
- The statement is not always true

Based on the information given in FACT SHEET B, what is the model he employs?

- Tobit
- Probit

where the error term  $U_i$ , conditional on all the regressors, follows iid Standard Normal Distribution.

= PROBIT Model

## ឯកសារ Endogeneity Problem

Estimates received from IV estimator are consistent under fixed effect model.

The statement is true

## ឯកសារ Endogeneity Problem

The statement is not always true

## ឯកសារ Endogeneity

X in the regression model  $Y = a + \beta X + U$  is an exogenous regressor if  $E[U | X] = 0$ .

$$\text{ឬ } \text{cov}(X, U) = 0 \quad \text{លើនូវរឿង}$$

The statement is true

The statement is not always true

## ឯកសារ Fixed effect

Random Effect causes endogeneity problem when applying Between Estimator.

→ Give serial correlation

The statement is true

The statement is not always true

Heteroskedasticity is possible when Hausman Test for fixed effect is not rejected.

The statement is true

The statement is not always true

= RE fits the model

└ ឥឡូវ Hetero, serial  
problem