Economic Theory II
Lecture 6 [1]

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[1] Content of current lecture slides derives on slides prepared by Dr Valentin Jouvanceau previously.

The IS-LM set-up [2]

- We saw how households optimise with given interest rate r_t and exogenous income Y.
- Now we introduce a concept of equilibrium in this economy.
- Firms still don't exist yet, hence an 'endowment' economy where output and income are given.
- Now, there are a large number of identical households who take r_t as given.
- No overlapping generations: imagine the world is only two periods and everyone lives at the same time and dies at the same time.

[2] Chapter 11 of GLS.

Model set-up

- Every house is indexed by (j), and there are J total households: $j = \{1, 2, 3, ..., J\}$.
- $U(j) = u(C_t(j)) + \beta u(C_{t+1}(j))$, subject to:

$$C_t(j) + S_t(j) \leq Y_t(j)$$
$$C_{t+1}(j) \leq Y_{t+1}(j) + (1 + r_t)S_t(j)$$

- Combining gives lifetime constraint:

$$C_t(j) + \frac{C_{t+1}(j)}{1 + r_t} = Y_t(j) + \frac{Y_{t+1}(j)}{1 + r_t} \tag{1}$$

Model set-up

- Euler is, as usual;

$$u'(C_t(j)) = \beta(1 + r_t)u'(C_{t+1}(j))$$

- Consumption of each household depends on today's income, tomorrow's income, and return on savings:

$$C_t(j) = C^d(Y_t(j), Y_{t+1}(j), r_t) \tag{2}$$

- Verify with $u(\cdot) = \ln(\cdot)$:

$$C_t(j) = \frac{1}{1 + \beta(1 + r_t)} \left[Y_t(j) + \frac{Y_{t+1}(j)}{1 + r_t} \right] \tag{3}$$

- Clearly, $\dfrac{\partial C_t(j)}{\partial Y_t(j)} < 1$: what does this mean? MPC?

Aggregation

- Competitive equilibrium: *set of prices and quantities, for which all agents behave optimally, and all markets clear simultaneously*.
- Price: r_t. Quantity: Consumption $C_t(j)$ and $C_{t+1}(j)$, and savings $S_t(j)$. *Market clearing*: supply = demand.
- So what is $\sum_{j=1}^{J} S_t(j)$? Why?
- For each period,

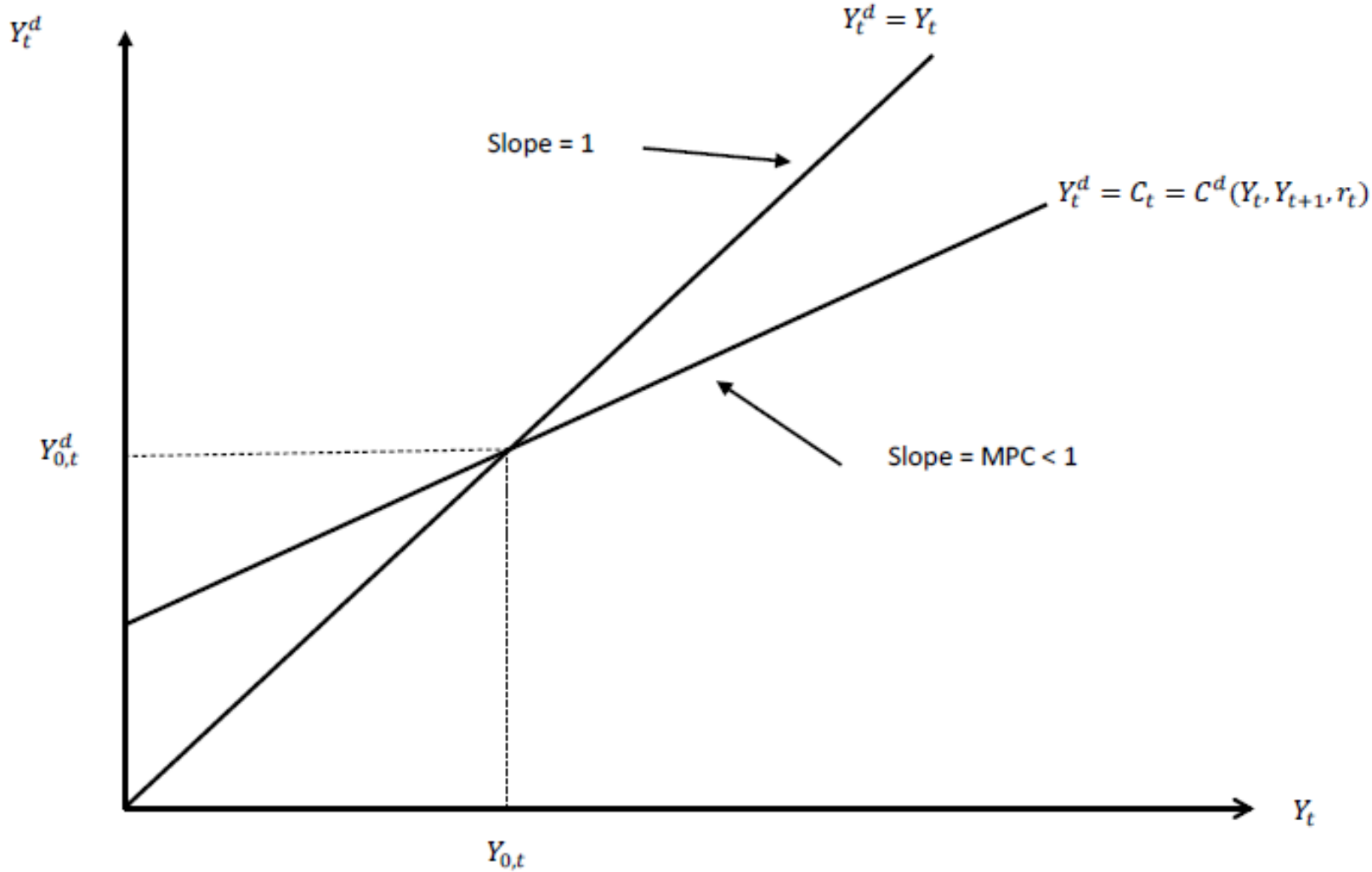
$$\sum_{j=1}^{J} C_t(j) + \sum_{j=1}^{J} S_t(j) = \sum_{j=1}^{J} Y_t(j) \Rightarrow C_t = Y_t$$

.

- *On aggregate*, no way to transfer resources over time. Artefact of assumption of no production.
- $Y_t^d := C^d(Y_t, Y_{t+1}, r_t)$ is desired expenditure, the same as consumption.

Graphical Analysis

Expenditure and Income

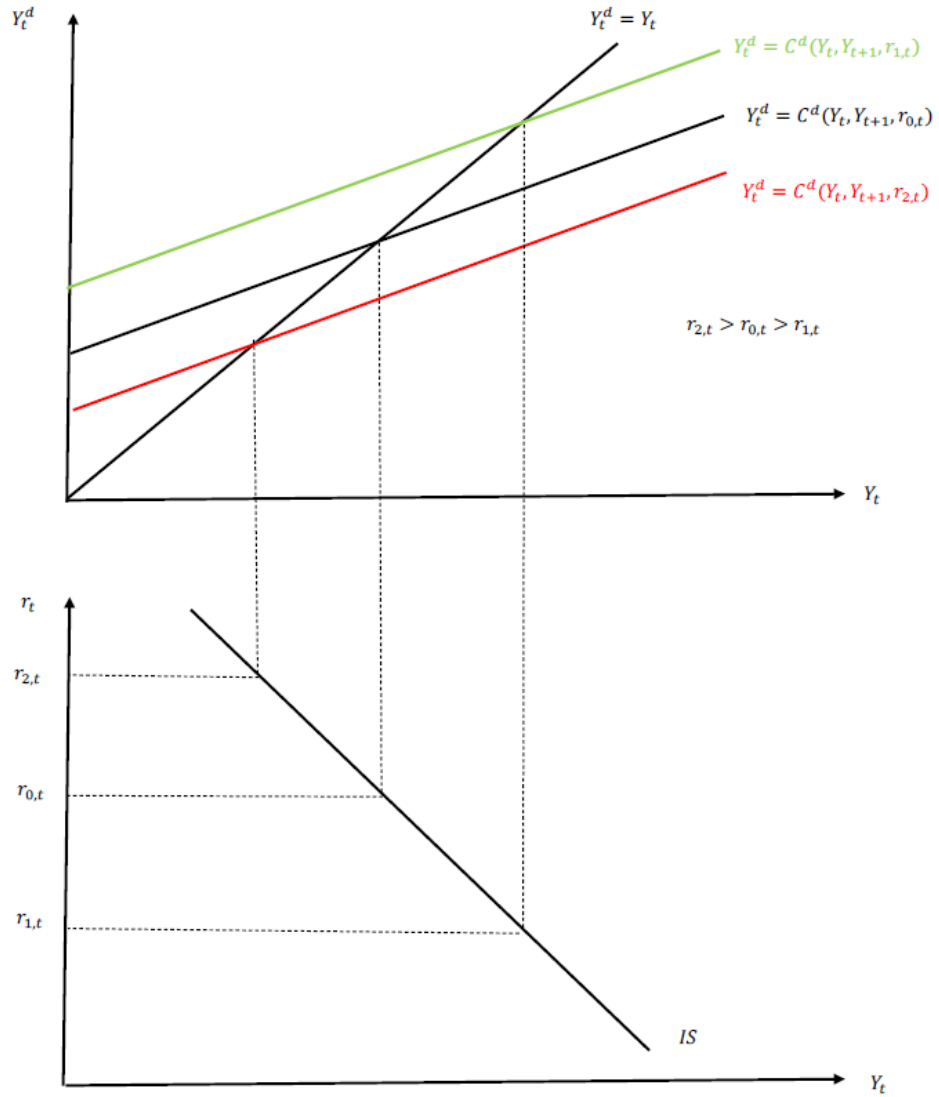


Graphical Analysis

- What is the impact of a change in r_t?
- Use rule of graphical analysis: if not in the plot, causes level shifts.
- This helps us define the IS curve: the relationship between interest rate (r_t), and expenditure (Y_t).
- IS stands for *Investment* = *savings*, or, in our case, *consumption* = *income*.
- What is the impact on IS curve of change in Y_{t+1}?

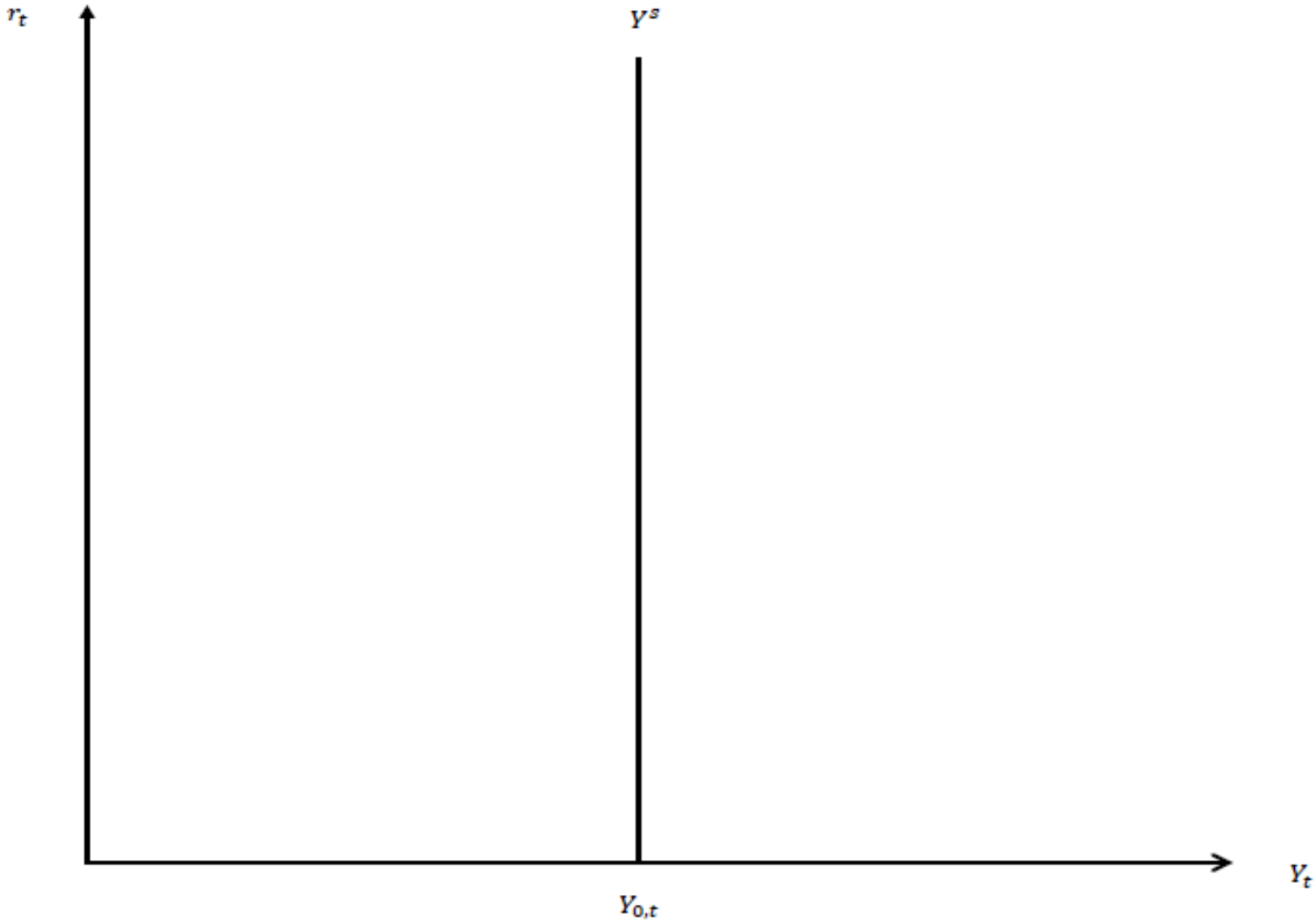
Graphical Analysis

Expenditure and Income



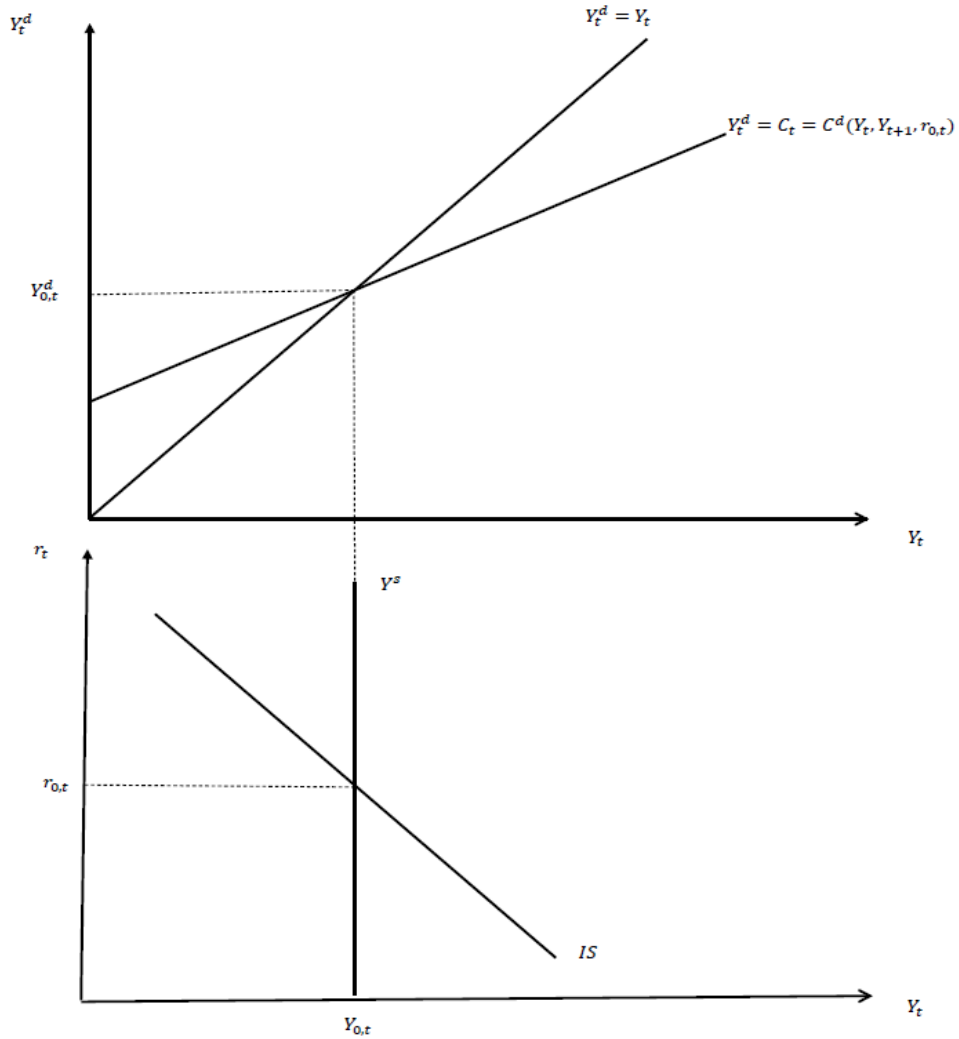
Graphical Analysis

Aggregate Supply



Equilibrium

Equilibrium



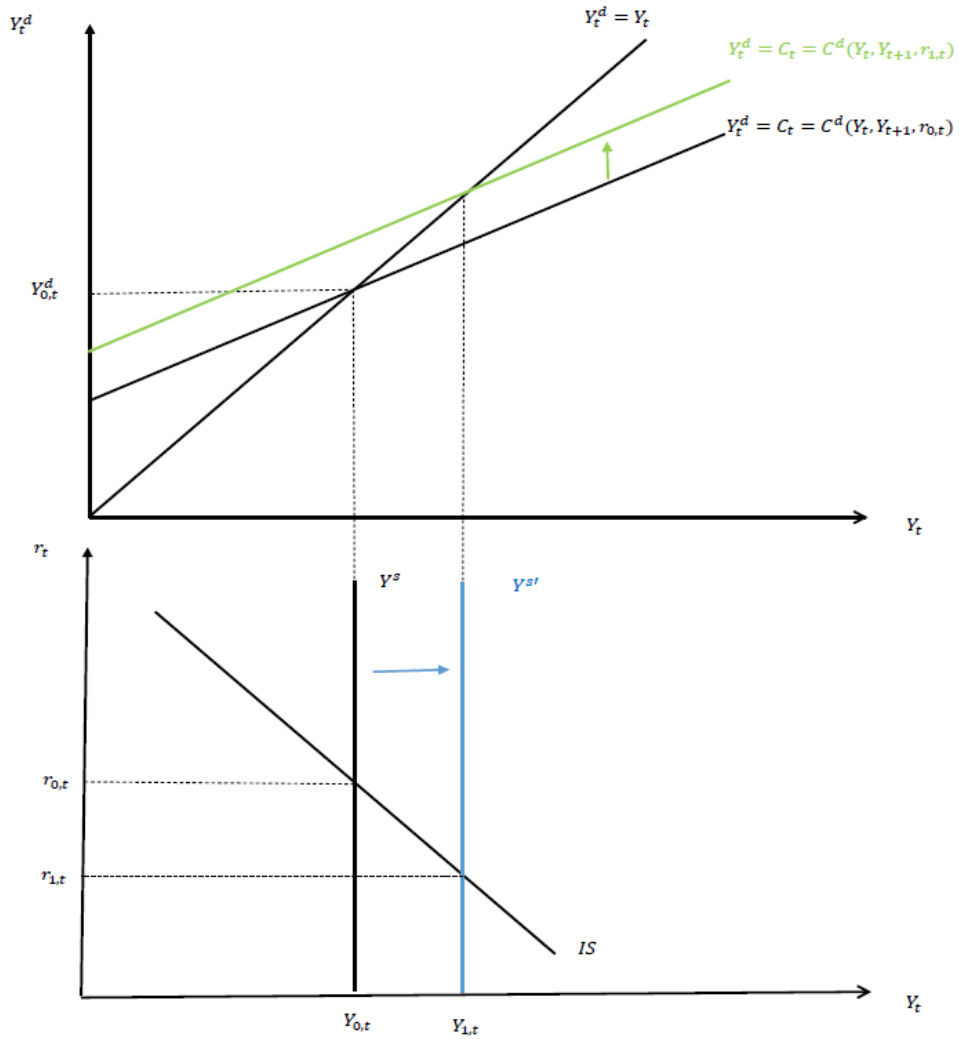
Experiments

Increase in Y_t:

1. Impact on Aggregate Demand curve on impact? Why?
2. Impact on Investment-Savings curve? Why?
3. What is the long term impact on r_t? What is the intuition?
4. Why is it a supply shock?
5. Is there a new equilibrium?

Supply shock

Supply shock



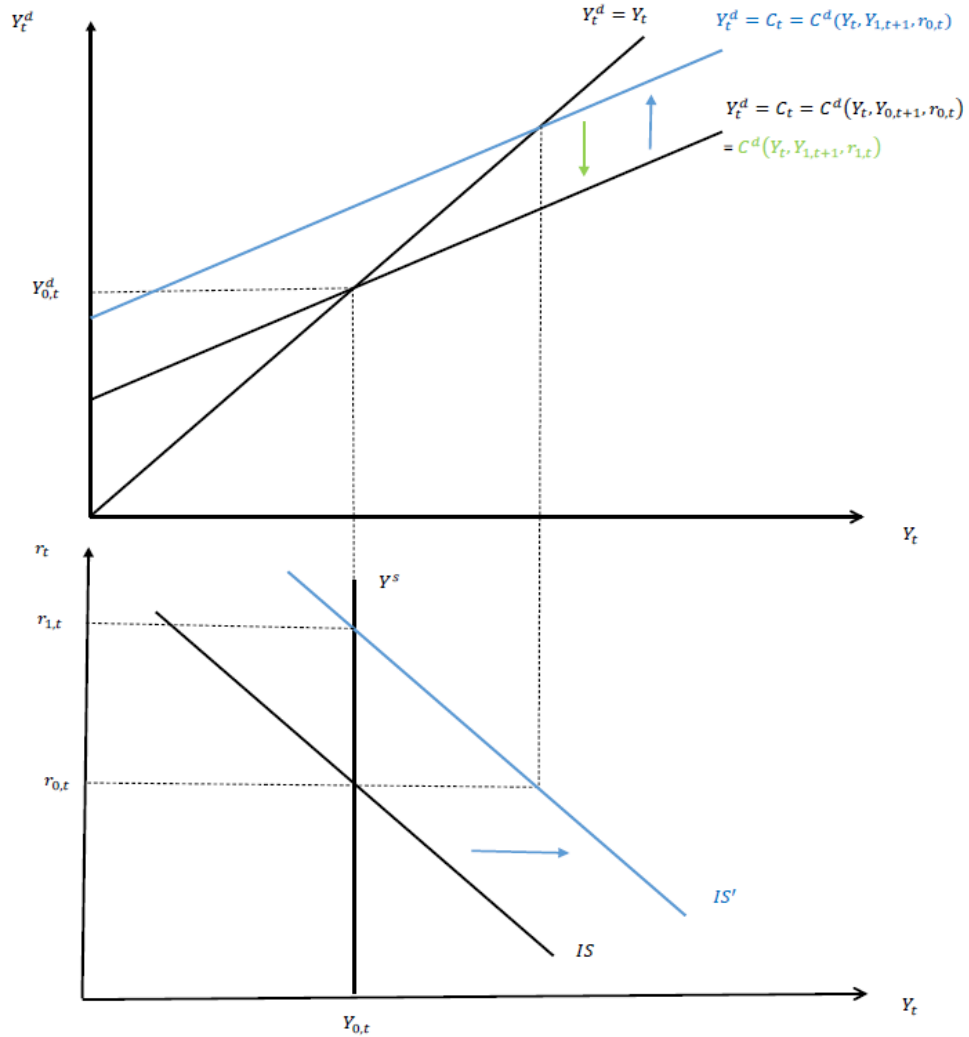
Experiments

Increase in Y_{t+1}:

1. What happens to the Aggregate Demand curve on impact? Why?
2. What happens to the IS curve? Why?
3. What is the long term impact on r_t? Why?
4. Why is it a demand shock?
5. Is there a new equilibrium?

Demand shock

Demand shock

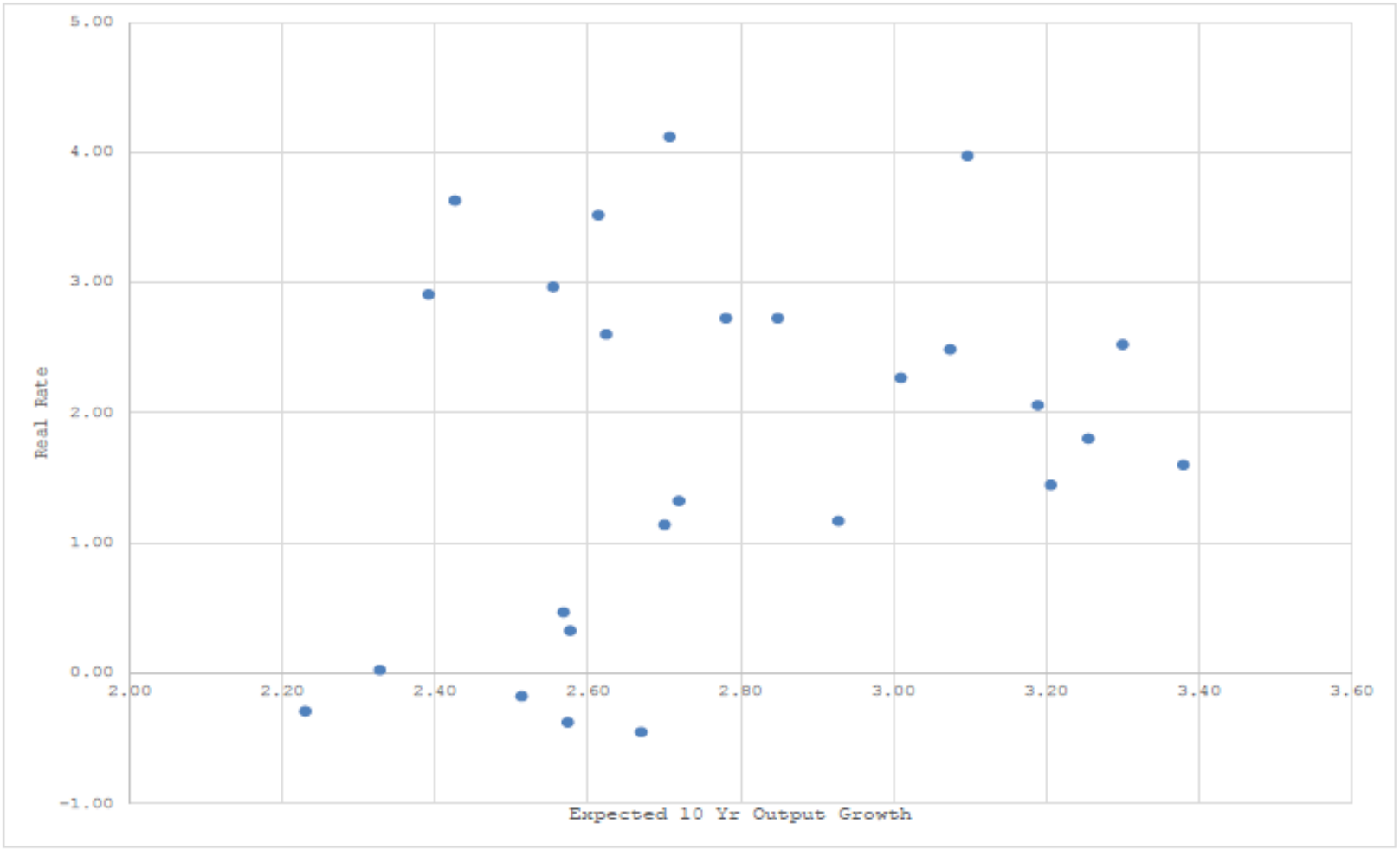


Insights

- The real interest rate r_t is a measure of the *plentifulness* of the future: if $\frac{Y_{t+1}}{Y_t} \uparrow\downarrow$, $r_t \uparrow\downarrow$.
- In an endowment economy, r_t *must* adjust to make sure there are no aggregate savings in equilibrium.
- If $Y_{t+1} \uparrow$, everyone wants to consume more today, and to dissuade that $r_t \uparrow$.
- If $Y_t \uparrow$, everyone wants to save more today, and to dissuade that $r_t \downarrow$.
- Is there any support in data?
- Related to 'Yield Curve'?

Data

Real Interest Rates and Expected Output Growth



End