ANALYSIS OF ECONOMIC GROWTH DETERMINANTS IN 15 ASIAN COUNTRIES

STATISTICAL MODELLING FOR BUSINESS ANALYTICS

GROUP 1

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PROBLEM DEFINITION

Background

Stable economic growth level is a desideratum that should be listed on the priority agendas of governments around the world. At the end of the day, growing economies generally register higher per capita income, numerous job opportunities due to increased competition among economic agents, higher levels of foreign direct investment, an overall improvement of living standards and citizens' wellbeing, among other benefits. Nevertheless, when the question of sustainability is also considered, achieving and maintaining economic growth becomes challenging.

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DATA COLLECTION

Economic growth was proxied by gross domestic product growth rate

Dependent Variable

- Gross domestic product growth rate (GDP)

Independent Variables

- Gross domestic savings (SAVINGS)
- Gross capital formation (CAPITAL)
- Imports of goods and services (IMPORTS)
- Exports of goods and services (EXPORTS)
- Foreign direct investment—net inflows (FDI_INF)
- Foreign direct investment—net outflows (FDI_OUTF)

Balanced Data: n = 20 , T = 15, N = 300

Note: All data and variables were retrieved from the World Bank database

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DATA DESCRIPTION, ANALYSIS

Descriptive Statistics

	GDP	SAVINGS	CAPITAL	IMPORTS	EXPORTS	FDI_INF	FDI_OUTF
Count	300	300	300	300	300	300	300
Mean	4.738044	31.256830	26.882830	39.387951	42.608971	3.005016	1.687777
Std. Dev.	3.022659	8.923765	6.862139	37.275564	44.042306	5.052440	3.358973
Minimum	-5.750007	9.685575	14.120627	9.195168	8.257320	-3.175129	-1.244177
Maximum	2.981132	24.808585	21.672224	22.136272	19.815659	0.799324	0.167496
Median	6.551460	36.350053	30.927902	38.678772	46.109447	3.047563	1.621889

Correlation Matrix

	GDP	SAVINGS	CAPITAL	IMPORTS	EXPORTS	FDI_INF	FDI_OUTF
GDP	1.000000						
SAVINGS	0.363797	1.000000					
CAPITAL	0.407150	0.524803	1.000000				
IMPORTS	0.035553	0.387184	-0.042745	1.000000			
EXPORTS	0.013199	0.446775	-0.058113	0.980870	1.000000		
FDI_INF	0.103786	0.424251	0.023335	0.852587	0.856862	1.000000	
FDI_OUTF	-0.031766	0.350323	-0.035122	0.800814	0.797861	0.852467	1.000000

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DATA
VISUALIZATION
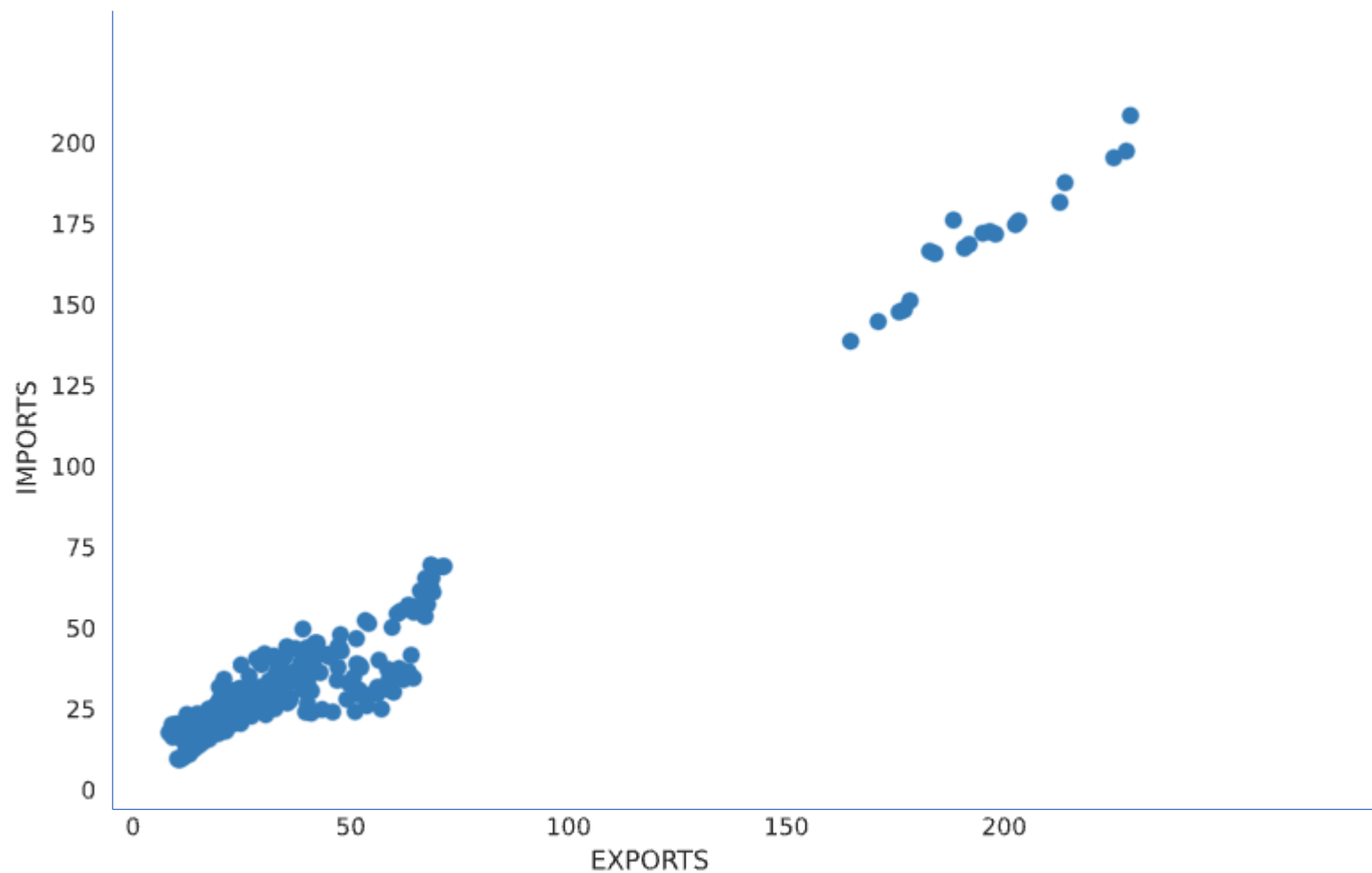
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STATISTICAL MODELS

1. POOLED MODEL
2. ENTITY FIXED MODEL
3. TIME FIXED MODEL
4. ENTITY & TIME FIXED EFFECT MODEL
5. RANDOM MODEL

MODEL SUMMARY

Regressor	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Savings	0.179***	0.132**	0.127**	0.100*	0.098*	0.093	0.091	0.166
	(0.021)	(0.060)	(0.053)	(0.059)	(0.058)	(0.062)	(0.062)	(0.124)
Capital				0.090**	0.084**	0.090**	0.089**	0.028
				(0.038)	(0.037)	(0.040)	(0.039)	(0.096)
FDI_INF					0.074	0.086	0.102	0.095
					(0.047)	(0.061)	(0.078)	(0.083)
Imports						0.019	0.019	-0.055
						(0.036)	(0.036)	(0.115)
FDI Outflow							-0.047	-0.042
							(0.056)	(0.058)
Exports								0.079
								(0.106)
Years	2000-2019	2000-2019	2000-2019	2000-2019	2000-2019	2000-2019	2000-2019	2000-2019
State Effects	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Effects	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Clustered SER	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes

MODEL SUMMARY

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Observations	300	300	300	300	300	300	300	300
R^2	0.166	0.035	0.035	0.062	0.067	0.069	0.070	0.074
Adjusted R^2	0.163	-0.016	-0.089	-0.063	-0.061	-0.062	-0.065	-0.065
F-statistic	59.216***	10.251***	9.513***	8.702***	6.254***	4.869***	3.945***	3.453***

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VERIFYING ASSUMPTIONS

1. Breusch-Pagan test for heteroskedasticity

BP = 9.6303, df = 4, p-value = 0.04714

- Presence of heteroskedasticity in the data
- Heteroskedasticity-robust standard error can be used to correct

2. Breusch-Godfrey/ Wooldridge test for serial correlation

chisq = 39.021, df = 20, p-value = 0.006628

- Presence of serial correlation in the data
- Serial correlation is usually present in panel data spanning over a long time period

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VERIFYING ASSUMPTIONS

3. Hausman Test for choosing between Fixed Effect Model or Random Effect Model

chisq = 41.195, df = 3, p-value = 5.945e-09

- Fail to reject null hypothesis
- Fixed Effect model is better than Random Effect model

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INFERENCES & CONCLUSIONS

- The savings coefficient had a significant change when the fixed state effects are included in the model

- Time effects are statistically significant and but the impact on the savings coefficient was low

- The effect of savings coefficient reduced when capital and FDI Inflow were included in the model

- Savings, Capital and FDI Inflow had significant impact, FDI Outflow had medium impact and imports had low impact in the estimation of GDP

- Imports and exports were highly correlated and hence both of them weren't included in the model simultaneously