Lucas Islands Game in Intermediate Macroeconomics

From Classroom Game to Empirical Macroeconomics

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Developments in Economic Education — Session: Papers – Games and Experiments

September 2025

Motivation

- Intermediate macro relies on stylized models (Phillips curve, rational expectations, etc.).
- Students often doubt realism and policy relevance.
- **Goal:** Use a classroom game + structured follow-up lecture to bridge abstract theory and data.

Why classroom games in macro?

- Active learning improves engagement, recall, and performance.
- Macro games are rarer than micro experiments.
- Lucas Islands game is flexible and maps cleanly to core macro ideas.

Lucas Islands: intuition (no heavy math)

- Imperfect information: agents misperceive aggregate vs relative prices.
- Short-run supply: output responds to price surprises.
- Policy angle: anticipated policy loses bite under rational expectations.

Baseline: Hazlett (1996) classroom design

- Students act as firms/workers under imperfect information.
- Observe nominal wages/prices, forecast aggregate price, choose action.
- Aggregation reveals macro relationships in real time.

The adaptation: labor-market framing

- **Workers** choose labor supply based on expected real wage.
- Clearer intuition for undergrads vs firm production choice.
- Data from each round supports follow-up empirical illustration.

Implementation in the course

- Textbook: Blanchard (2020)
- Timing: Week 5–6 (after Phillips curve, before credibility of monetary policy).
- 10–15 rounds; each round has: wage table + qualitative news.
- Paper worksheets vs Excel form.

Student information sheet

The zero line shows what happened yesterday, before you start the game. The actual price level was 1, and the wage in your island was 10, so the real wage was 10. When we play, you start filling from line one.

Island name:

Day	**Nominal Wage w**	**Expected Price P^e**	**Expected Real w/P^e**	**Hours to $0.8 \times w/P^e$**	**Actual Price P**	**Actual Real w/P**	**Notes**
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
0	10.00	–	–	–	1.00	10.00	History
1							
2							
3							

In the game, the complete sheet contains one row per day (typically for 15 days). The layout is identical to this preview.

Figure 1: Overview of the worksheet students use during the game.

Expected real wage → hours (example)

- The number of hours to work is proportional to your expected real wage, i.e. you have an upward-sloping labor supply curve:

$$\text{Hours to work} \;=\; 0.8 \times \frac{w}{P^e}.$$

Examples

- If $w = 10$ and $P^e = 1.0$, then hours $= 0.8 \times 10/1.0 = 8$.
- If $w = 11$ and $P^e = 1.0$, then hours $= 0.8 \times 11/1.0 = 8.8$.
- If $w = 11$ and $P^e = 1.1$, then hours $= 0.8 \times 11/1.1 = 8$ (no change from the baseline).

Table 1: Worked example shown to students before Round 1.

Running a round

1. **Morning:** see wage table + news (aggregate or island-specific).
2. **Forecast:** choose P^e; compute w/P^e; pick hours.
3. **Evening:** observe actual P; update sheet; learn.

Day 3 Morning

...jobs are harder to find - unemployment figures are rising.

A	B	C	D	E	F	G	H	I	J	Price
8.5	11	9	9.5	8.5	11	9.5	9	9.5	9.5	

Day 3 Evening

...jobs are harder to find - unemployment figures are rising.

A	B	C	D	E	F	G	H	I	J	Price
8.5	11	9	9.5	8.5	11	9.5	9	9.5	9.5	0.95

News flow

1	...according to leading economic indicators (LEI) the economy is growing at a steady rate. Unemployment and inflation are within the target range.
2	...the newest craze is for goods produced on islands B and F.
3	...jobs are harder to find - unemployment figures are rising.
4	...the economy is still slowing and unemployment figures are higher than expected.
5	...unemployment is no longer a problem yet inflation figures are higher than those forecast for the year.
6	This morning the news announcer states that it will air regular reports from the Federal Reserve Bank. Today you hear that the Fed met, announced concern about the high rates of inflation and raised interest rate.
7	...the Fed met and indicated that after looking at leading economic indicators this afternoon it will decide how successful the battle against inflation has been. They stated that they will take no action for the time being.
8	...the Fed met and reported that it feels inflation is no longer a threat, but it is concerned with high unemployment. The Fed decided to reduce interest rate to stimulate the economy.

Wage table

	A	B	C	D	E	F	G	H	I	J	P
0	10	10	10	10	10	10	10	10	10	10	1
1	10	10	10	10	10	10	10	10	10	10	1
2	9	12	9	10	9	12	10	9	10	10	1
3	8.5	11	9	9.5	8.5	11	9.5	9	9.5	9.5	0.95
4	8	10	9	9	8	10	9	9	9	9	0.9
5	9	11	10	10	9	11	10	10	10	10	1
6	10	11	10.5	10.5	10	11	10.5	10.5	10.5	10.5	1.05
7	10	11	10.5	10.5	10	11	10.5	10.5	10.5	10.5	1.05
8	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	1.05
9	8.5	10.5	11	11	8.5	11	9	10.5	11	9	1
10	9	10.5	10.5	10.5	9	10.5	9.5	10.5	11	9	1
11	9	10.5	10	9.5	9	10	9	10	10	9	0.95
12	9.5	9.5	9.5	9.5	9.5	10	9	9.5	10	9	0.95
13	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	0.95

Follow-up lecture

- Recap with students' data - discuss the patterns.
- Link to the Phillips curve.
- How economists build and test models?
- Aggregate effects from individual data
- Implications for policymakers: generate surprises

Follow-up lecture: recap with students' data

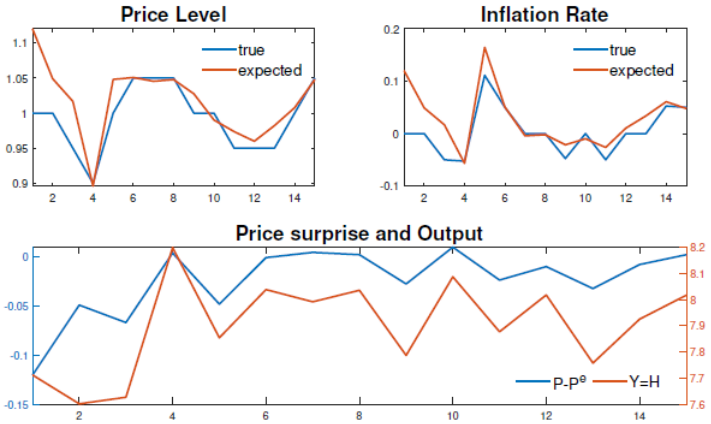

Figure 2: Forecasting performance over rounds (aggregate).

Link to Phillips curve / short-run AS

- Imperfect information: $Y_t - Y^n = \beta\,(P_t - P_t^e)$ or $\delta(\pi_t - \pi_t^e)$.
- Reduced-form correlation aligns with textbook PC/AS views.

	AS	PC
Intercept	7.99^c [7.92,8.07]	7.99^c [7.93,8.07]
Expectation Error	3.95^c [2.25,5.65]	3.91^c [2.21,5.61]
Number of observations	16	16
F(1,14)	24.71	24.29
Prob > F	0.0002	0.0002
R-sq	0.64	0.63
Adj. R-sq	0.61	0.61

Note: ^{c} denotes statistical significance at 99% confidence level.

Figure 3: Short-run AS estimates from classroom data.

Follow-up lecture: Expectation formation

- Adaptive component: correct prior errors.
- Forward-looking component: respond to news/policy and wage signals.
- Heterogeneity across participants but robust aggregate patterns.

Expectation formation: simple panel model

$$\Delta \log P^e_{k,t} = \theta_0 + \theta_1(\log P^e_{k,t-1} - \log P_{t-1}) + \theta_2 \Delta \log P^e_{k,t-1} + \theta_3 \Delta \log P_{t-1}$$
$$+ \psi_0 \Delta \log W_{k,t} + \psi_1(\text{infl. signal}) + \psi_2(\text{unemp. signal}) + \psi_3(\text{rate} \uparrow) + \psi_4(\text{rate} \downarrow) + \cdots$$

Expectation formation: simple panel model

Table 2: Expectation formation (FE), dep. $\Delta \log P^e_{k,t}$

Intercept	0.02^{***}
$\log(P^e_{k,t-1}) - \log(P_{t-1})$	-1.13^{***}
Prices, $\Delta \log(P^e_{k,t-1})$	-0.13^{***}
Prices, $\Delta \log(P_{t-1})$	-0.12
Wages, $\Delta \log(W^k_t)$	0.10
Economy, E^i_t	0.05^{***}
Economy, E^u_t	-0.06^{***}
Policy, M^c_t	0.003
Policy, M^e_t	0.03^{***}
Demand, $N^b_{i,t}$	0.04
Demand, $N^r_{i,t}$	-0.06^{***}

Note: *, **, *** denote 90%, 95%, 99% significance.

Follow-up lecture: Model-building

- Hypothesis.
- Variables
- Getting results
- Interpreting

Students' forecasts and labour supply decisions translate into measurable empirical relationships

Follow-up lecture: Future topics

- More than one model leading to empirical Phillips curve
- Short term business fluctuations (Business cycles)
- Policy implications: surprises and rational expectations, learning
- Role of expectations

Students' forecasts and labour supply decisions translate into measurable empirical relationships

Practical takeaways for educators

- **Design choices:** number of rounds, clarity of shocks/news, idiosyncratic vs aggregate.
- **Data layer:** keep analysis simple (plots) or show light regressions.
- **Course fit:** pairs well with Phillips curve then leads into expectations/credibility.

Survey results: perceptions and confidence

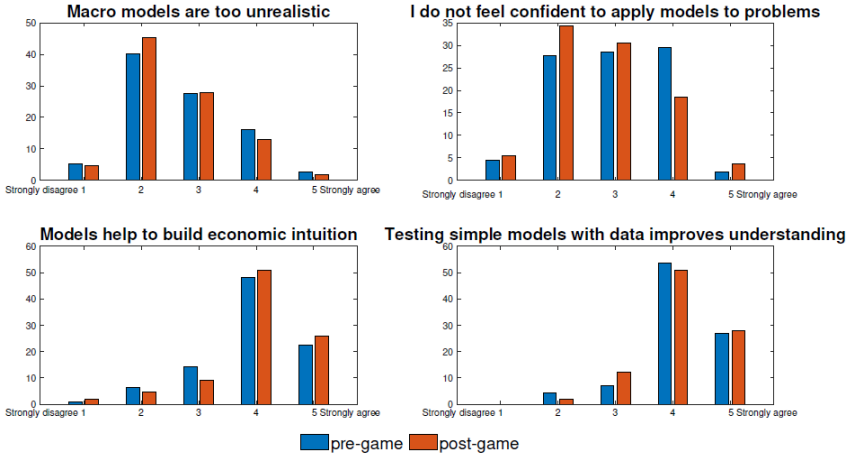

Figure 4: Selected pre/post comparisons (Likert responses).

Post-game evaluation

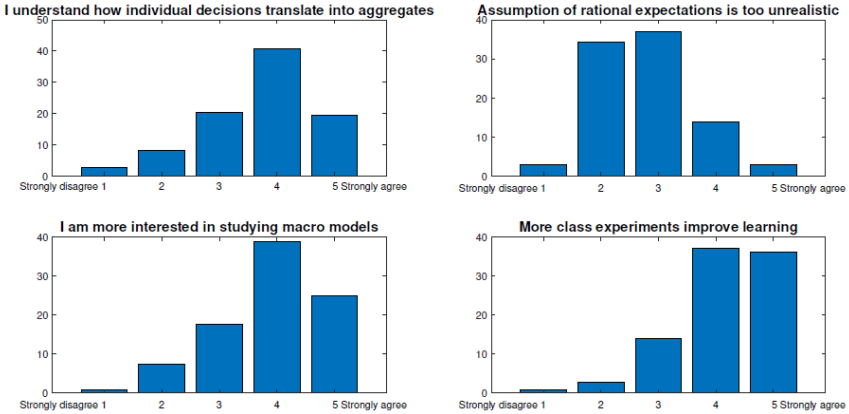

Figure 5: Student evaluations of the game and follow-up lecture.

Conclusion

- Classroom game + structured debrief connects theory to data.
- Improves confidence and engagement with macro modeling.
- Flexible template to extend across macro topics.