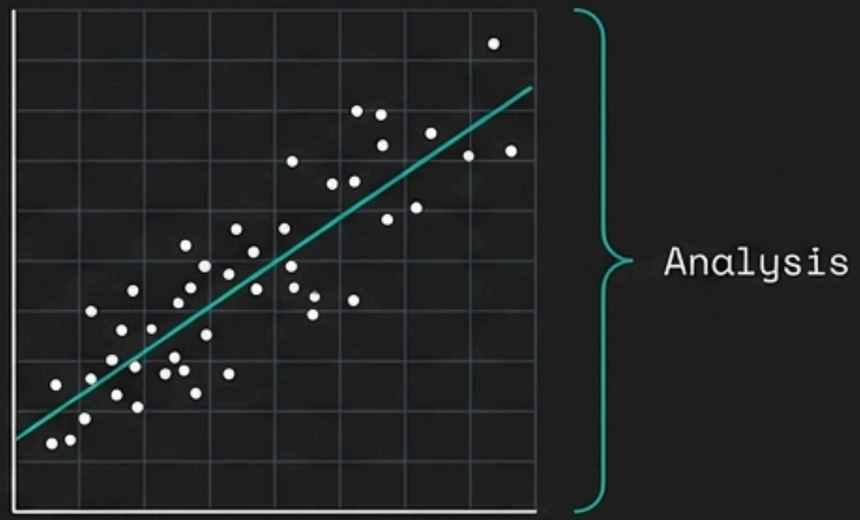
Software Packages for Economics

Bridging Economic Theory, Data Analysis, and Policy Formulation



COURSE CODE: BEC4207 | WEEK 1 | INTRO TO ECONOMETRIC TOOLS

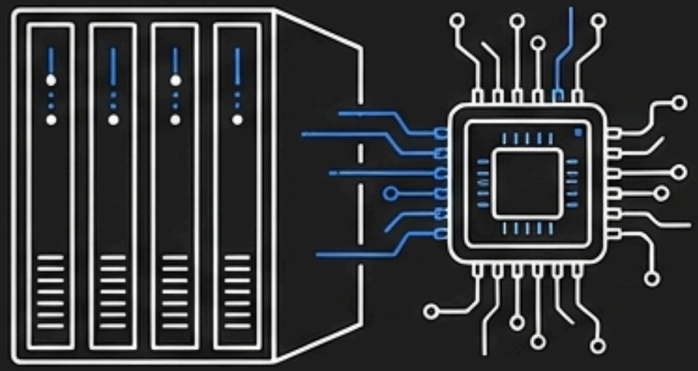
Why We Transition to Statistical Packages

Statistical packages are specialized programs designed for direct statistical analysis. While manual calculation explains the logic, software provides the scale.

Manual Calculation

- Limited Variable Handling
- High Time Cost
- Prone to Human Error

Software Processing



- Efficiency: Rapid processing of complex datasets
- Volume: Handles N-dimensional variables simultaneously
- Speed: Instantaneous regression computation

The Landscape of Economic Software

Category 1: General Purpose

Comprehensive tools for versatile statistical analysis.

- SPSS
- SAS
- MINITAB
- MINITAB
- R
- STATA

Category 2: Specific Purpose

Optimized for econometric tasks and time-series forecasting.

- TSP (Time Series Program)
- Gretl
- EViews
- Microsoft Excel

User Interface Paradigms: Command vs. Menu

Command Driven

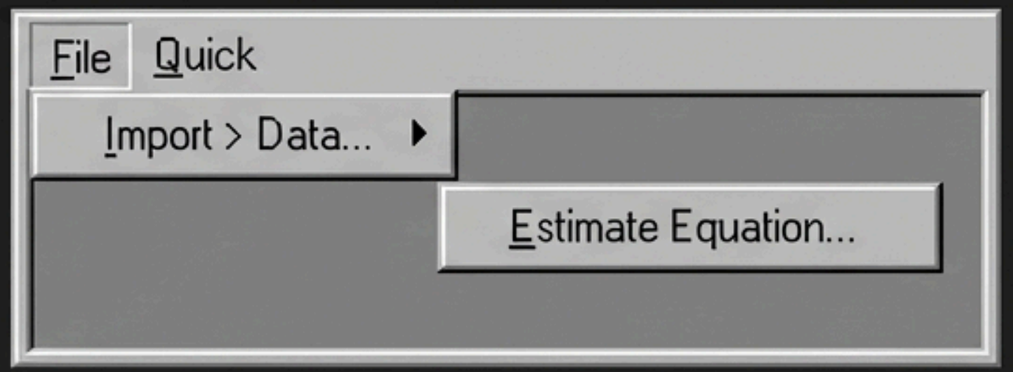
Users write specific syntax. Steeper learning curve, high control.

```r
model <- lm(y ~ x1 + x2, data=df)
summary(model)
```

R, SAS, MINITAB, STATA

Menu Driven

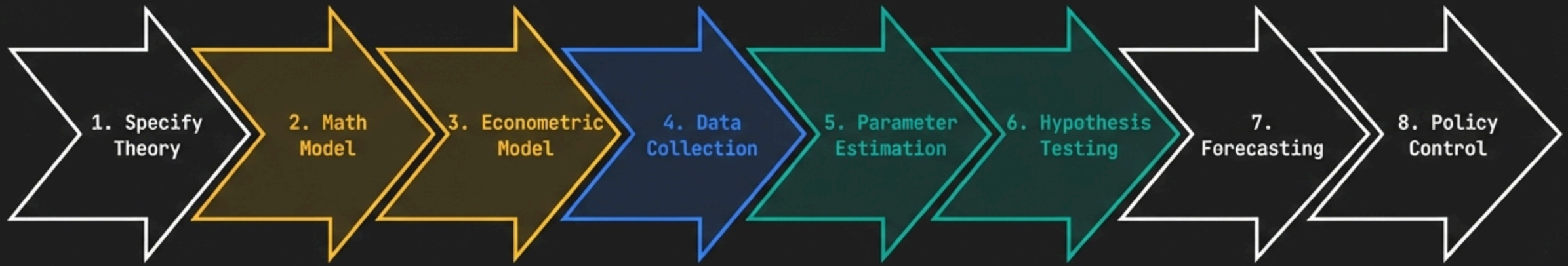
Users select operations from GUI lists. Easier for rapid prototyping.



EViews, SPSS, Excel, Gretl

The Methodology of Economic Modeling

From abstract theory to concrete mathematical structure, then statistical estimation.



Steps 1 & 2: From Theory to Mathematics

Keynesian Consumption Function

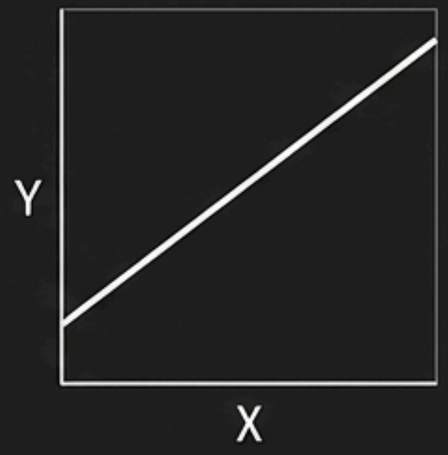
As income increases, consumption increases, but by a smaller amount than the increase in income.

The Mathematical Model

$$Y = \beta_1 + \beta_2 X$$

Y = Consumption Expenditure
X = Income
β_1 = Intercept Parameter
β_2 = Slope (Marginal Propensity to Consume)

Condition: $0 < \beta_2 < 1$



Deterministic Relationship (Math)

Step 3: The Statistical Reality Check

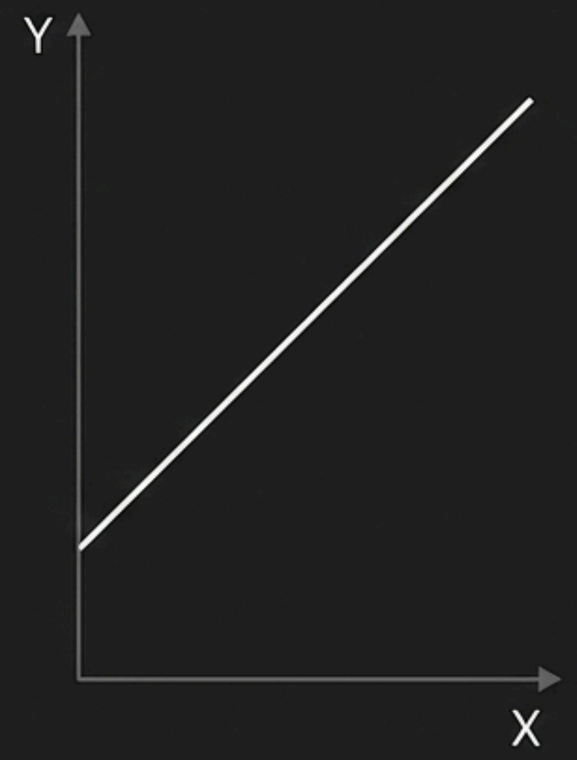
The Core Concept: In reality, the relationship isn't exact. Omitted variables and randomness interfere.

The Statistical Model:

$$Y = \beta_1 + \beta_2 X + \mu$$

μ = The Error Term
(Disturbance Term)

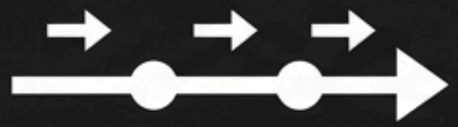
Math Model
(Deterministic)



Statistical Model
(Stochastic)

Step 4: Classifying Economic Data

Time Series Data



Observations of variables over a period of time.

Thailand GDP (1980-2017), Daily Stock Prices.

Cross-Section Data

Observations at a single point in time across different entities.

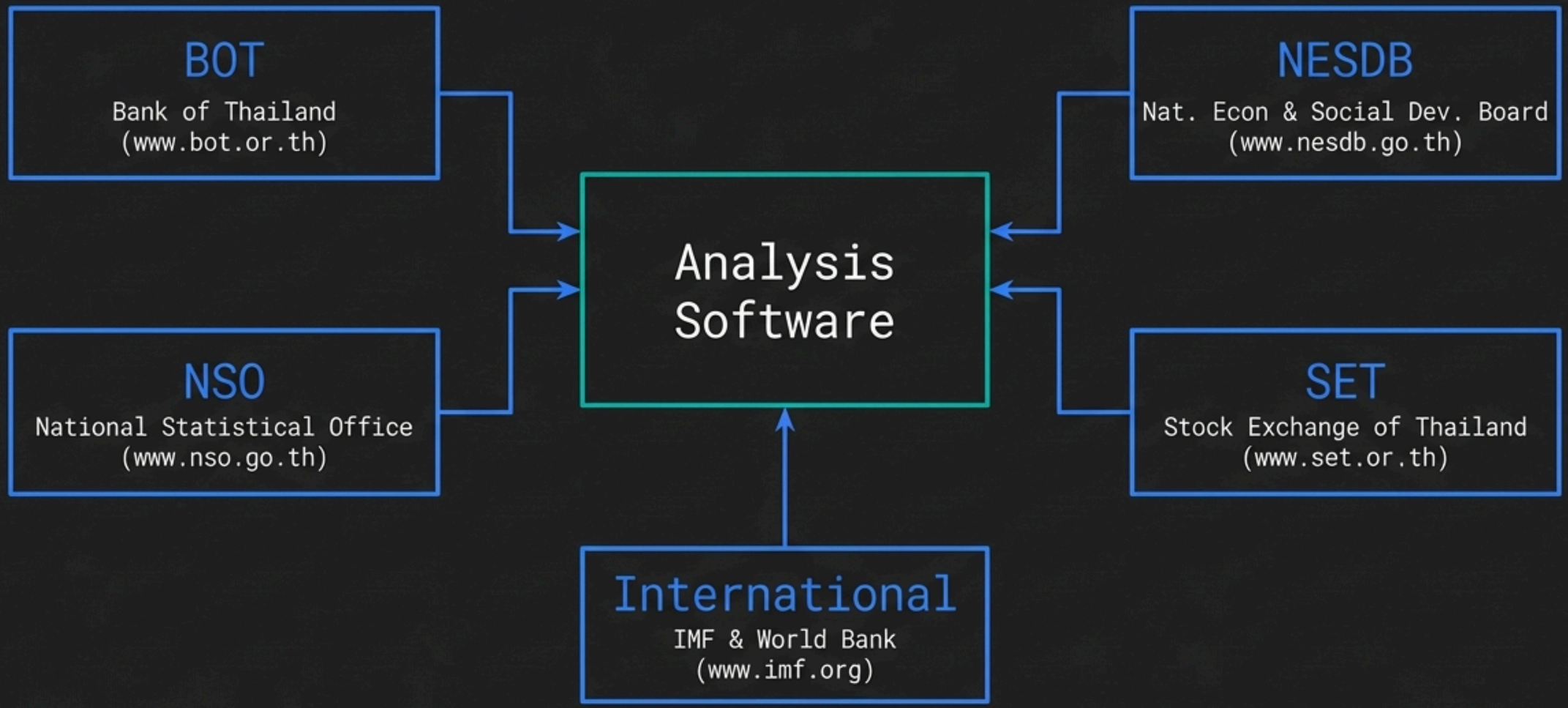
Household Income in 2016, GDP of multiple countries in 2020.

Panel Data

Combination of both: Multiple entities observed over time.

GDP of ASEAN countries (2007-2016).

Sourcing Reliable Economic Data



Step 5: Parameter Estimation

Theoretical Equation:

$$Y = \beta_1 + \beta_2 X + \mu$$

Estimated Equation:

$$\hat{Y} = b_1 + b_2 X$$

Note: $\hat{Y}$ is the estimated value, b represents sample estimators.

Interpreting Estimation Results

From the Case Study Output

b_1 (Intercept)

b_2 (MPC)

$$\hat{Y} = -231.80 + 0.7194X$$

m_2 (Consumpton)

Economic Interpretation

For every 1 million Baht increase in Income (X), Consumption (Y) increases by an average of 0.7194 million Baht.

Step 6: Hypothesis Testing

THE GOAL

Verify if the estimated parameters align with the original theory.

THE THEORY CONSTRAINT

$$0 < \beta_2 < 1$$

OUR RESULT

$$b_2 = 0.7194$$

THE TEST METHOD

t-test

We use the t-statistic and probability values from the software output to determine if the relationship is statistically significant.

Step 7: Economic Forecasting

Predicting future consumption based on projected income.

Input:	Projected Income (X) = 6,000 Million Baht
Model:	$\hat{Y} = -231.80 + 0.7194(X)$
Calculation:	$\hat{Y} = -231.80 + 0.7194(6{,}000)$
Forecast:	**$\hat{Y} = 4{,}084.6$ Million Baht**

Step 8: Policy Formulation & Control

Using the model to determine required inputs for a target output.

Target: Govt wants Consumption (Y) at 4,000 Million Baht.

Question: What Income (X) level is required?

$$4{,}000 = -231.80 + 0.7194X$$

$$\Rightarrow 4{,}231.80 = 0.7194X$$

$$\Rightarrow X = 4{,}231.80 / 0.7194$$

Required Income (X) = 5,882 Million Baht

Policy Suggestion: Stimulate economy to reach this income level.

The Analyst's Environment: EViews

Mastery of these tools transforms raw data into actionable economic insight.

File Edit Object View Proc Quick Options Window Help

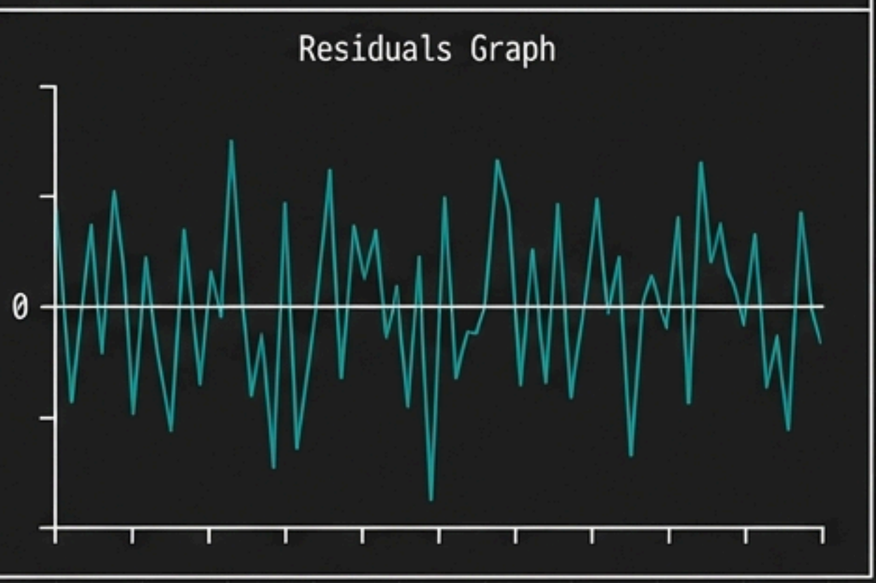
Command Line

```
EViews > equation eq1.ls y c x
```

Equation Output

Variable	Coefficient	Std. Error	t-Statistic
C	-231.80	45.21	-5.127
X	0.7194	0.0563	12.774
R-squared	0.8750		
Adjusted R-squared	0.8690		

Graph View



Ready for Analysis.