THE IMPACT OF FUEL PRICES ON FOOD INFLATION IN SOUTHEAST ASIA: A PANEL DATA APPROACH

Assignment Type:

Dissertation / Term Paper (Econometrics focus)

Tools Used:

STATA, World Bank Data, IMF Price Index

Abstract:

This dissertation-level case study investigates how fluctuations in fuel prices affect food inflation across six Southeast Asian countries from 2005 to 2022. Using panel data techniques, the analysis explores both short-run and long-run dynamics, testing for fixed effects, random effects, and co-integration. Results reveal a strong positive correlation, with policy implications on energy subsidies and food security.

1. Research Objective

- Examine whether fuel prices significantly drive food inflation
- Understand the elasticity of food inflation with respect to energy costs
- Provide region-specific policy insights for economic planners

2. Hypotheses

- **H0**: Fuel prices have no significant effect on food inflation
- **H1**: Fuel prices significantly affect food inflation levels

3. Dataset

Variable	Source	Frequency	Description
Fuel Price Index	IMF Commodity Prices	Monthly	Regional average in USD/barrel

Food Price Inflation	World Bank WDI	Monthly	CPI-based food inflation index
GDP per Capita	World Bank	Annual	Control variable
Exchange Rate Volatility	IMF IFS	Monthly	Control for import price dynamics
Countries	Indonesia, Thailand, Vietnam, Philippines, Malaysia, Cambodia		

4. Methodology

- **Panel Data Structure**: Balanced panel (n=6, t=204)
- **Econometric Tests**:
  - Levin-Lin-Chu unit root test
  - Hausman test (Fixed vs Random Effects)
  - Panel Co-integration (Pedroni)
  - Error Correction Model (ECM)
- **Model Form**:

$$FoodInflation_{it} = \alpha + \beta 1 \cdot FuelPriceit + \beta 2 \cdot GDPpcit + \beta 3 \cdot ExchangeVolit + \mu_i + \varepsilon_i t$$

5. Key Results Table (STATA Output Interpreted)

Coefficient	**Estimate**	**Std. Error**	**p-value**	**Interpretation**
Fuel Price	0.47	0.09	<0.001	Statistically significant; 1% increase in fuel price increases food inflation by 0.47%
GDP per Capita	-0.03	0.01	0.020	Higher GDP reduces food inflation
Exchange Volatility	0.15	0.05	0.004	Volatility increases imported inflation

6. Diagnostic Tests

- **Hausman Test**: $p < 0.05 \rightarrow$ Use Fixed Effects
- **Serial Correlation**: Wooldridge test (No autocorrelation)
- **Heteroskedasticity**: Breusch-Pagan test (Detected → Clustered SE used)

7. Graphs Included

- Fuel Price vs Food Inflation (line chart by country)
- Coefficient plot of regression
- Error correction term adjustment over time

8. Conclusion

Fuel prices have a clear, significant impact on food inflation across Southeast Asia. Countries dependent on imported energy face the highest risks. The study recommends exploring subsidies, regional fuel stabilization funds, and agricultural input diversification to cushion food inflation shocks.

9. Deliverables Provided to Student

- Full STATA .do file and results log
- Word-formatted dissertation (approx. 4500 words)
- Graphs and regression tables (APA style)
- Discussion chapter with original interpretation
- 12 APA-style references from IMF, WB, Elsevier, Springer