International Macroeconomics
Lecture 5.2: Business Cycles in Open Economies

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- Dynamics of aggregate economies
  1. Trend (growth)
  2. Cycles (booms/recessions)

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- Now we turn to cycles in open economies
- Start with closed economy refresher (as before)

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  - $\hat{A}_{t+1}/\hat{A}_t = 1 + z$, as in NCG (deterministic)
  - z_t follows mean-zero, AR(1) process (random)

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ρ_z is close to one, but strictly less than one

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5. 100% Capital Depreciation $\rightarrow$ Resource constraint

$$K_{t+1} = A_t K_t^{\alpha} - C_t$$

RBC Model: Solution

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$$u'(C_t) = \beta E_t \left[(1 + \tilde{r}_{t+1}) u'(\tilde{C}_{t+1}) \right]$$

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- Consumption growth high when expected productivity high and vice versa

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- Exactly pattern for developed world business cycles

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- Point (1) requires some explicit exploration

World RBC Model

- Put two RBC countries together in the same world
- Set growth in $\tilde{A}_t$ to zero for simplicity

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- $\lambda \to$ Planner's preference for home
  - Corresponds to home having more initial capital in competitive eq'm

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- Growth rates of C_t same but the *levels* will depend on λ

Investment

- Where will capital go?

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- Invest approximately according to average productivity tomorrow

$$E_t[z_{t+1}] = \rho_z z_t$$

- MPK(Home) $\approx$ MPK(Foreign)

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- Then $K_{t+1} > K_{t+1}^\star$
  - Since $E_t[z_{t+1}] > E_t[z_{t+1}^\star]$ too, clearly $E_t[Y_{t+1}] > E_t[Y_{t+1}^\star]$

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- In general, model does a terrible job of matching data

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- Correlated productivity shocks get us the rest of the way i.e. raise output correlation above consumption correlation

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- Even if RBC works for cross-country developed world, need another framework for these economies...

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- Start with structure of growth: Aguiar and Gopinath (2007)

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$$\hat{A}_t = A_0 \times \Pi_{s=0}^{t} e^{g_s}$$

  i.e.

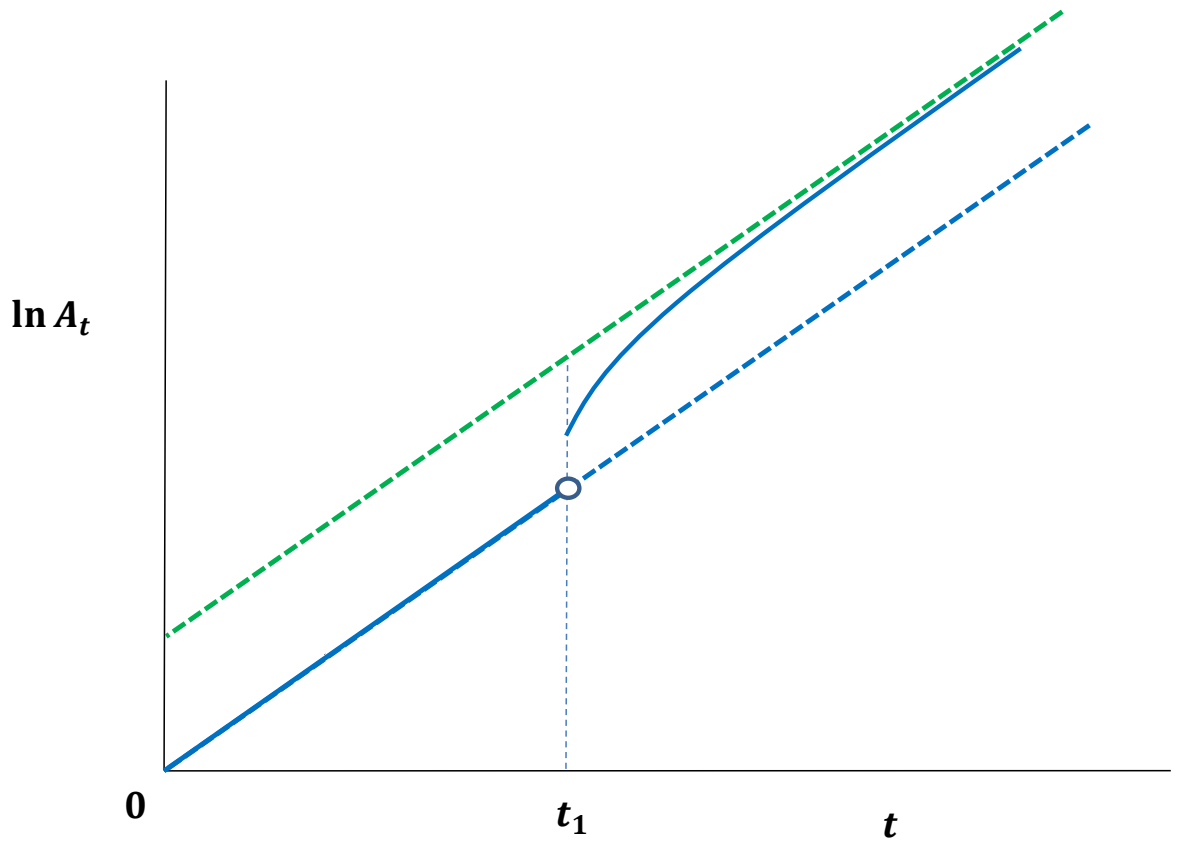
$$\hat{A}_1 = A_0 e^{g_1}$$

$$\hat{A}_2 = A_1 e^{g_2}$$

$$\ldots$$

- Where g_t is random and follows AR(1) (just like z_t)

A Trend Shock to Productivity



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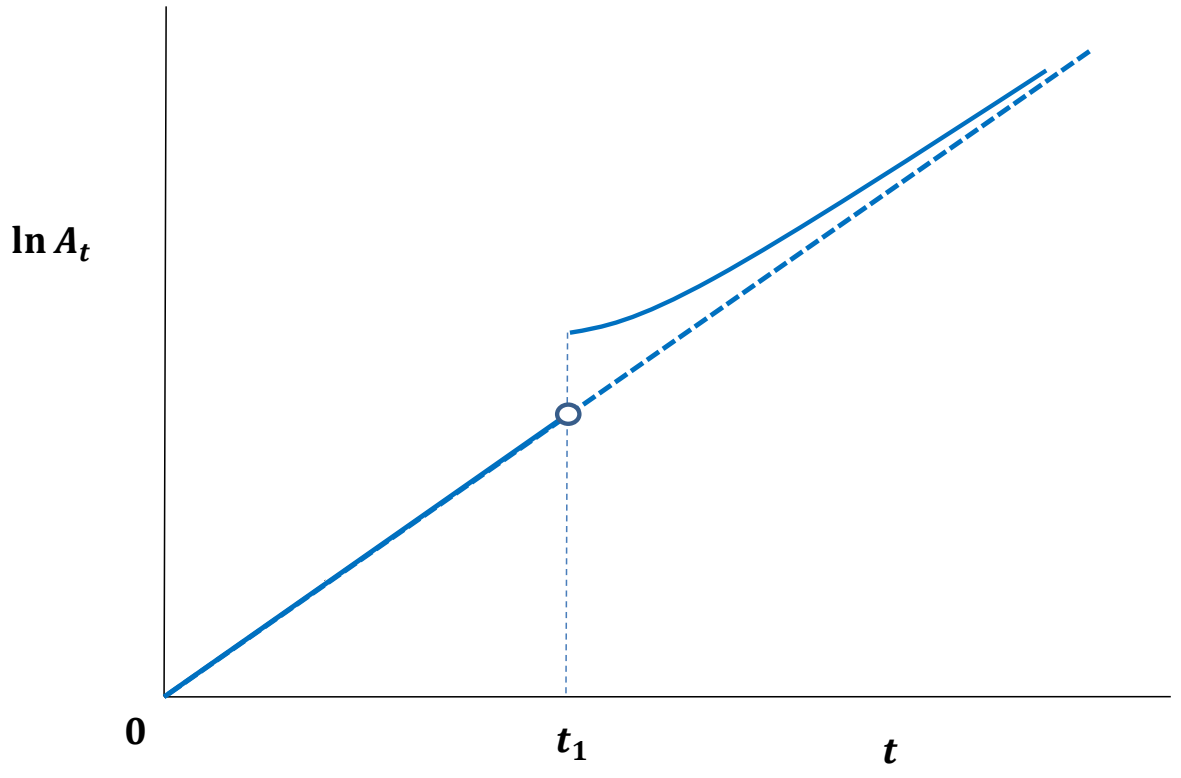
A Cycle Shock to Productivity



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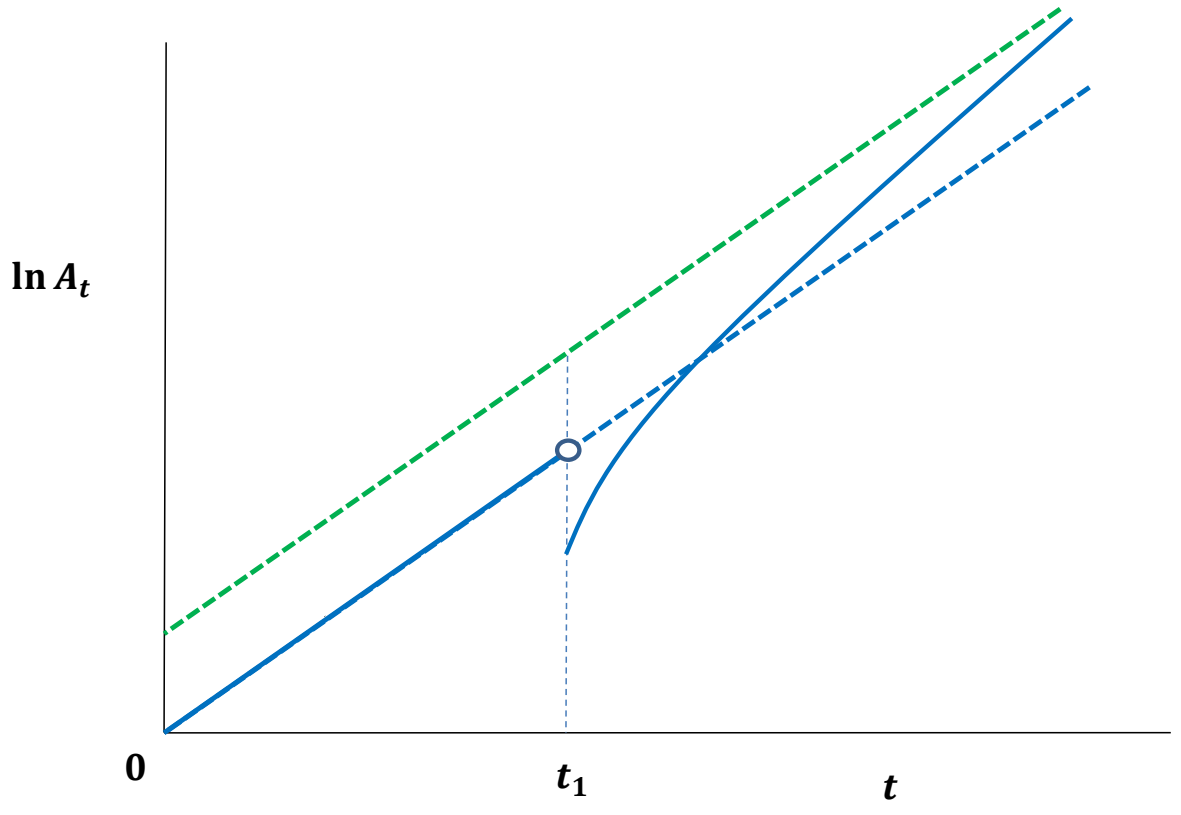
Example: Both Shocks Simultaneously



Large, negative shock to z_t and small, positive shock to g_t

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- z_t is a *transitory productivity shock* and g_t is a *permanent productivity shock*

Productivity Process

- Productivity evolves via two AR(1) processes

$$z_t = \rho_z z_{t-1} + \epsilon_{z,t}$$

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- Relative magnitudes of $\sigma_{g,t}$ and $\sigma_{z,t}$ govern business cycle dynamics

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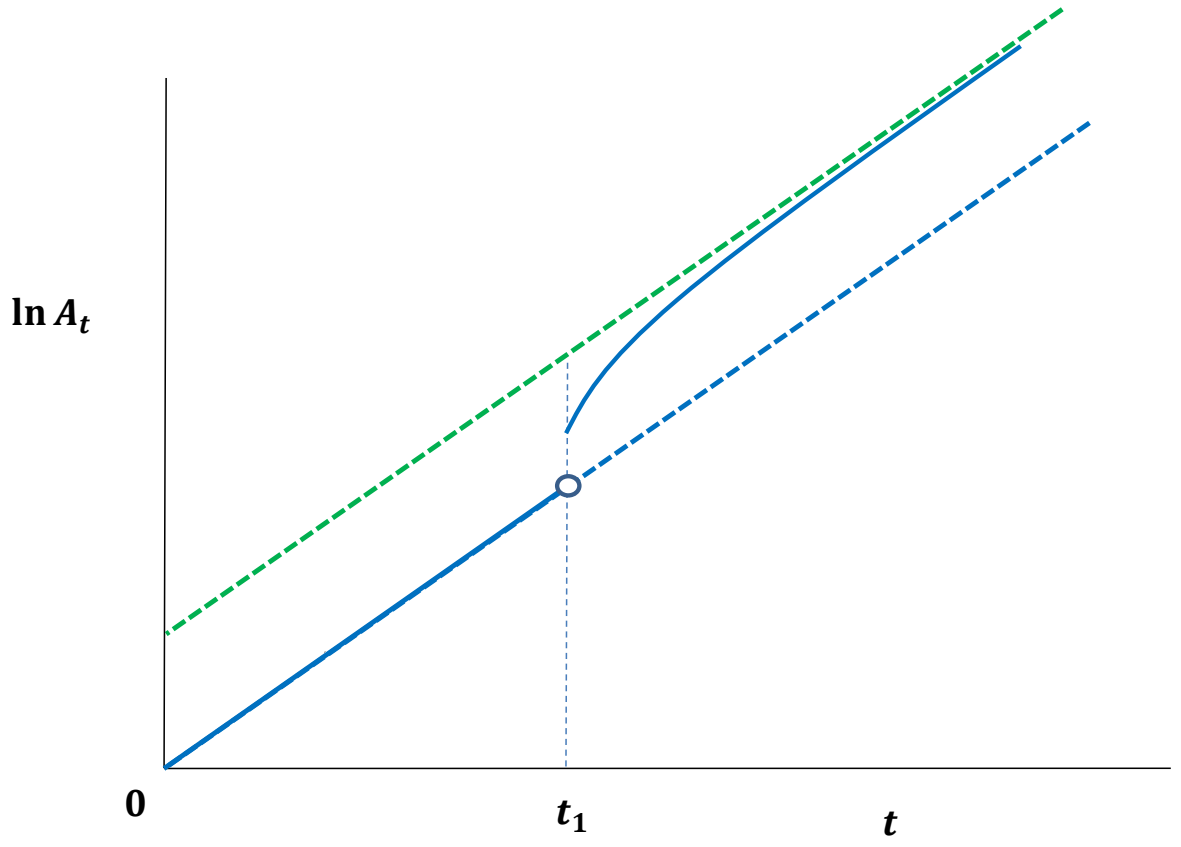
- No reason to save! Unlike z_t, income not likely to come down again

Implications

- We know how households respond to z_t shocks: Consumption smoothing
- How do they respond to g_t shocks?
- For a positive shock at t_1
  1. Income is currently higher
  2. It's expected to continue to grow (g_t persistent)
  3. It's expected to be higher *forever* (permanent)
- No reason to save! Unlike z_t, income not likely to come down again
- In fact, since income is *expected to be higher following initial shock*
  - Incentive to borrow at t_1

Positive Trend Shock



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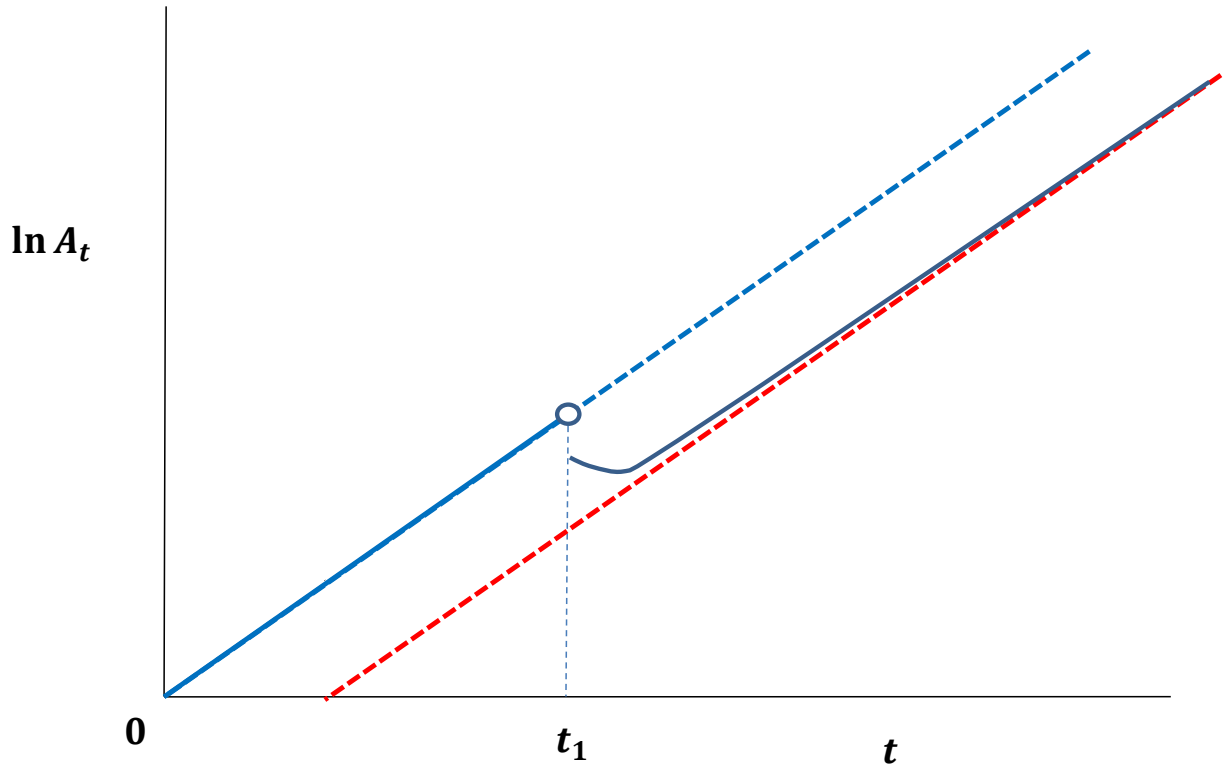
Negative Trend Shock



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- To sum up, emerging market business cycle features emerge when $\sigma_{g,t}$ large relative to $\sigma_{z,t}$

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- Aguiar and Gopinath (2004) show that a large permanent shock alone can explain most of Mexico's 1994 Crisis

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- Alternative theory: Interest rates
- Exploit fact that SOEs are in fact *open*
  - In a small open economy, world interest rate taken as given
  - Fluctuations in it will impact economic activity

EME Cycles and Interest Rates

Table 2. Argentine Business Cycles. 1983.1-2000.2. Correlations[12]

	Correlation of GDP with					
	R	NX	Tot. Cons	Inv.	Emp.	Hrs
Argentina	-0.59	-0.87	0.97	0.93	0.37	0.51
	(0.12)	(0.03)	(0.01)	(0.02)	(0.08)	(0.11)
Canada	0.30	-0.04	0.86	0.73	0.86	0.94
	(0.14)	(0.17)	(0.04)	(0.09)	(0.06)	(0.04)
	Correlation of R with					
	Y	NX	Tot. Cons.	Inv.	Emp.	Hrs
Argentina	-0.59	0.66	-0.62	-0.57	-0.31	-0.55
	(0.12)	(0.07)	(0.11)	(0.12)	(0.13)	(0.13)
Canada	0.30	0.22	0.20	0.05	0.34	0.22
	(0.14)	(0.14)	(0.14)	(0.17)	(0.24)	(0.22)

The number in parentheses are the standard errors of the GMM estimates of the correlations

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- Causality reversed in two cases: Focus on case (2)
  - Fluctuations in interest rates imply plausible EME cycles when domestic agents respond: Neumeyer and Perri (2001)

Set-Up: Firms

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$$R_t = (1 - \rho_r)\bar{R} + \rho_R R_{t-1} + \epsilon_{R,t}$$

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- Rather, factor prices set by

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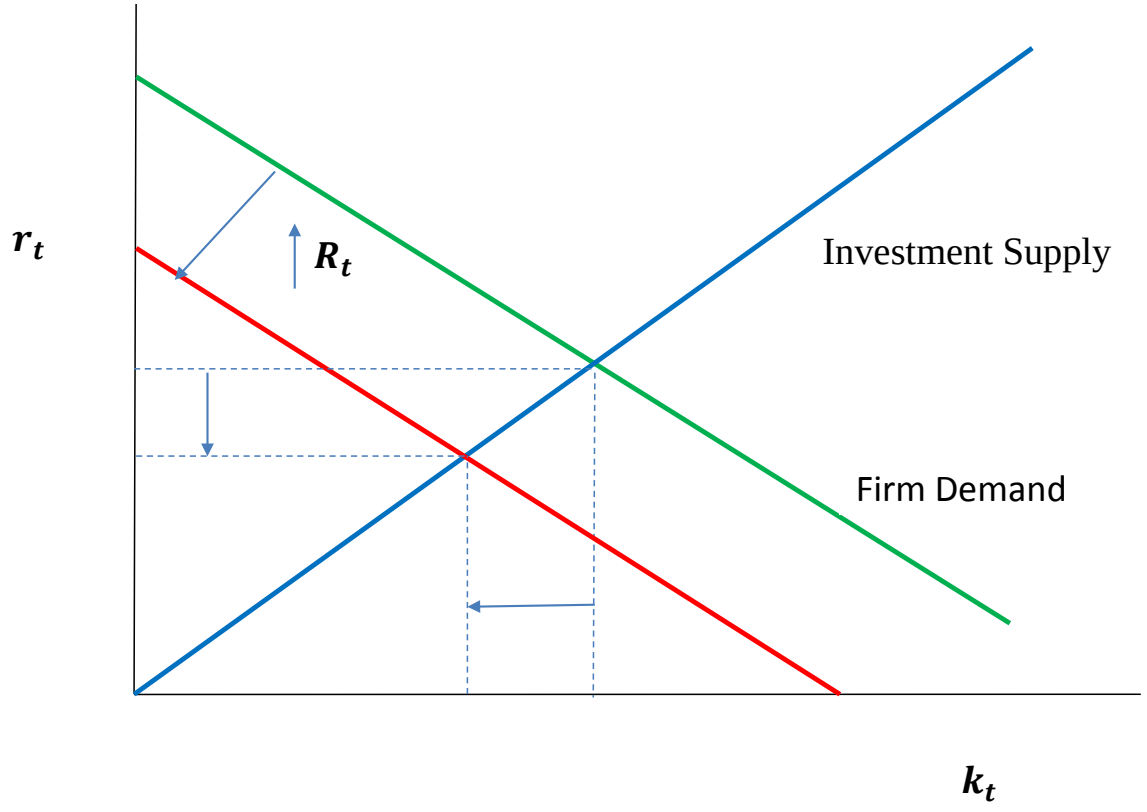

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- Output will definitely fall unless labor supply increases a lot
- Will it?

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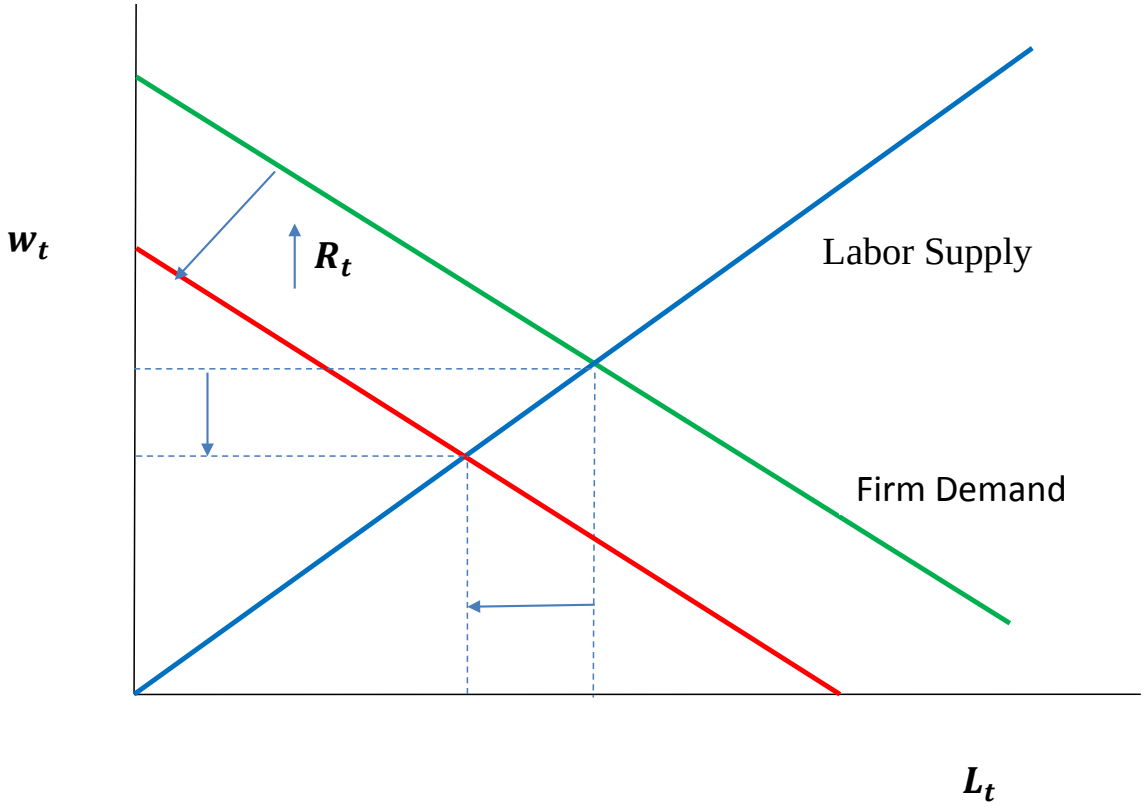
Response to R_t Shock: Labor



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