345 NOTES:

Stock Market Model

Newman

Ch. 7

Stocks

Indiv. $P_S^e = (PDV) = \frac{D_1^e}{(1+i)} + \frac{D_2^e}{(1+i)^2} \cdots \frac{SP_n^e}{(1+i)^n}$

10   1   12 − 10 = 2

10   −   8 − 10 = −2

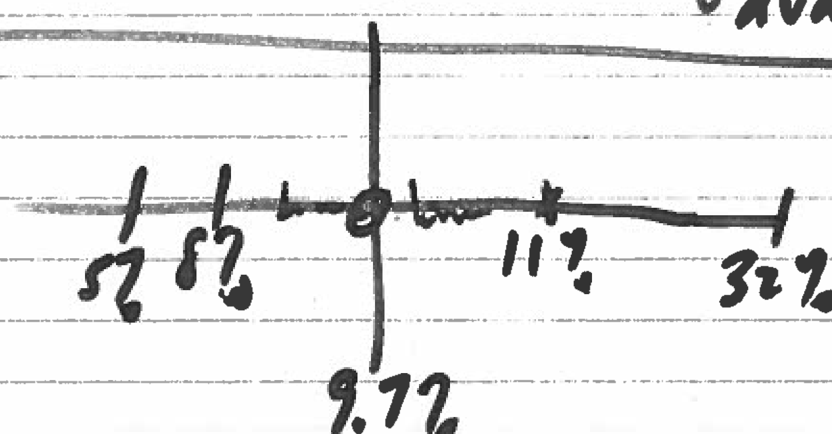
Aggregate   What is P_S?

x : earnings per share for firm

$$P_S = \frac{X_1^e}{(1+i)} + \frac{X_2^e}{(1+i)^2} \cdots \frac{X_n^e}{(1+i)^n}$$

Rational Exp. : agents form expectations given all information available

Σ forecast error = 0

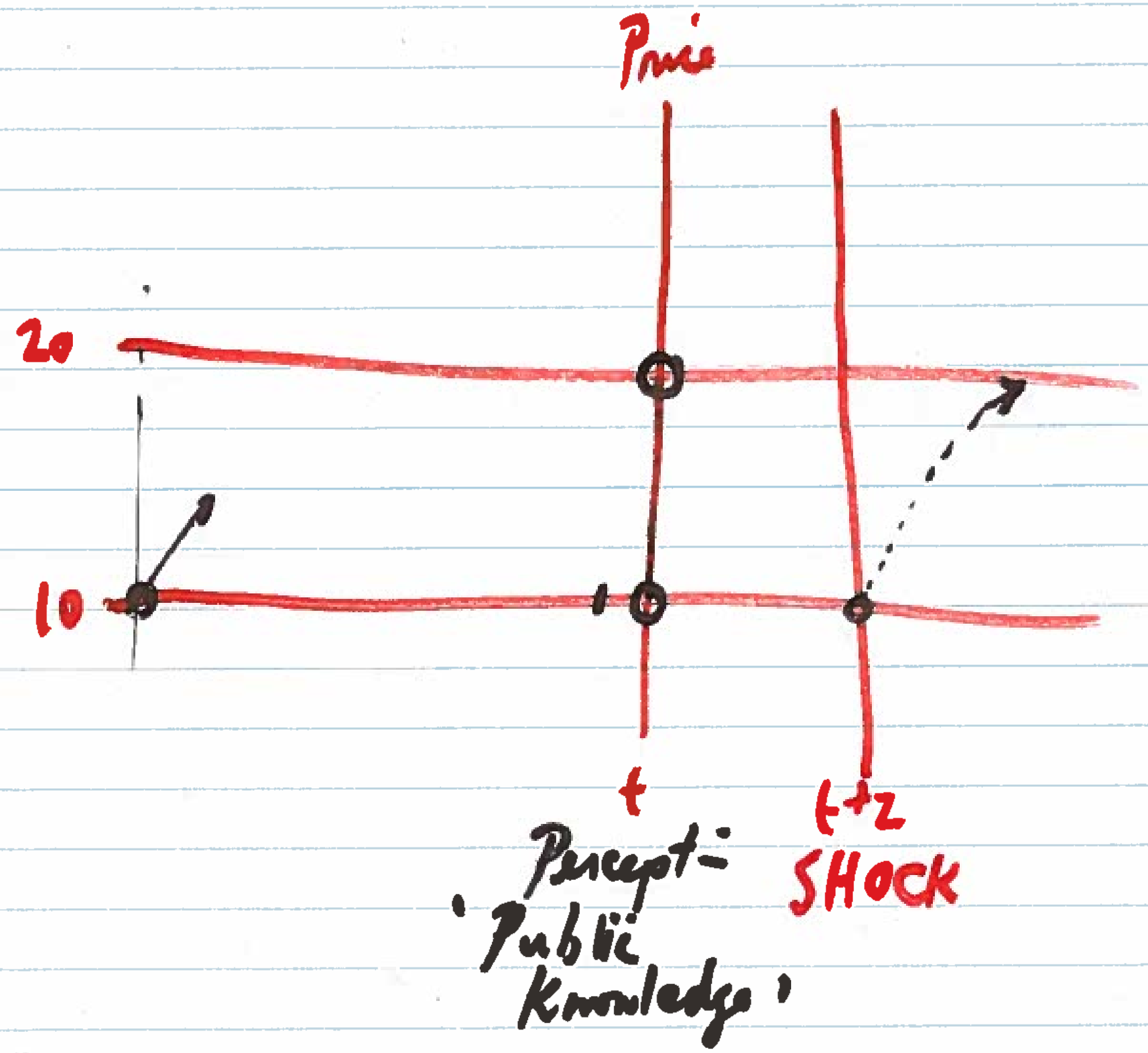


$$P_s = \frac{X_1^e}{(1+i)} + \frac{X_2^e}{(1+i)^2} - - - \frac{X_n^e}{(1+i)^n}$$

Information Set I_t

I_{t+1}

I_{t+2}



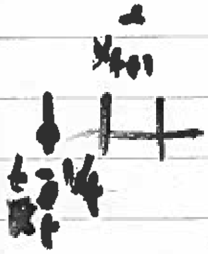
Stock Mkt Model

1. $$P_S = \frac{x_1^e}{(1+i)} + \frac{x_2^e}{(1+i)^2} \cdots \frac{x_n^e}{(1+i)^n}$$

2. How are x^e's formed?

future earnings multiplier

+ −



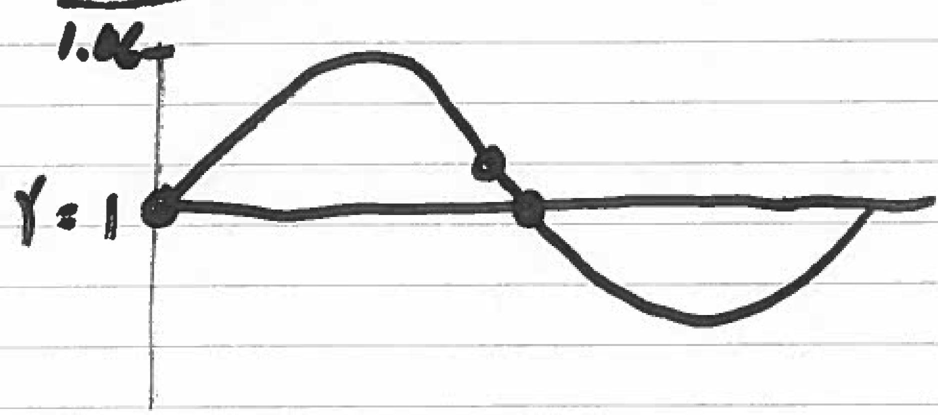
$$x^e_{t+1} = \gamma^e x_t + \alpha(x_t - x^e_t)$$

growth rate

$$x^e_{t+2} = \gamma^e x_{t+1} + \alpha(x_{t+1} - x^e_{t+1})$$

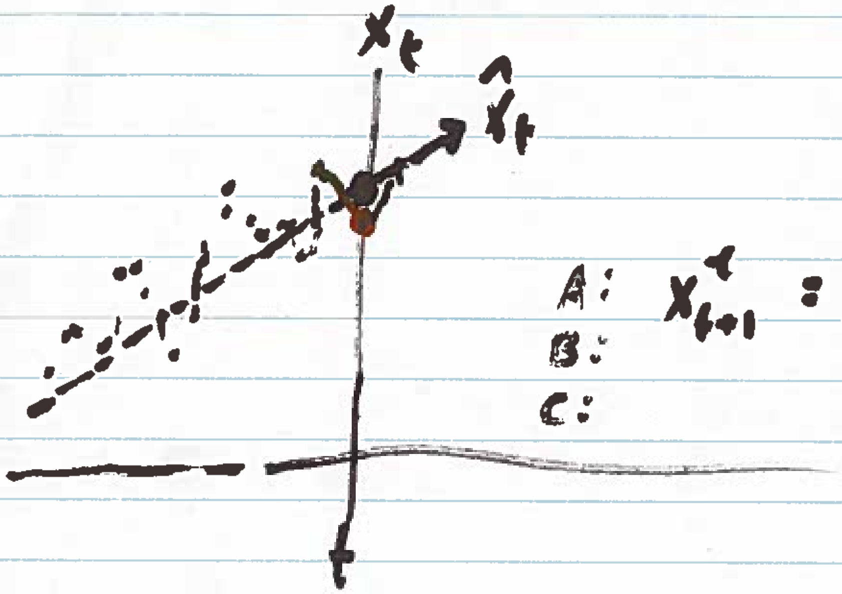
3. $\gamma^e_t = \gamma_t$ Rat. Exp.

4. γ process



Old Firm Economy

- long time series
- no finance problems:



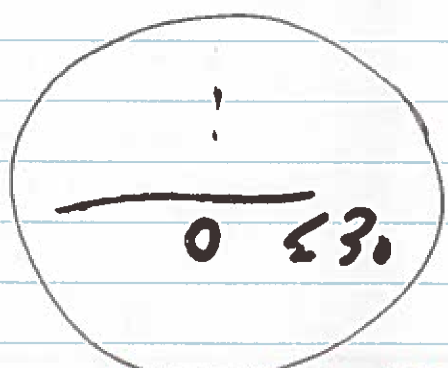
'mean reversion'

A: $x^e_{t+1} = \gamma x_t + \alpha(x_t - x_t^*)$ ⊖

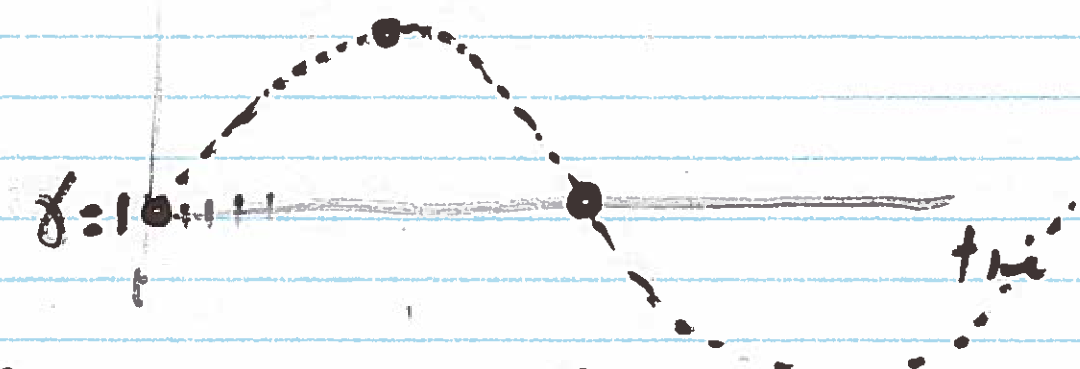
B:

C:

α_{OLD} is small

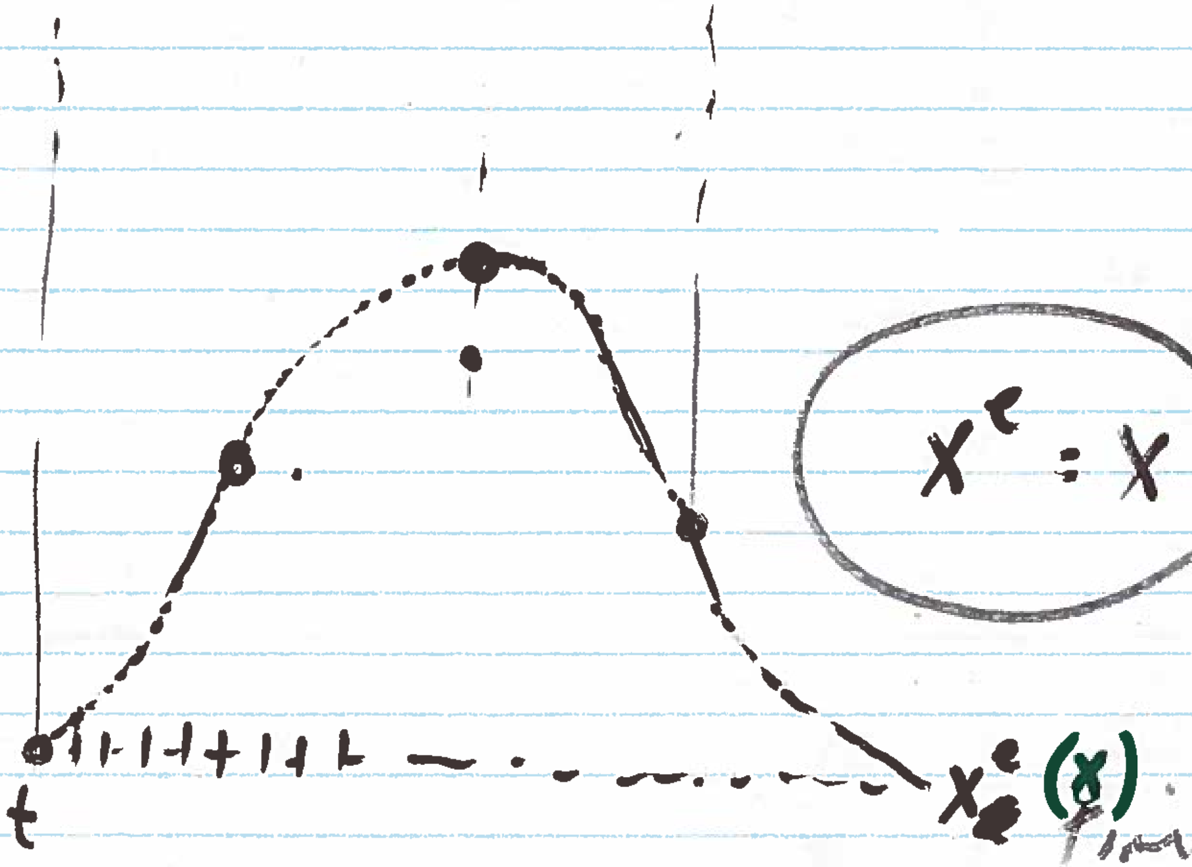


Sum of forecast error = 0



Forecast → $X^e_{t+1} = \gamma^e_t X_t + \alpha_0 (X_t - X^e_t)$

Actual World $X_{t+1} = \gamma_t X_t$



$X^e = X$

plot γ
average 'old'
form

New Firms

Avg. New $x^e_{t+1} = \gamma x_t + \alpha_N (x_t - x^e_t)$ [2]

– are financially-constrained

Old $x^e_{t+1} = \gamma x_t + \alpha_O (x_t - x^e_t)$

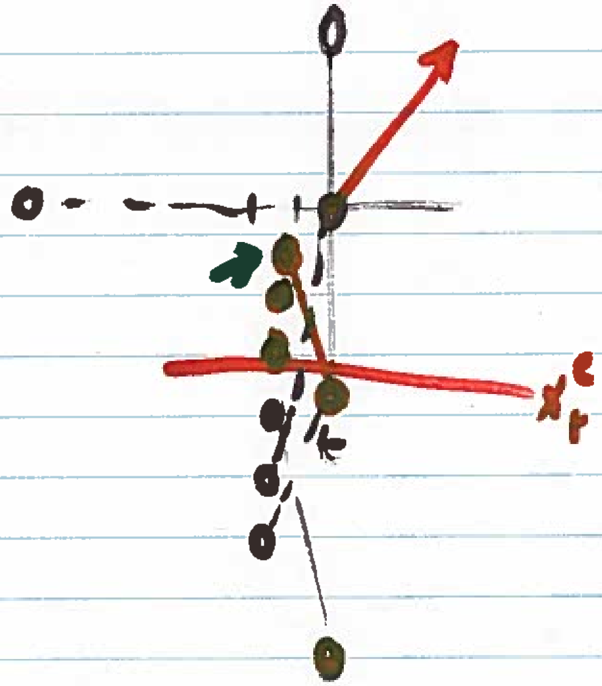
avg Old $x^e_{t+1} = \gamma x_t$ [1]

$$X^e_{t+1} = \gamma X_t + a \alpha_N (x_t - x^e_t)$$

$$\begin{array}{c} \varnothing \quad 1 \\ a = \dfrac{N}{N+O} \\ \varnothing \quad 1 \\ 1 \end{array}$$

NASDAQ

New Firm:



A. $x^e_{t+1} = \gamma x_t + \alpha_N (x_t - x^e_t)$

B.

C.

$\Sigma : \neq 0$

Sum of forecast error not necessarily zero

Aggregation

Old: $X^e_{t+1} = \gamma X_t + \alpha_O (X_t - X_t^e)$

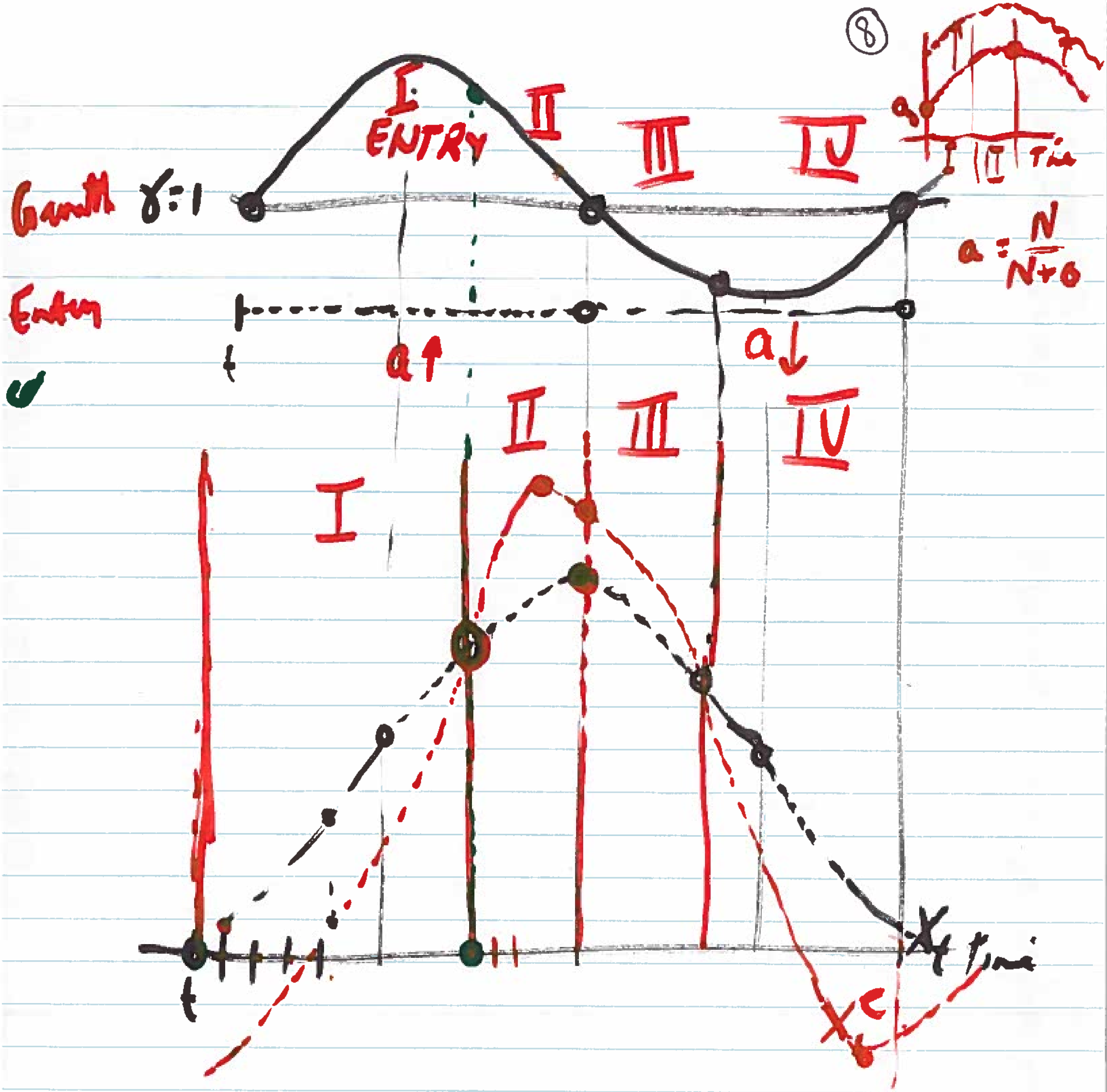
$\Sigma \quad 0$

New $X^e_{t+1} = \gamma X_t + \alpha_N (X_t - X_t^e)$

$\neq 0$

$$a = \frac{N}{N+O}$$

Agg $X^e_{t+1} = \gamma_t X_t + a\,\alpha_N (X_t - X_t^e)$



Tandard $X^e_{t+1} = \gamma_t X_t + a\,\alpha_N (X_t - X_t^e)$

1	>1	↑	+
2	>1	↑	− ✓
3	<1	↓	−
4	<1	↓	+ ✓

Stock Mkt: Model Results

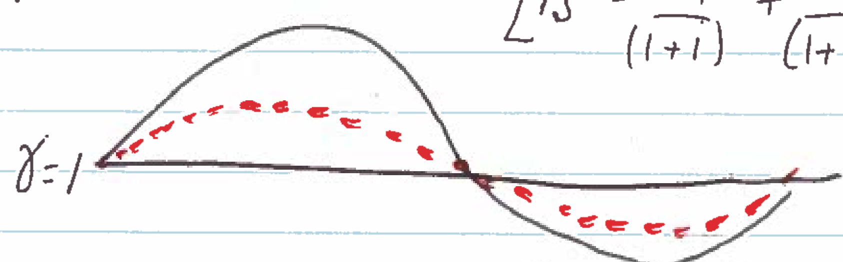
$$[X^e_{t+1} = \gamma X_t + a\alpha_N(X_t - X^e_t)]$$

A. There are consistent departures from 'rational' pricing, but we are closer to 'rational' pricing in a recession, (a is lower) especially in Phase IV

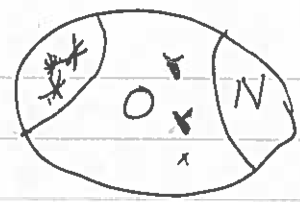
B. Stock prices ($X^e_{...}$) are more volatile for emerging market than advanced economies
(new economies have fewer established firms; a is higher)

C. A one-time entry shock which is not repeated converges to 'rational' pricing as time passes
(a jumps up, but falls to 0 as new firms become old)

D. If policy makers are risk averse, they will attempt to smooth the cycle: pull back the top and cushion the bottom $\left[P_S = \frac{X^e_1}{(1+i)} + \frac{X^e_2}{(1+i)^2} - - - -\right]$



Raise interest rates to do this. When?



E. Financial Crisis

When large banks and 'established' firms become financially fragile, they place financial constraints on many firms that would not face any financial constraints otherwise.
This is the property of an aggregate CREDIT FREEZE, that makes some 'old firms' like 'new firms' in terms of financing constraints

Implication (1) Financial crises can be seen as $a \uparrow$

(2) Later credit freeze $\Rightarrow$ $\downarrow \gamma$
$\downarrow$ Investment

Why did stock prices ~~[illegible]~~ tumble so much in late 2008? Assume that economy just entering Phase II

$$X^e_{t+1} = \gamma X_t + a\alpha_N \underbrace{(X_t - X^e_t)}_{\ominus}$$

If $(X_t - X^e_t) < 0$, $a\uparrow$ and $\gamma\downarrow$ put extra downward pressure on X^e.

Big Question:

Explain why $\Sigma(x_t - x_t^e) \neq 0$ for NEW firms.
i.e. Rat. Expectations does not hold.

(1) Limited info on new firms does not rule out Rational Expectations

(2) Need something which creates an aggregate information 'distortion'.

Answer:

GAME between analyst + new firm is the answer.

In aggregate, the information released to analysts in evaluating new firms is not correct.

(a) new firms distort information to get finance

(b) analysts themselves distort performance of new firms by the earnings forecasts they make.

Stock Mkt. Model : ADVANCED

So far we have the analyst's forecasting equation

$$X^{e}_{t+1} = \gamma X_t + a\,\alpha_N (X_t - X^e_t) \quad [1]$$

But, we need the process that actually determines X_{t+1}. This will depend on $(X_t - X^e_t)$ too, since if avg. firm has the term positive, then 'cheap' finance, and earnings ~~[illegible]~~ can expand more quickly. If $(X_t - X^e_t)$ is ⊖, then 'expensive' finance, and earnings growth is constrained.

Write 'actual earnings':

$$X_{t+1} = \gamma X_t + a\,F(X_t - X^e_t) \quad [2]$$

If $(X_t - X^e_t) = 0$, there is no effect on X_{t+1}

> 0 " ⊕ - - -

< 0 " ⊖

— Note: if $a = 0$, $\gamma^e = \gamma$, where X is 'aggregate'

then $X^e_{t+1} = \gamma X_t$ [1]

$X_{t+1} = \gamma X_t$ [2]

and $X^e_{t+1} = X_{t+1}$ always

— Also, if analysts knew the RHS of [2]: $aF(x_t - x_t^e)$ then they could simply substitute into RHS of [1] ⇒ Full Rational Expectations, both old + new firms.

It is the 'game' which stops analysts from knowing $F(x_t - x_t^e)$

— To get the right crossing slopes between Phase I and II, and between III and IV we must place restrictions on the size of RHS terms.

The following works (all values are absolute values):