

# Risk Shocks

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*The Causes and Macroeconomic Consequences of Uncertainty*  
Dallas Fed, October 3, 2013

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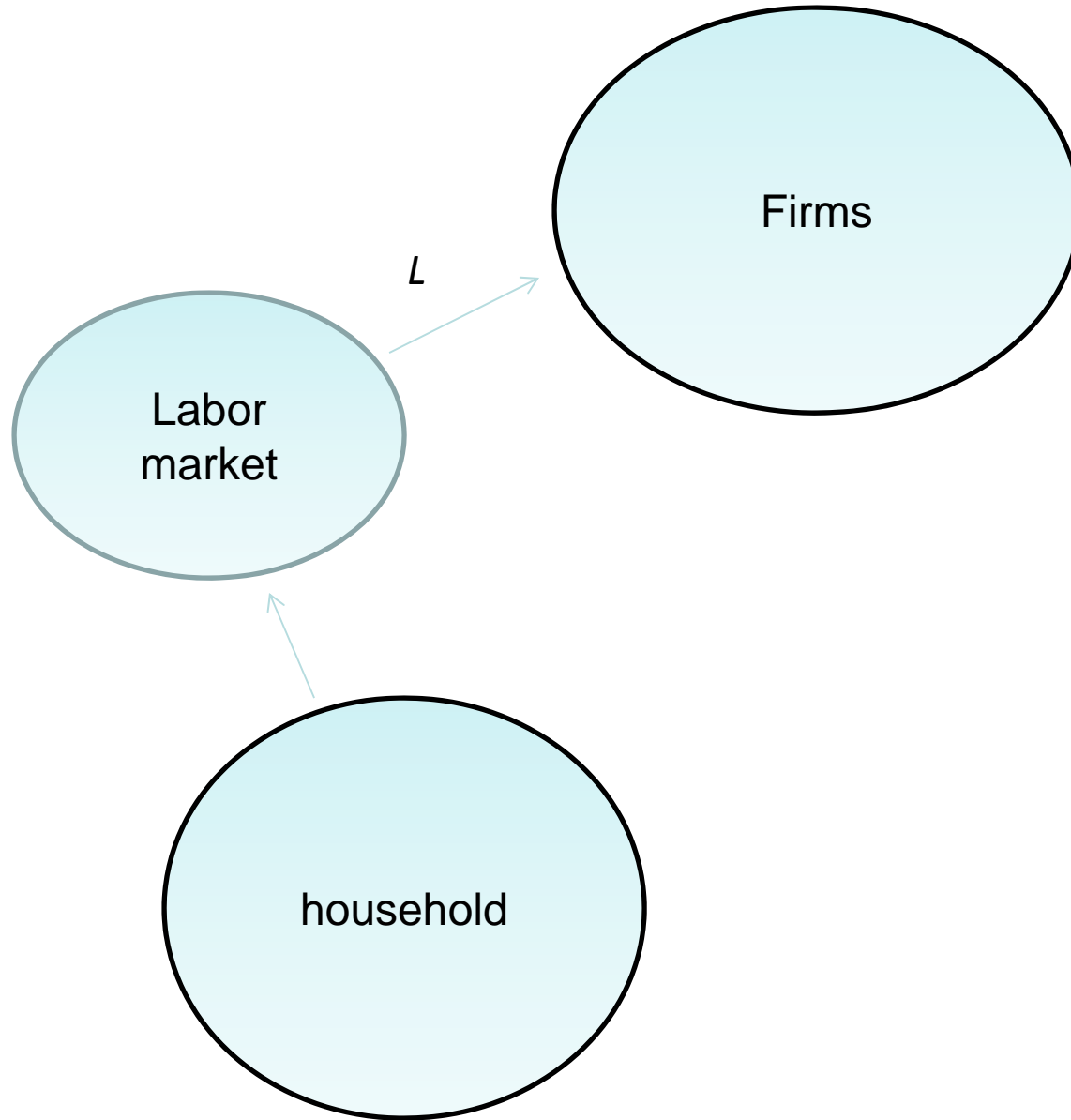
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- Model used in analysis:
  - A DSGE model, as in Christiano-Eichenbaum-Evans or Smets-Wouters
  - Financial frictions along the line suggested by BGG.

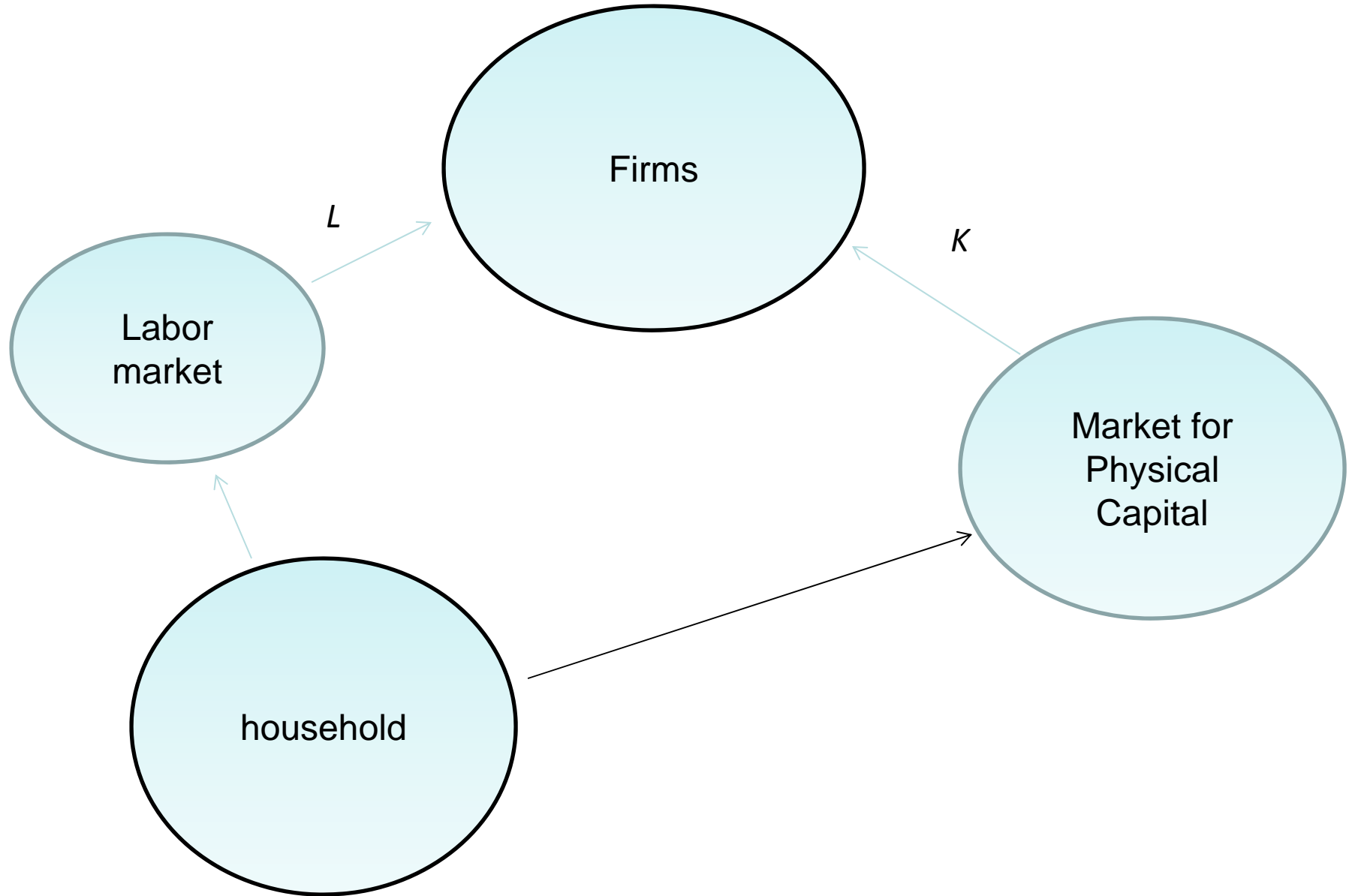
# Outline

- Rough description of the model.
- Estimation results.
- Explanation of the basic results.

# Standard Model

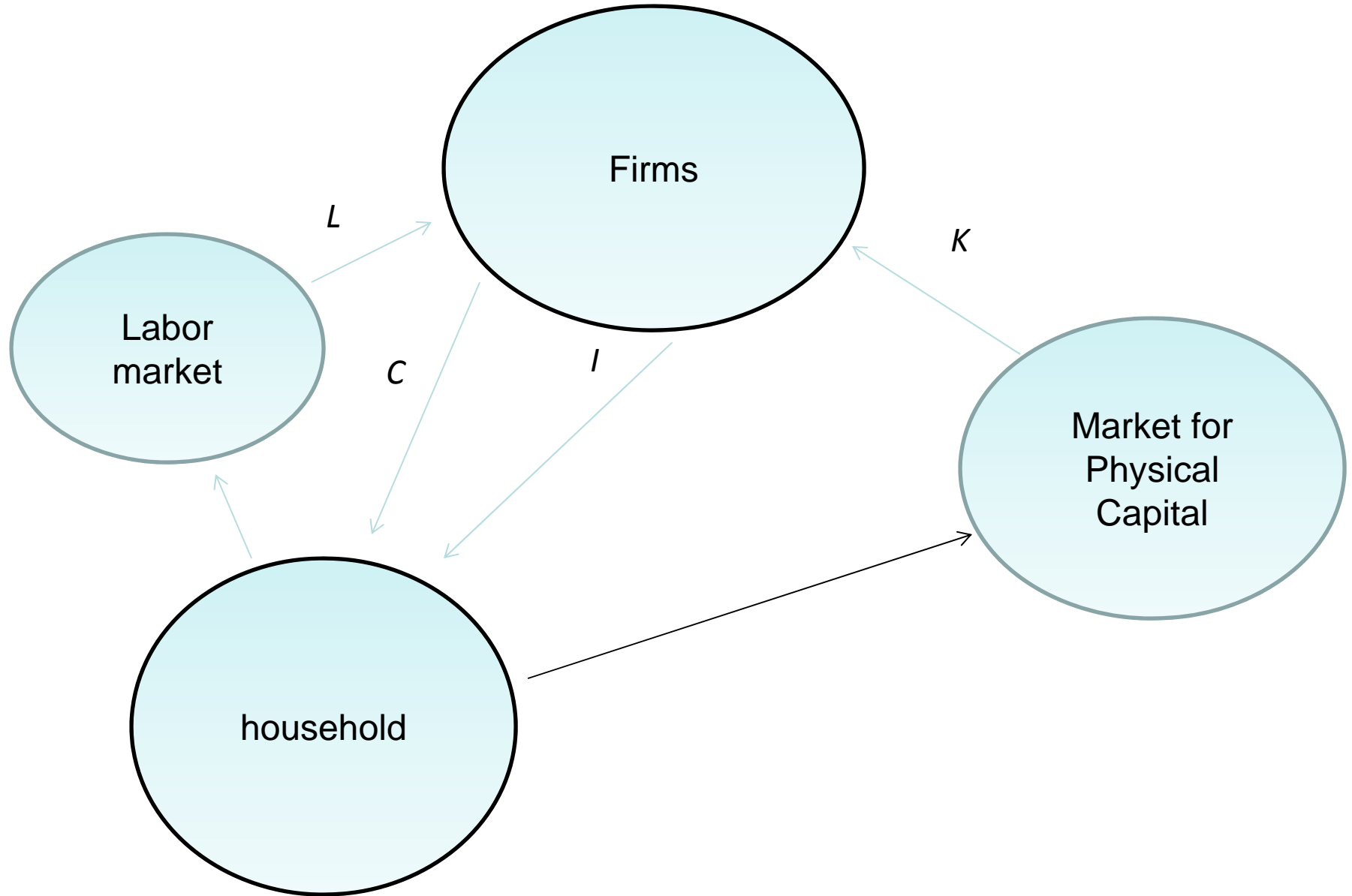


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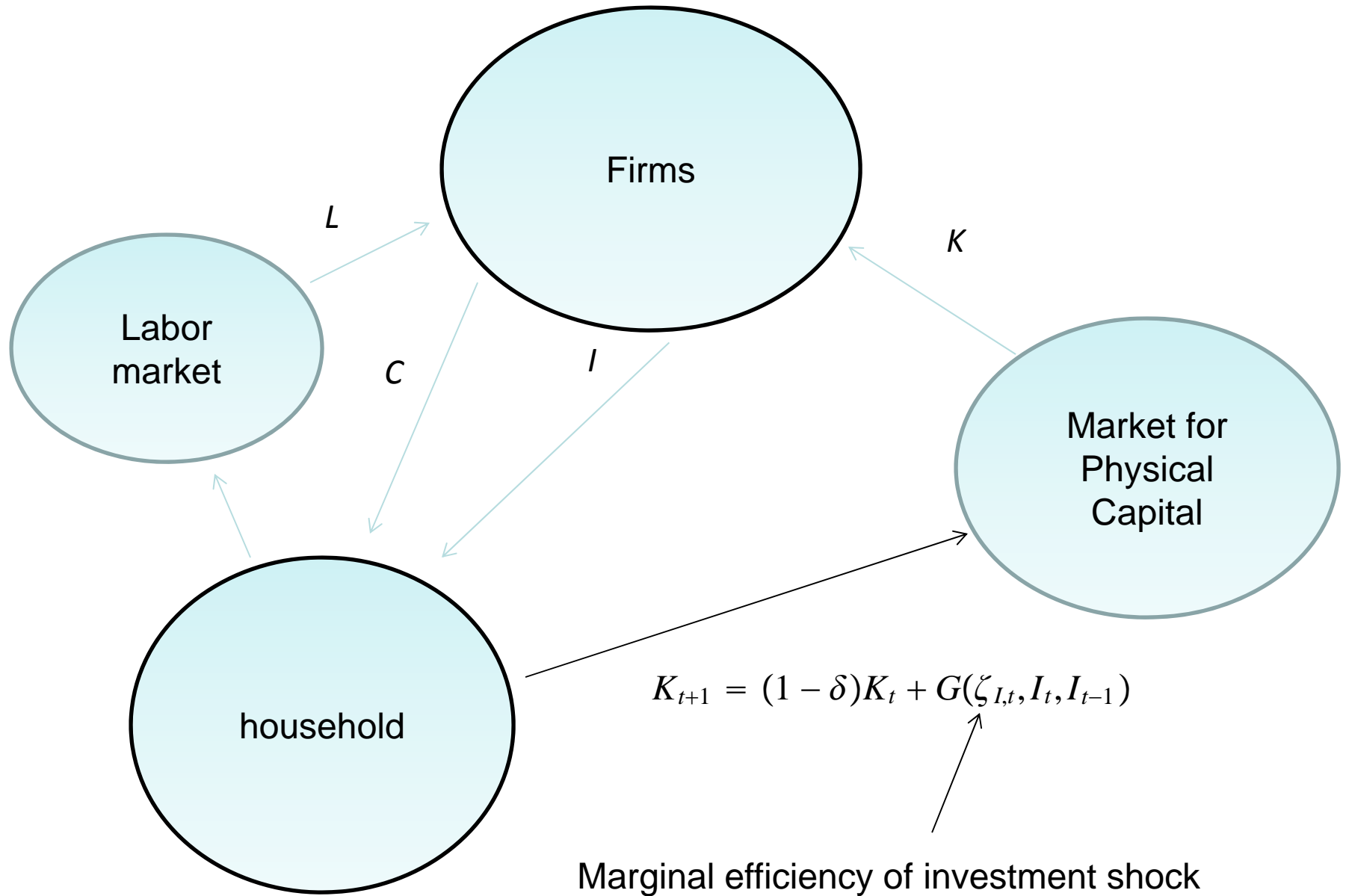




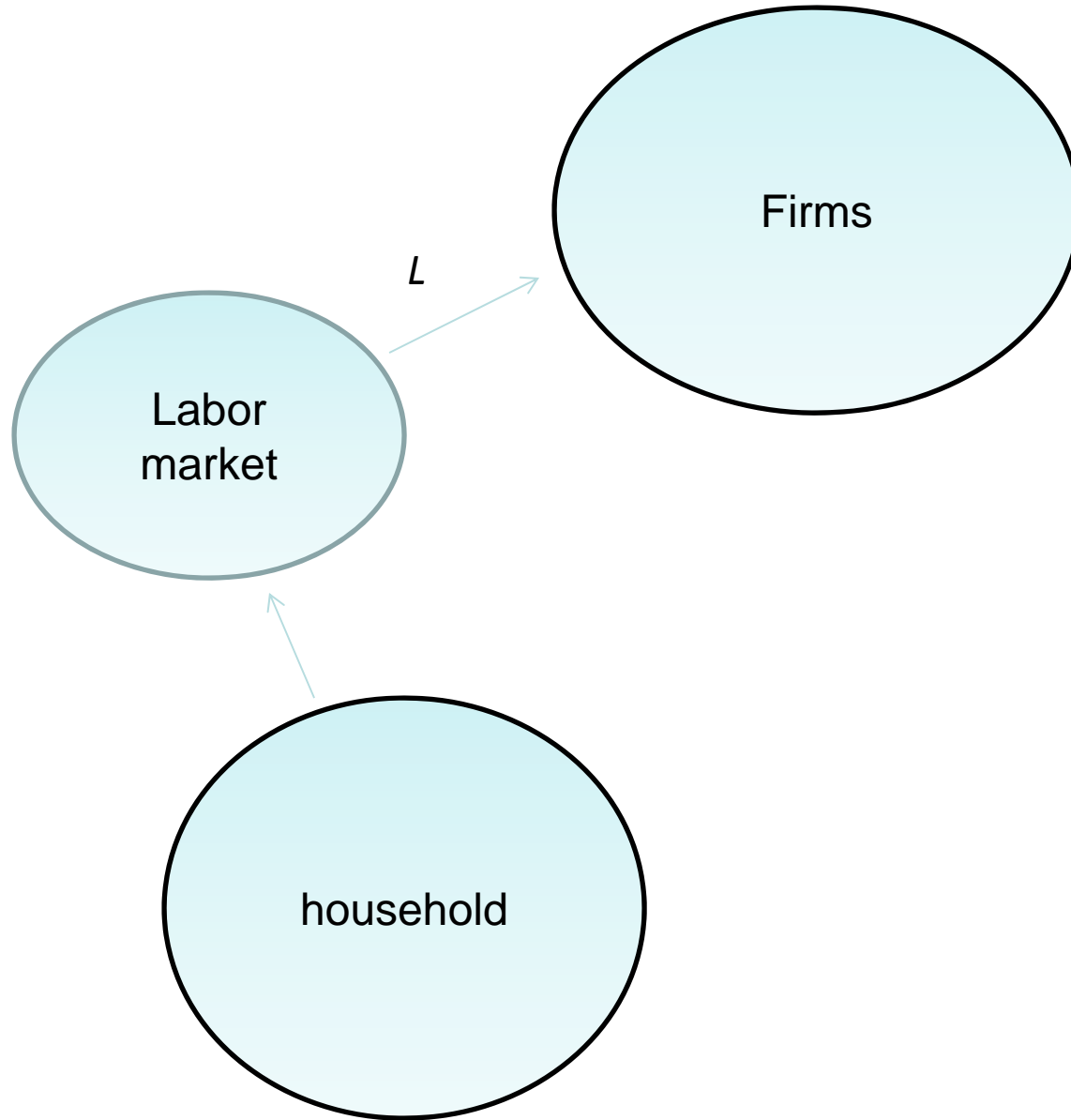
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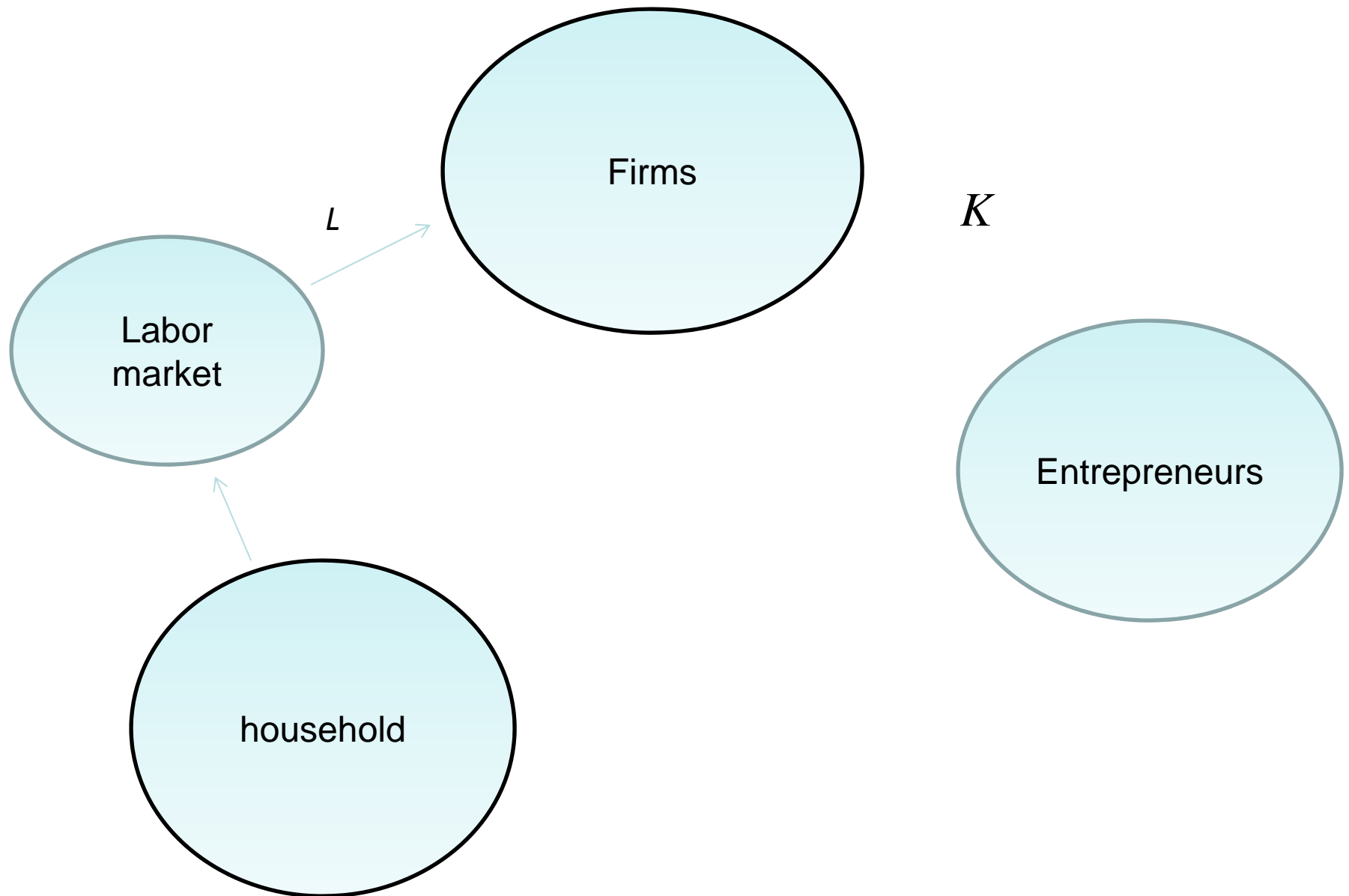
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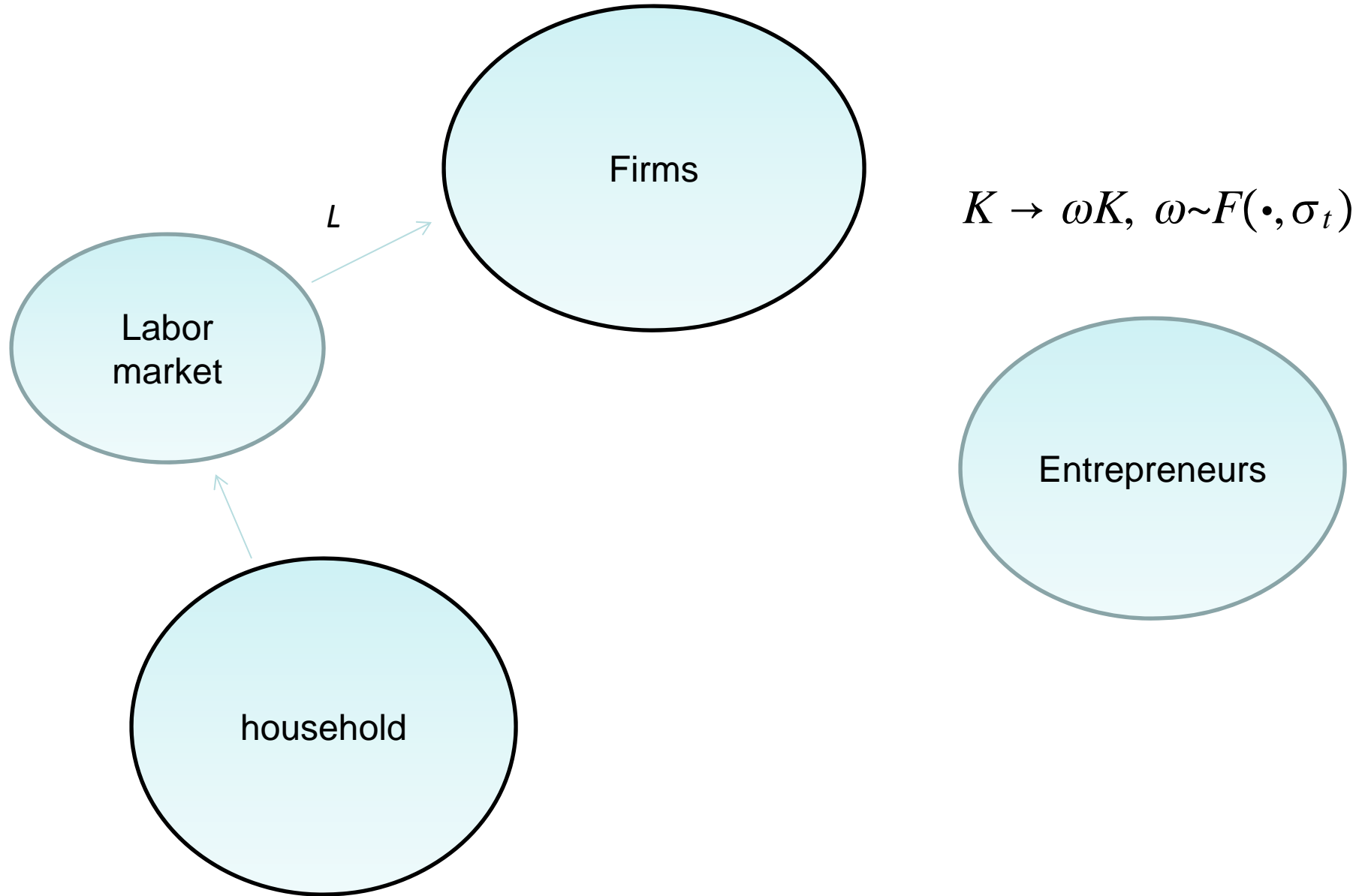
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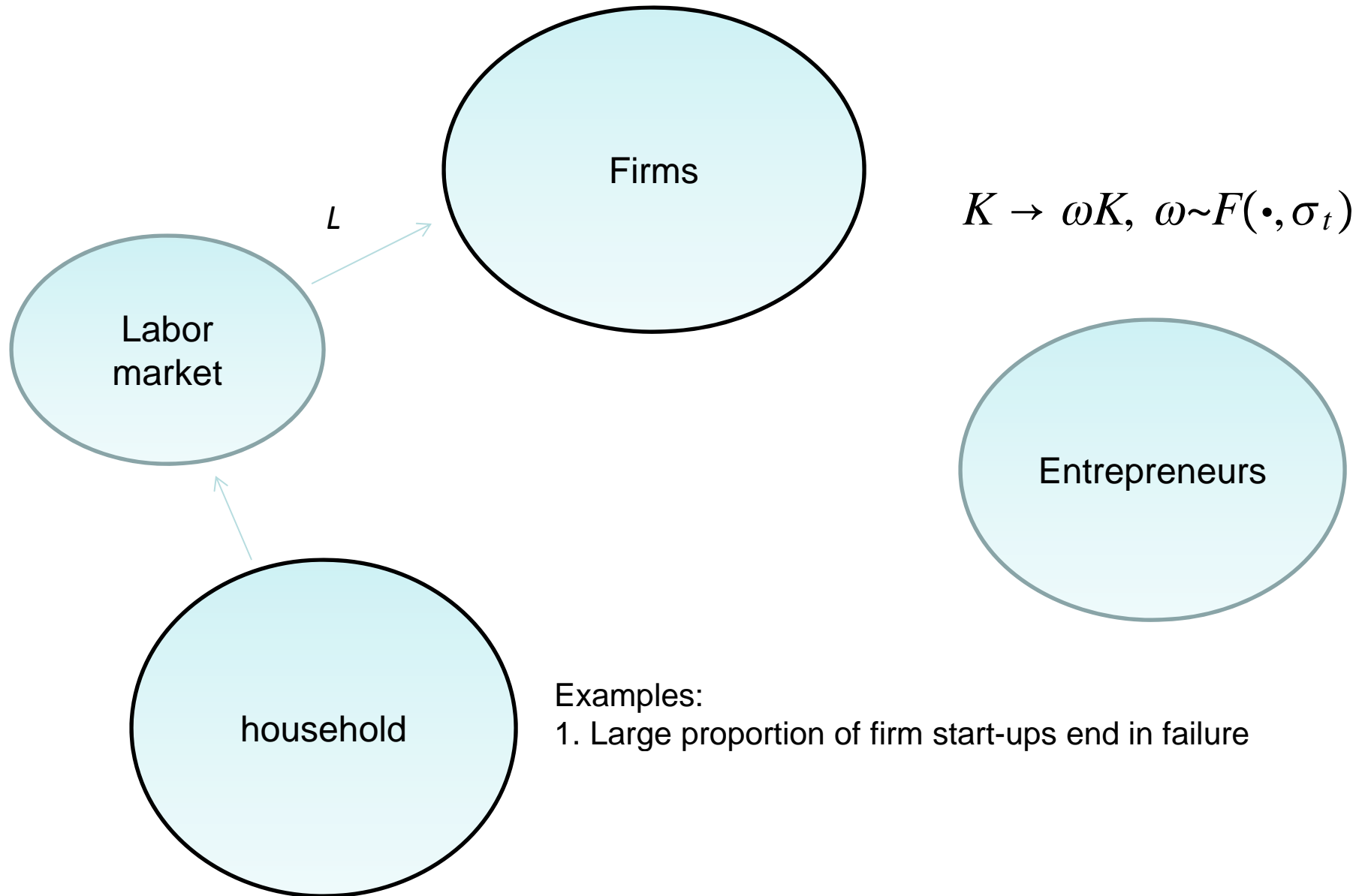
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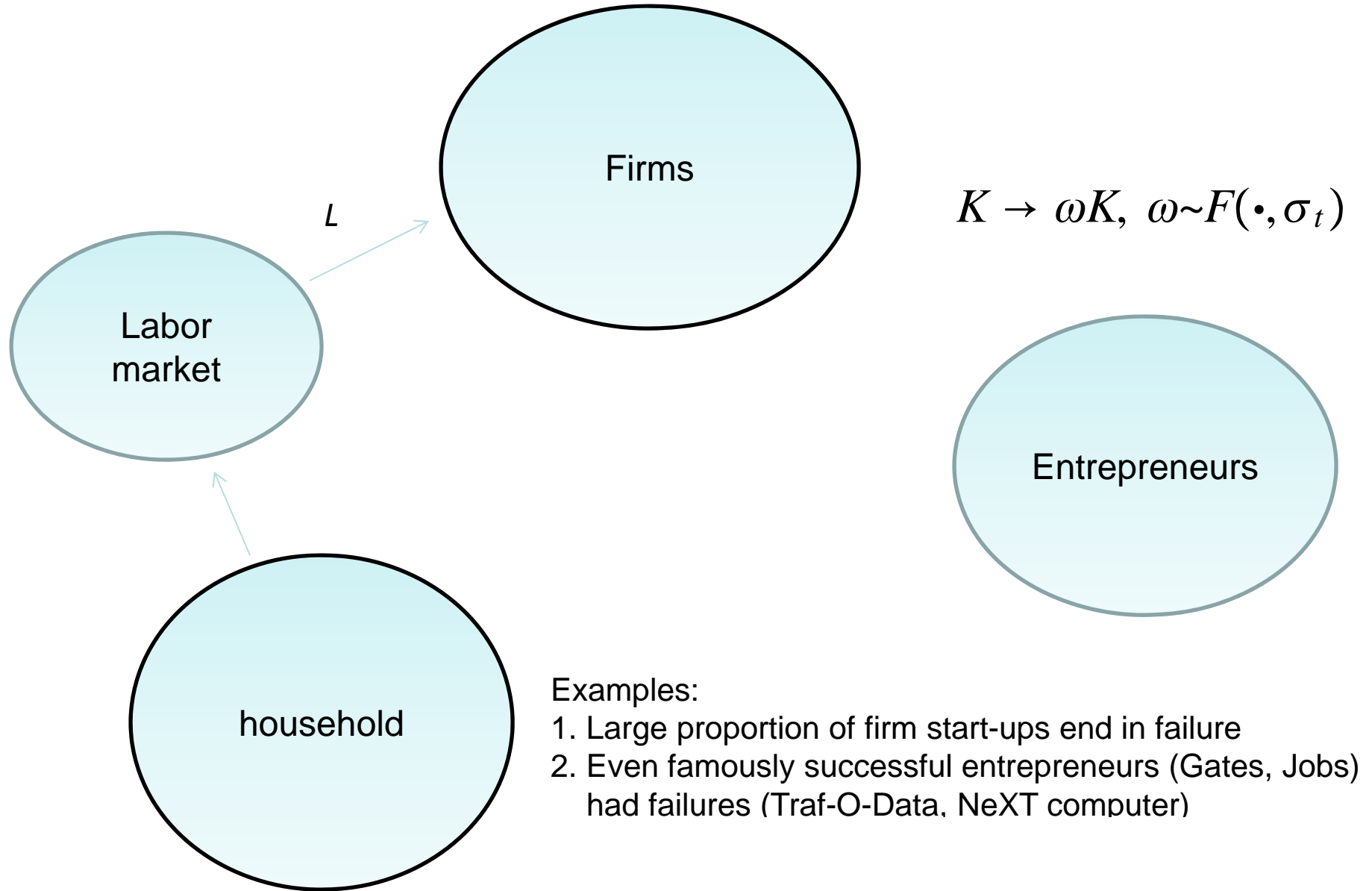
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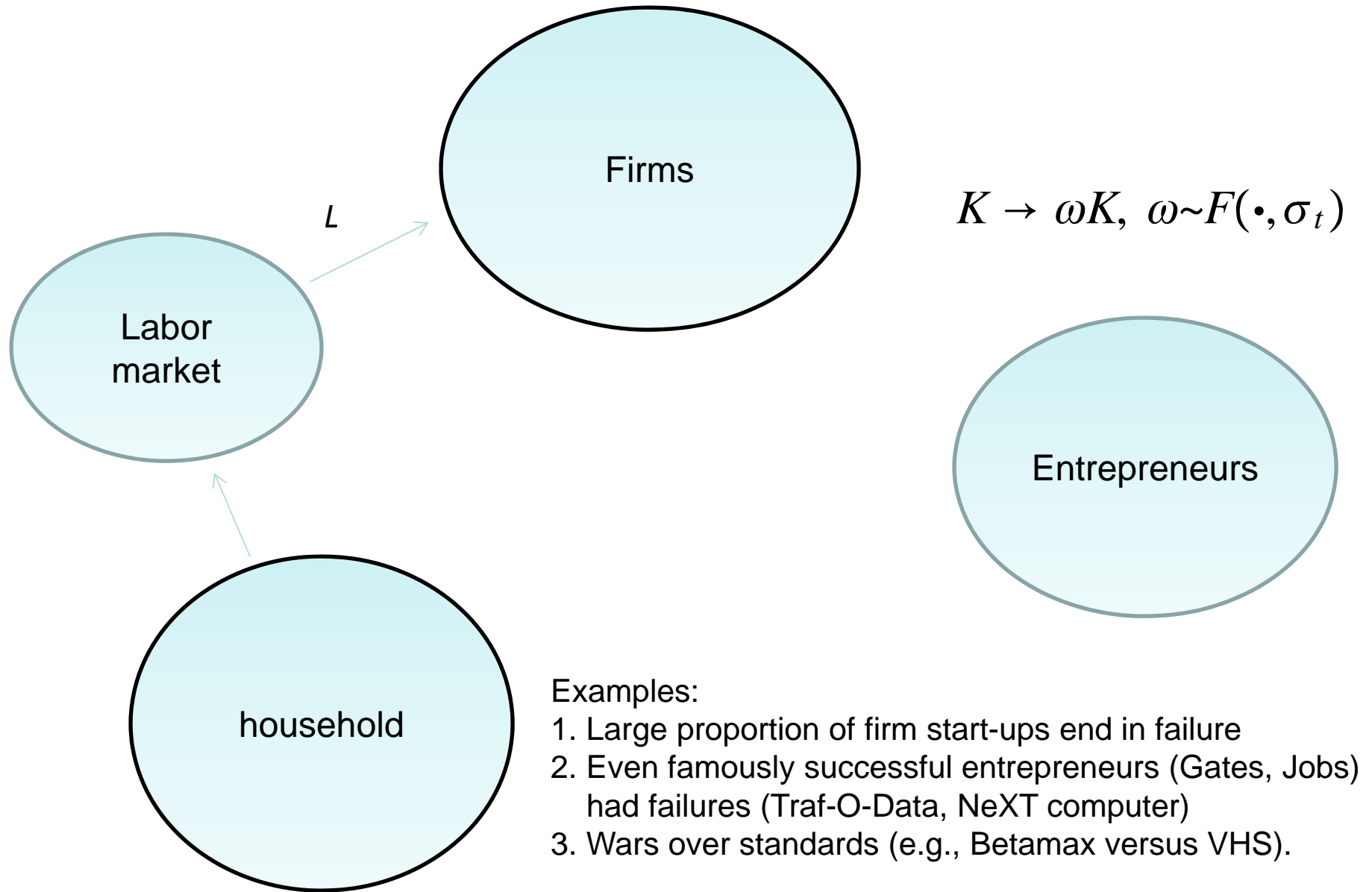
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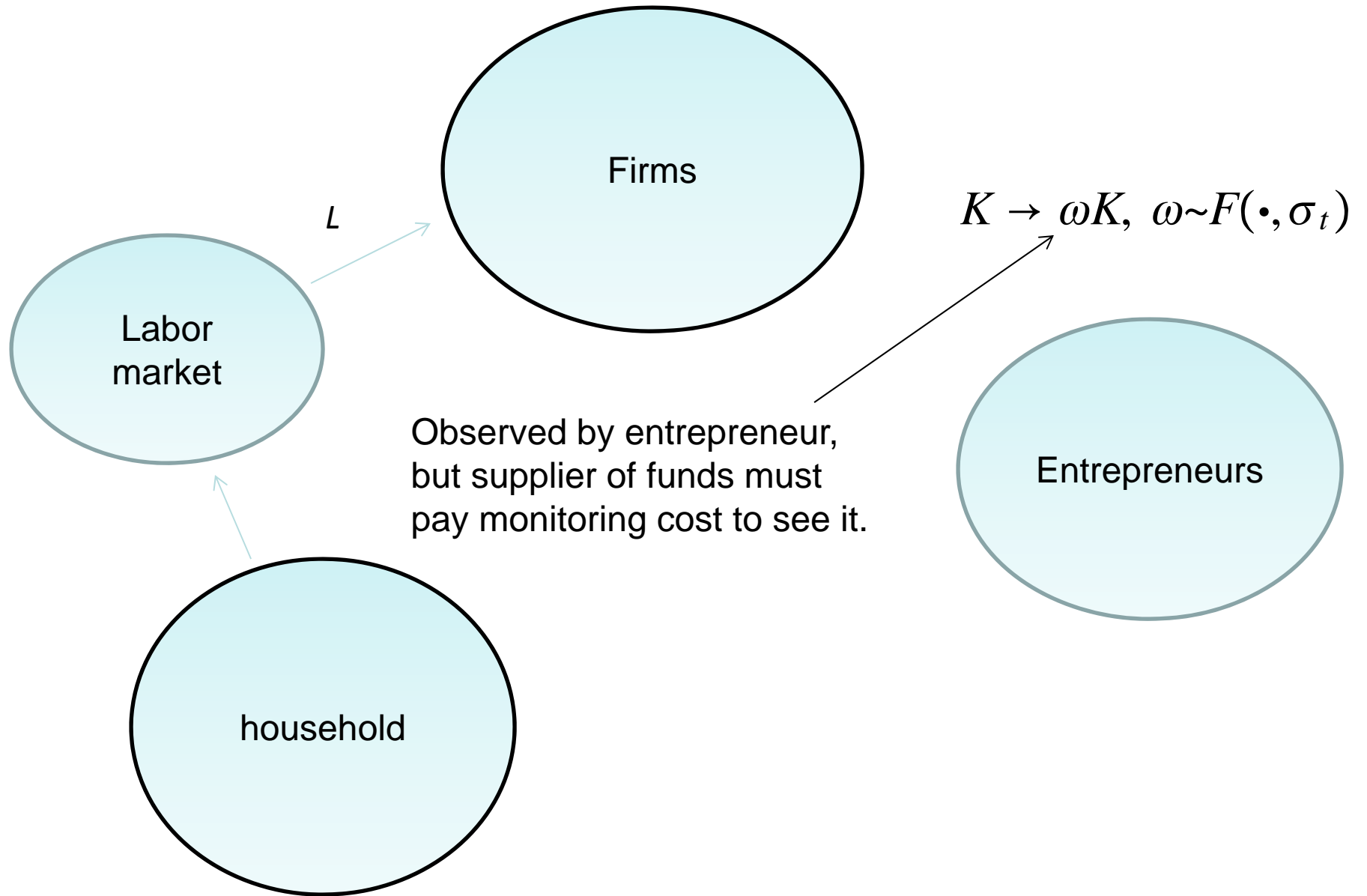


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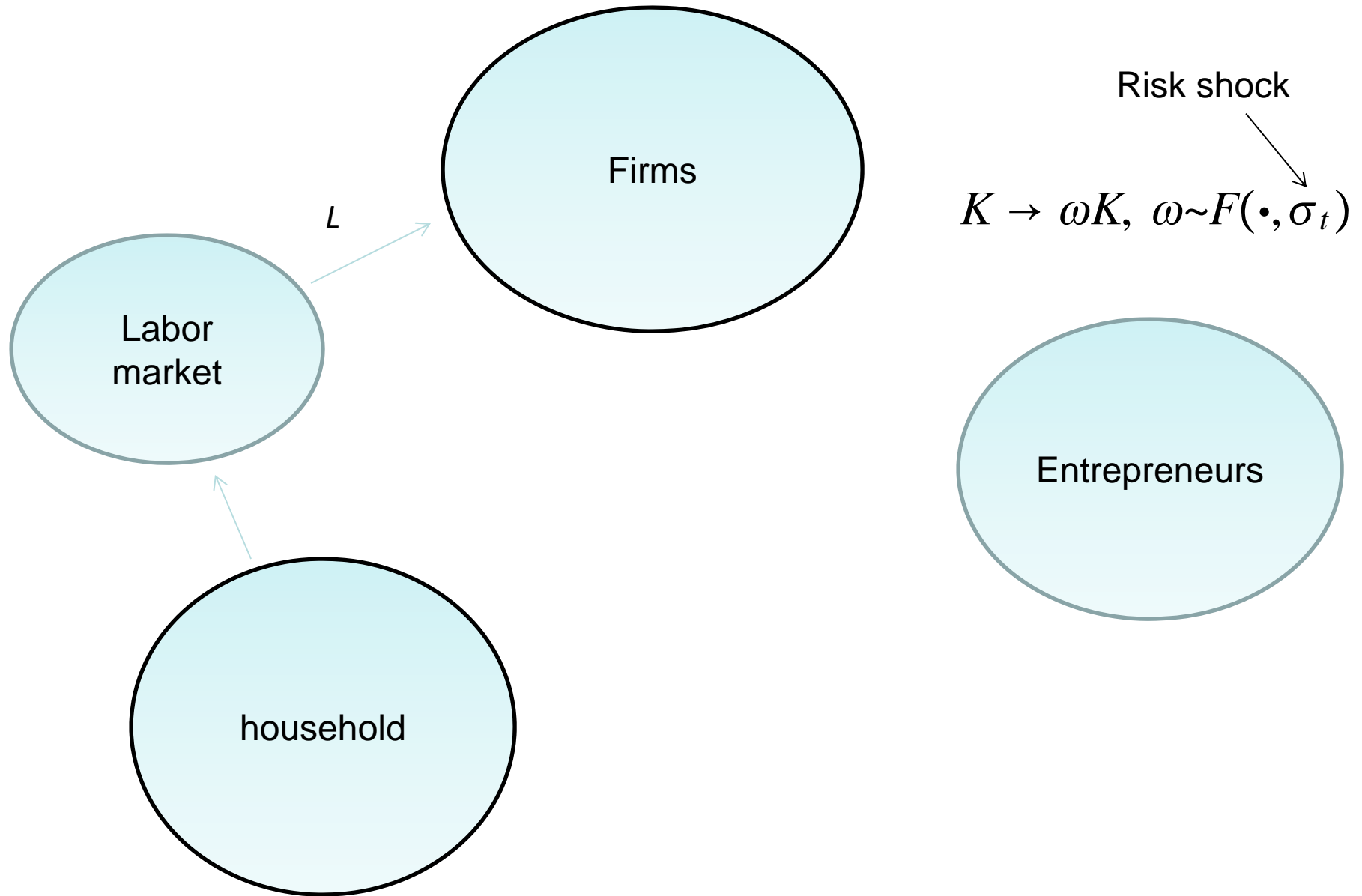




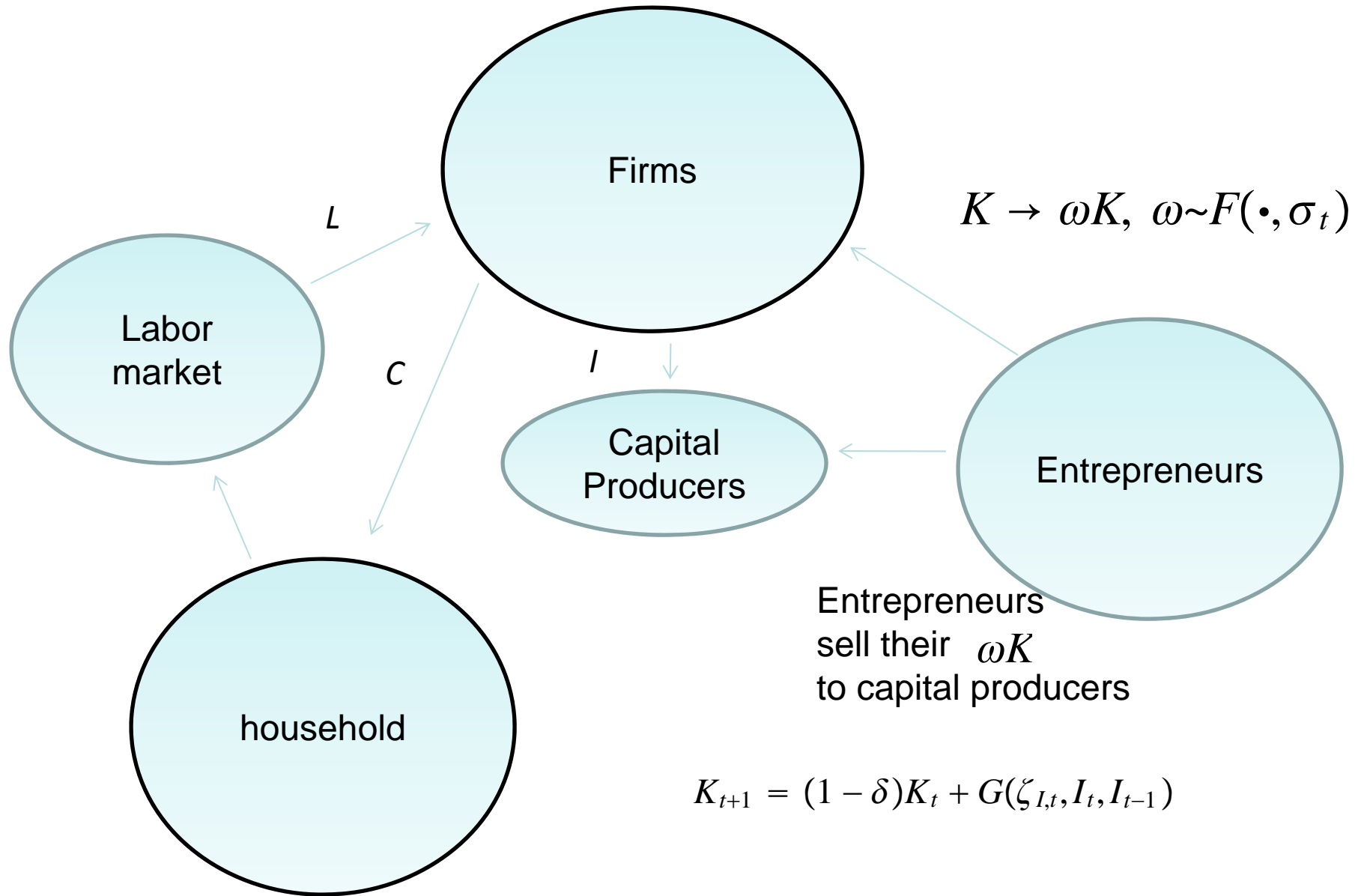
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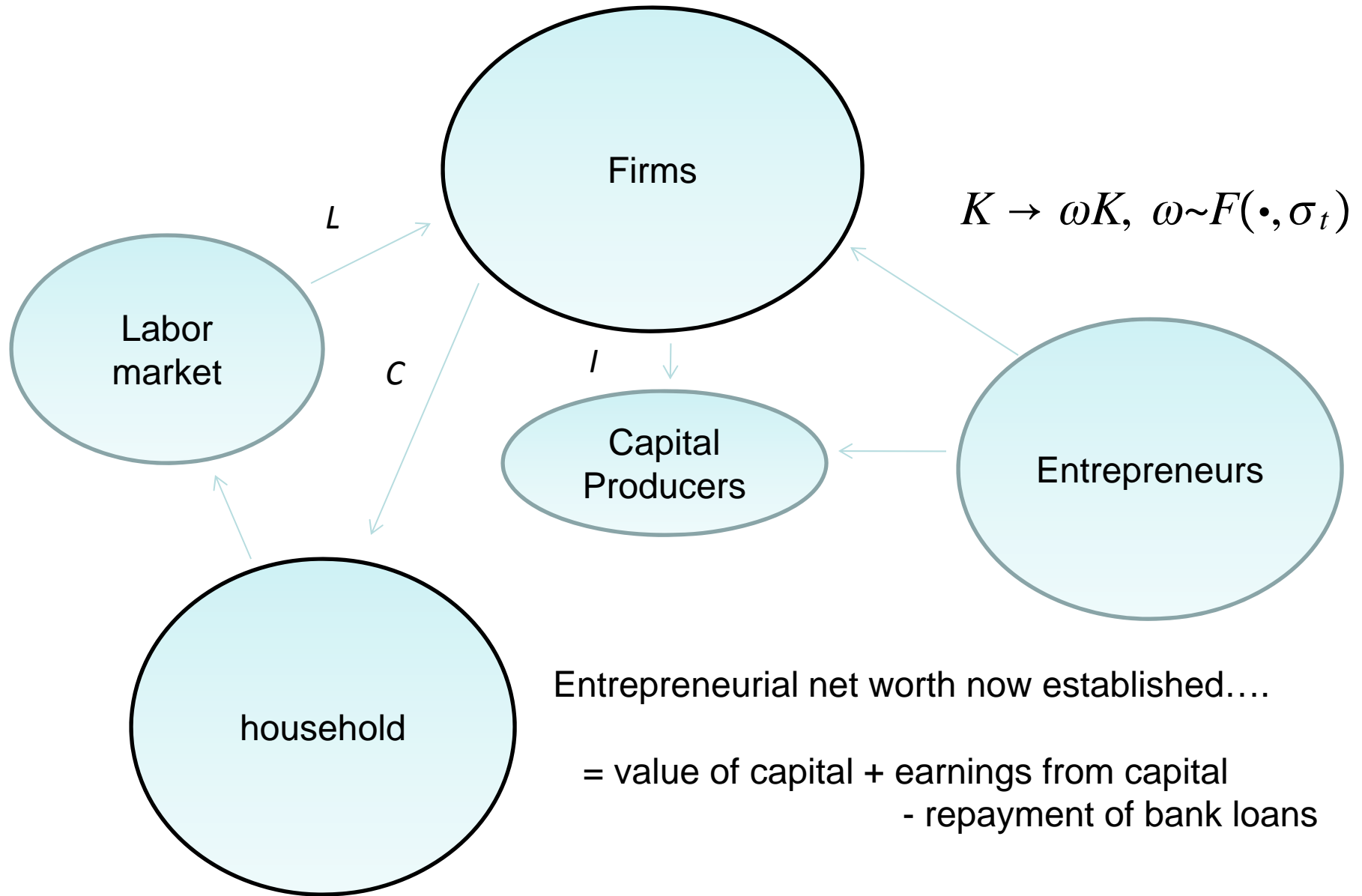
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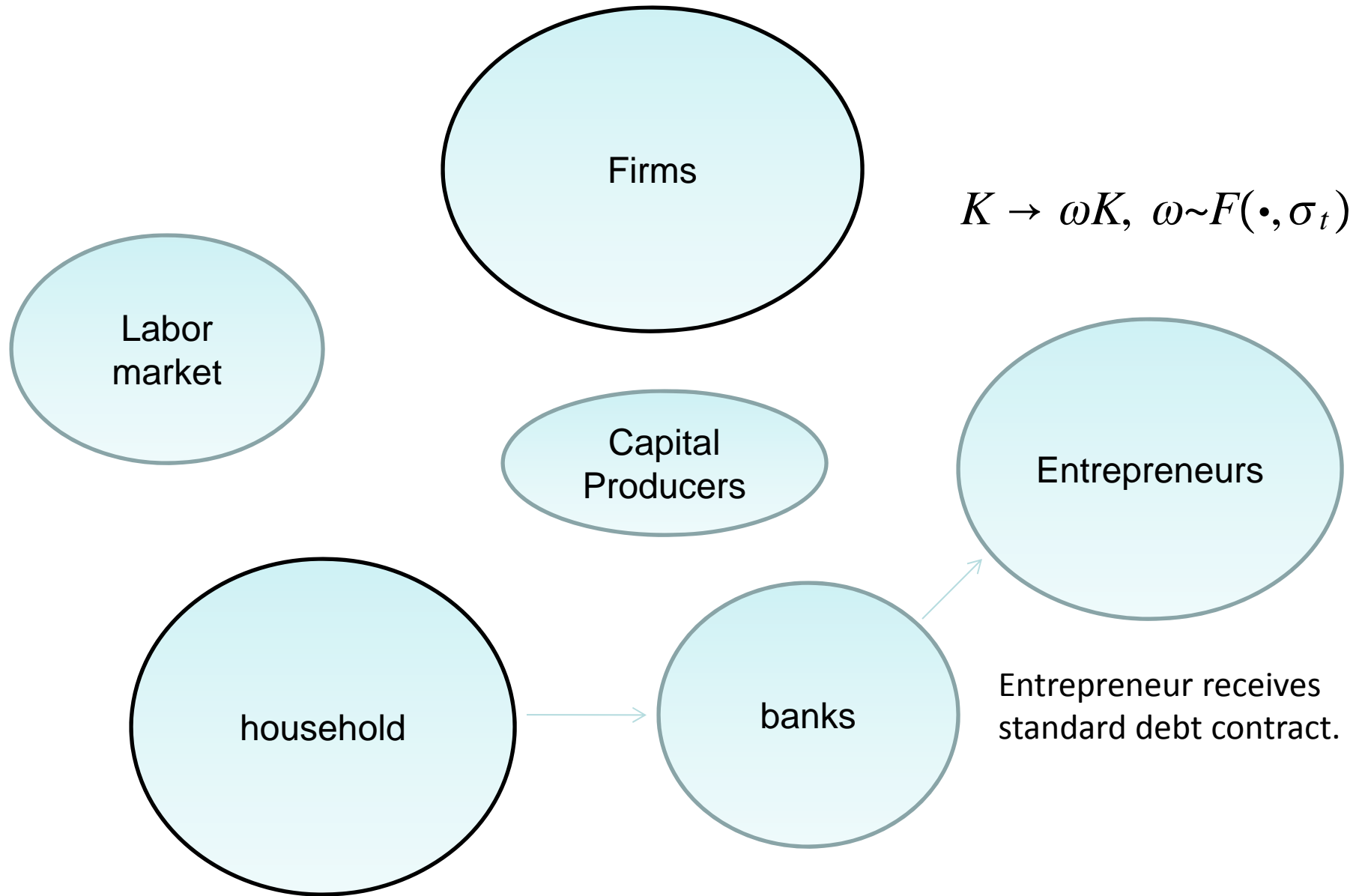
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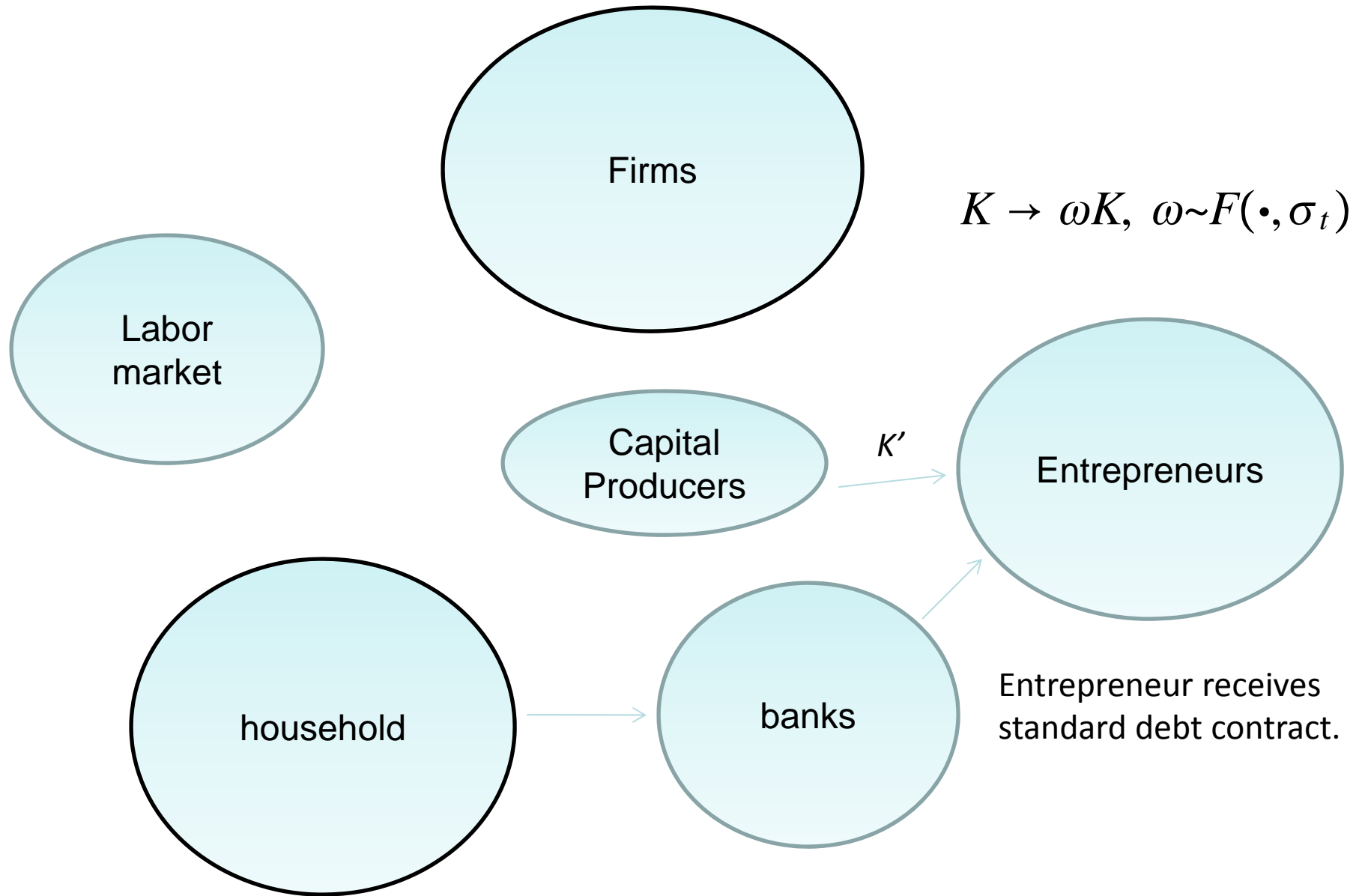
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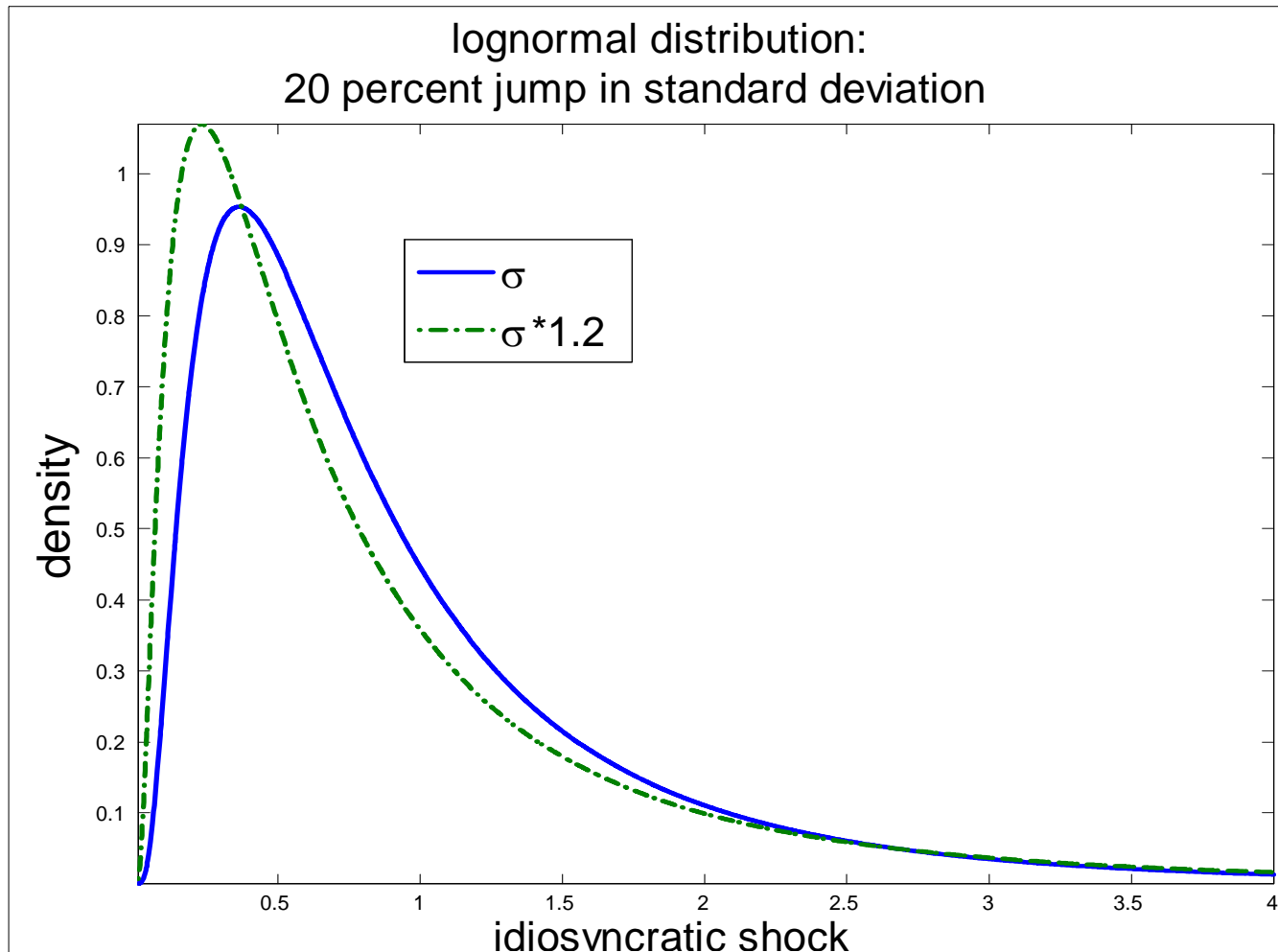


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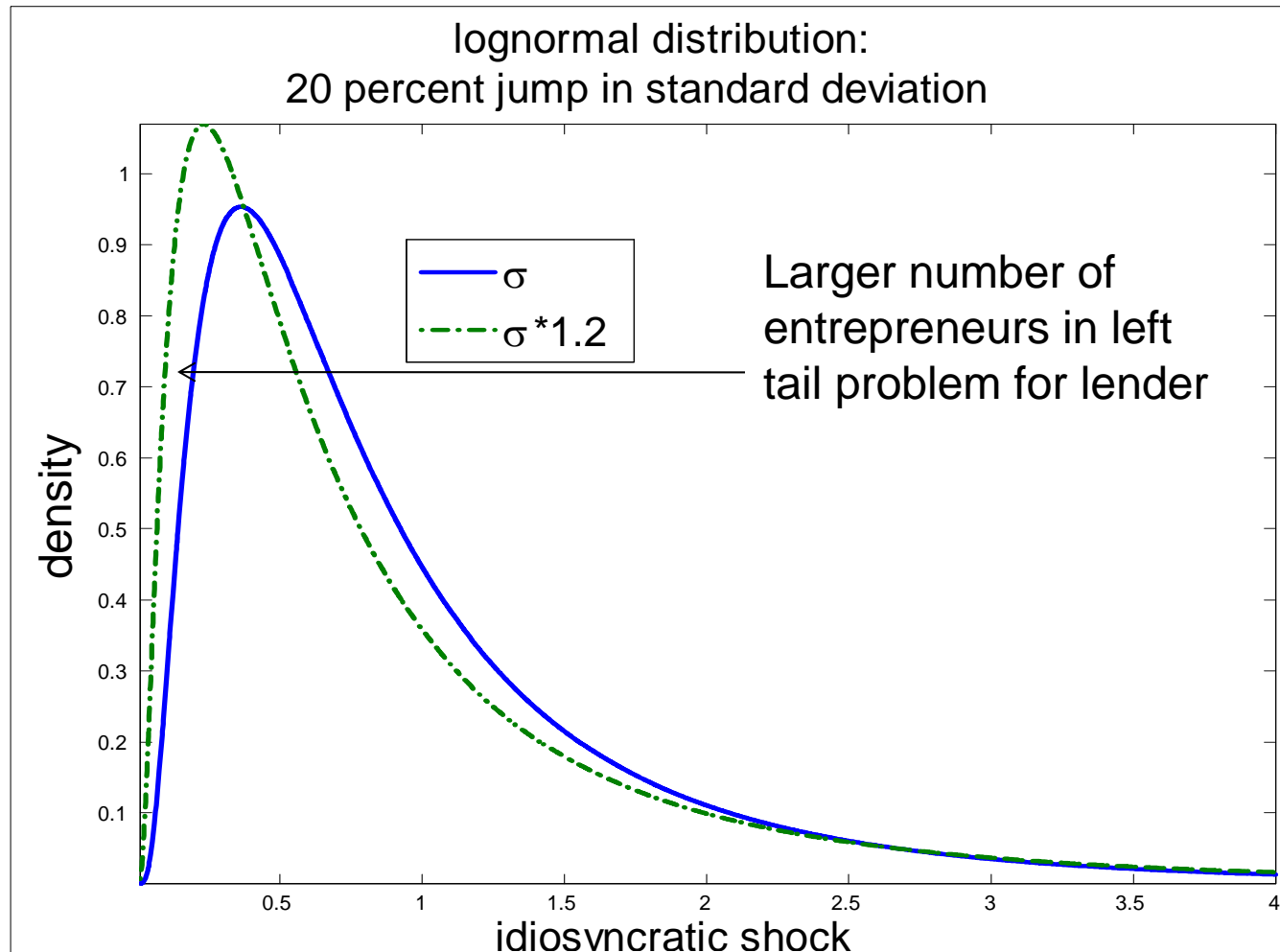
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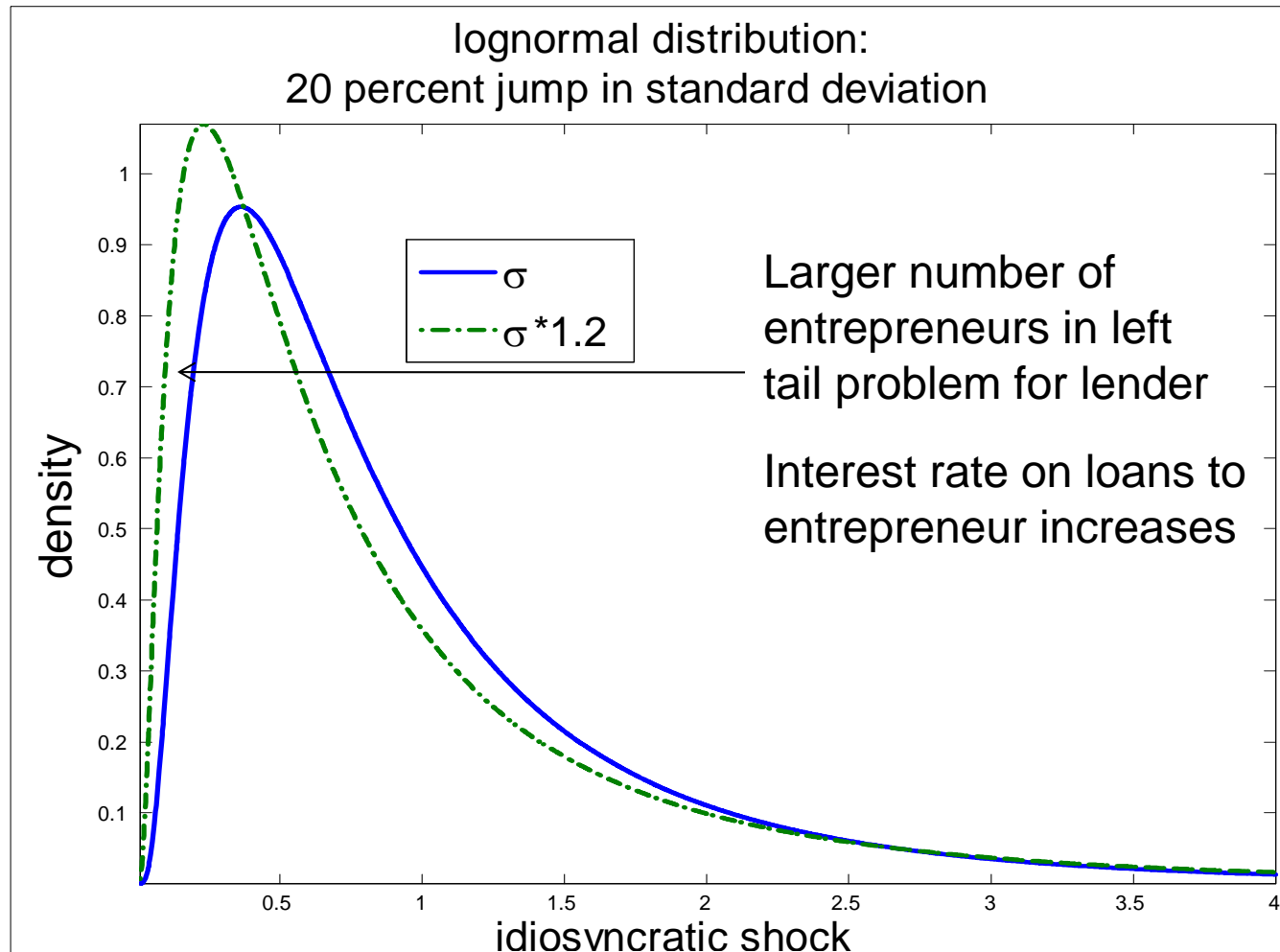




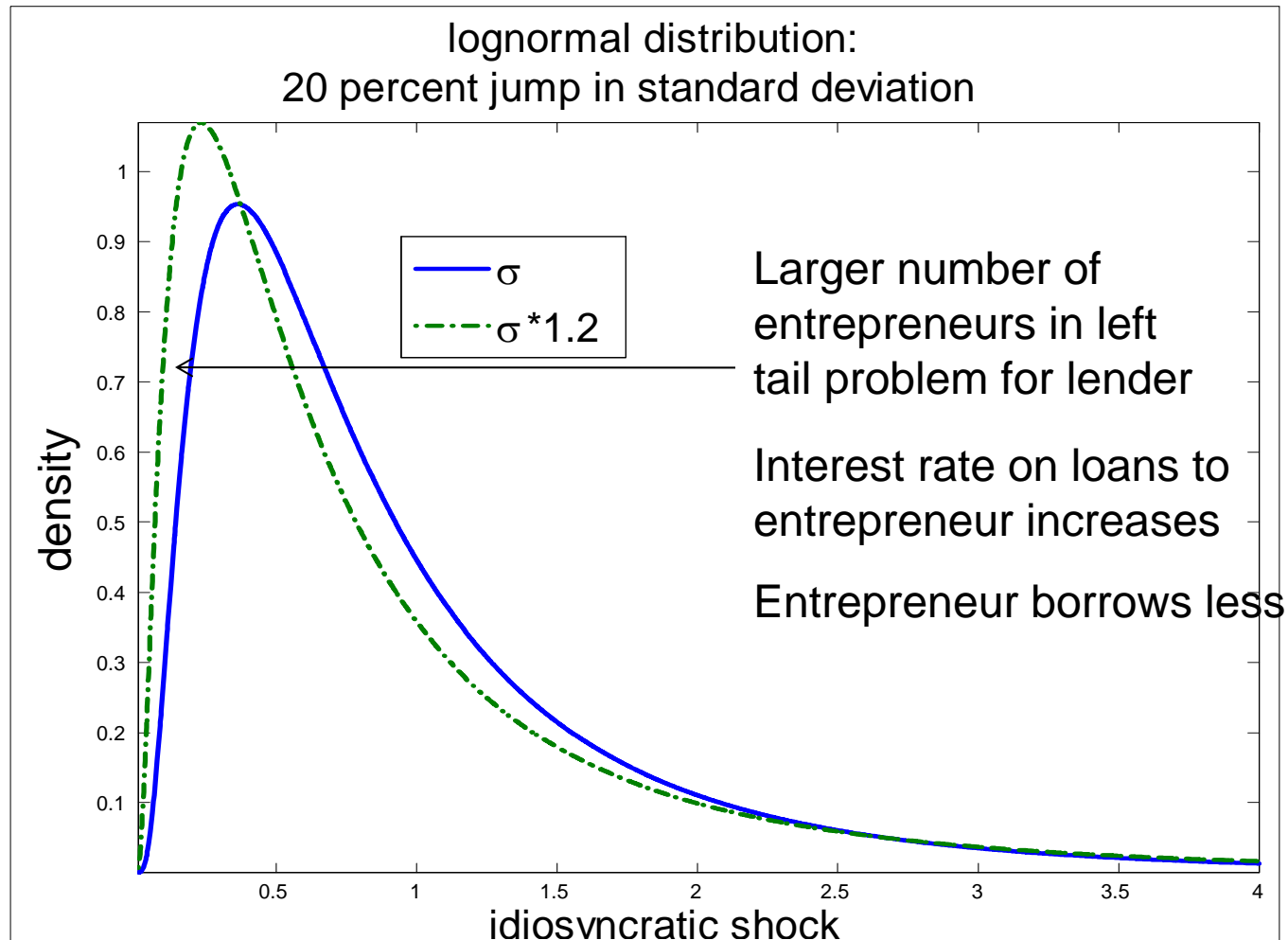
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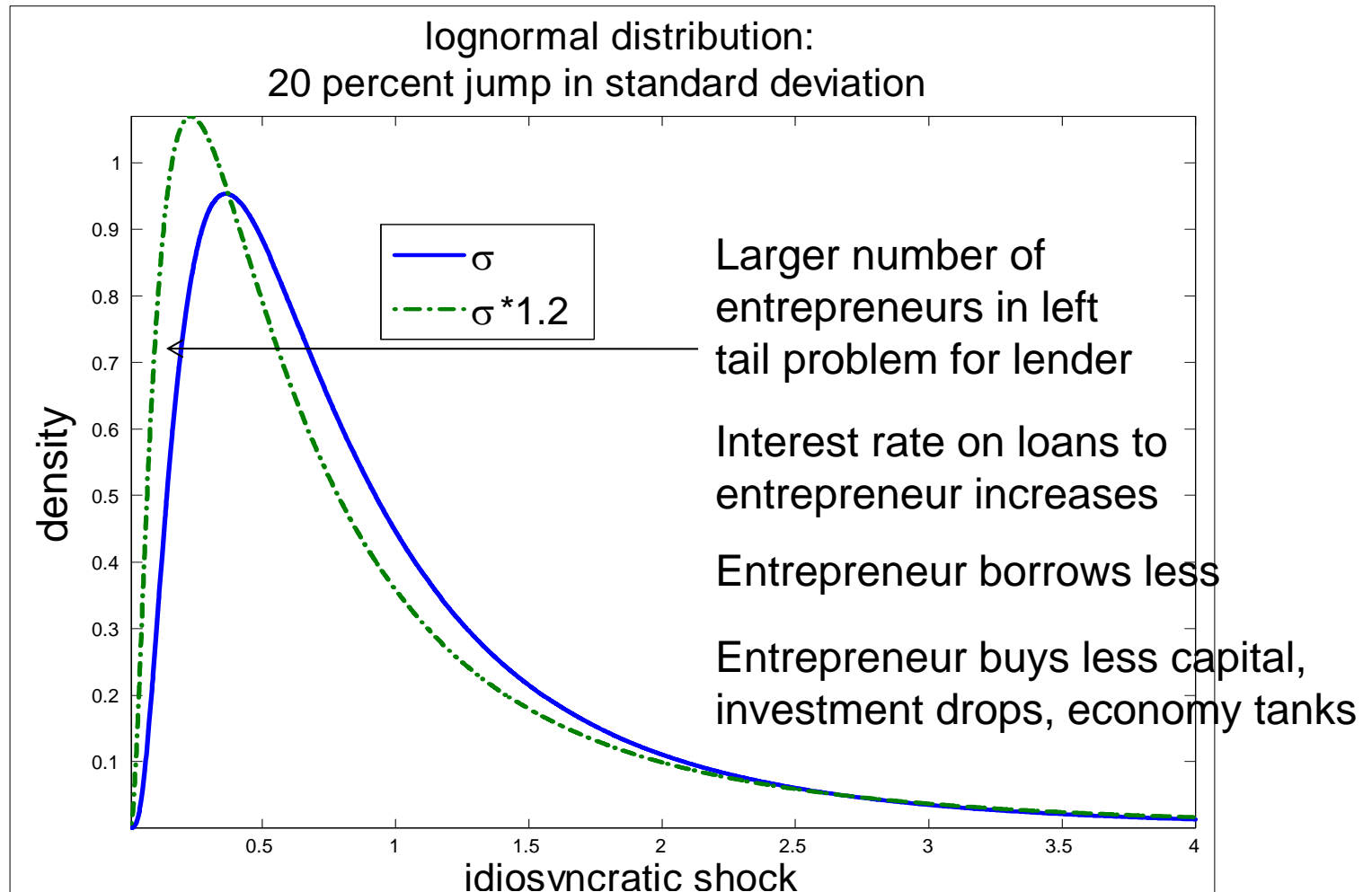
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$$u_t = \overbrace{\xi_t^0}^{\text{unanticipated component}} + \overbrace{\xi_{t-1}^1 + \xi_{t-2}^2 + \dots + \xi_{t-8}^8}^{\text{anticipated component of } u_t \text{ 'news', or 'signals'}}$$



# News on Risk Shocks Versus News on Other Shocks

	Marginal likelihood
DSGE Baseline	4493.85

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DSGE with Signals on Monetary Policy and No Signals on Risk Shock ( $\sigma$ )	4427.59

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DSGE with Signals on Exogenous Spending Shock ( $g$ ) and No Signals on Risk Shock ( $\sigma$ )	4096.62

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	Marginal likelihood
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DSGE with Signals on Technology Shocks and No Signals on Risk Shock ( $\sigma$ )	4334.47

# Monetary Policy

- Nominal rate of interest function of:
  - Anticipated level of inflation.
  - Slowly moving inflation target.
  - Deviation of output growth from ss path.
  - Monetary policy shock.

# 12 Shocks

- Trend stationary and unit root technology shock.

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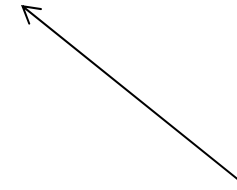
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$$\bar{K}_{t+1} = (1 - \delta)\bar{K}_t + G(\zeta_{i,t}, I_t, I_{t-1})$$

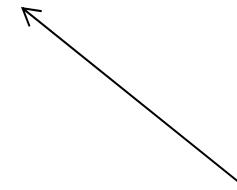


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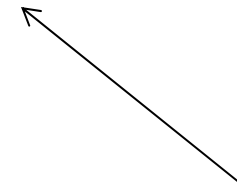


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- Equity shock.

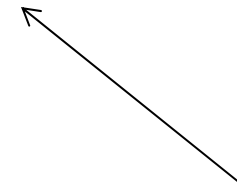


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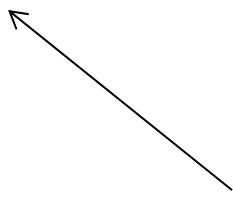
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- Monetary policy shock.
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  - 6 other shocks.
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- Data: 1985Q1-2010Q2



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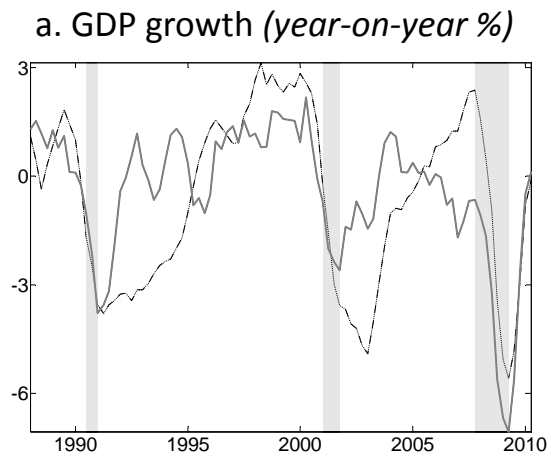
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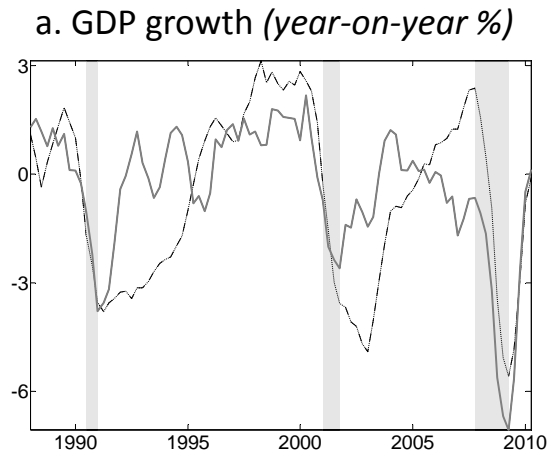
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- *Why* are they important?
- Some Direct Evidence on Risk Shocks.

# Figure 5: The Role of the Risk Shock in Selected Variables



Grey, solid line: data when all shocks are fed to model.

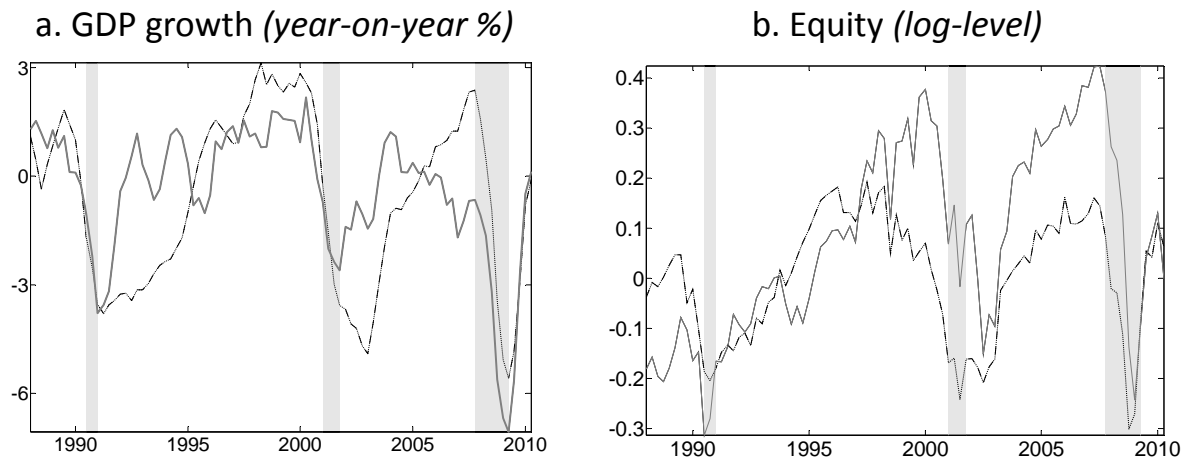
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Dashed line: data when only disturbances to risk are fed to model.

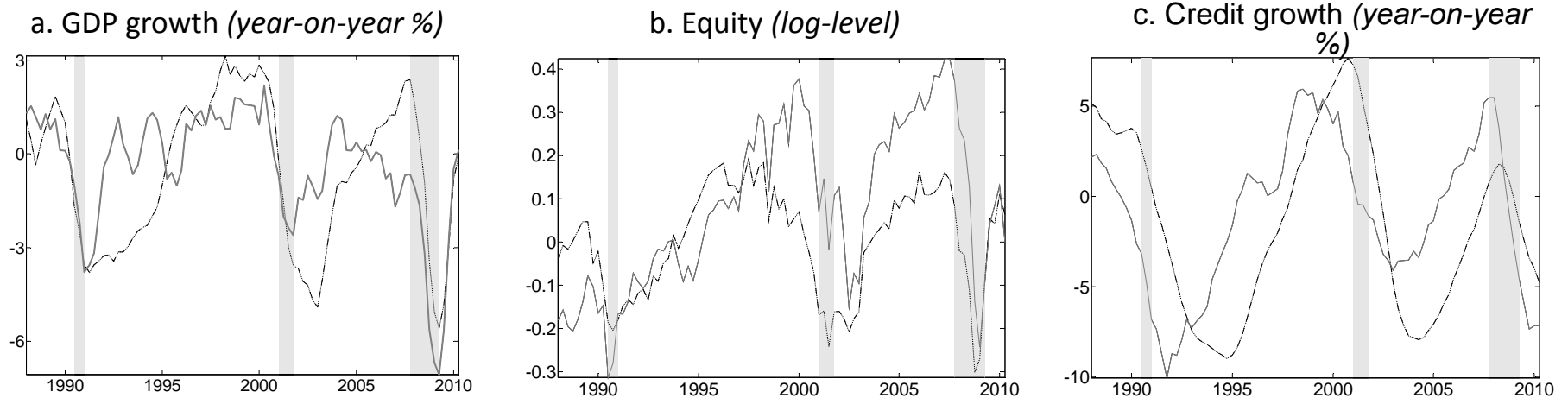
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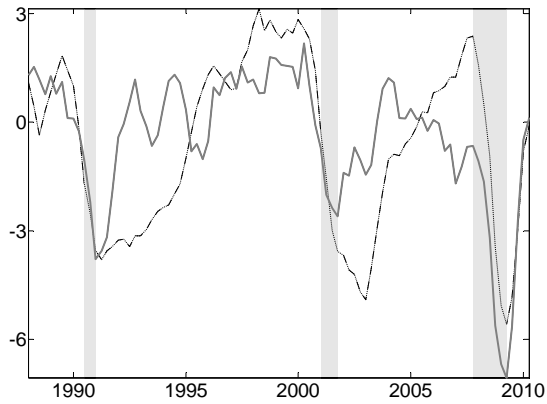
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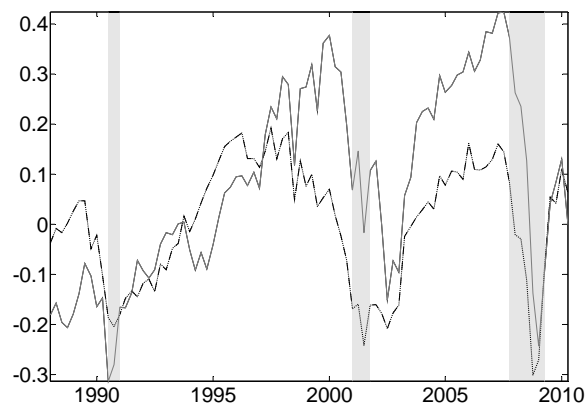


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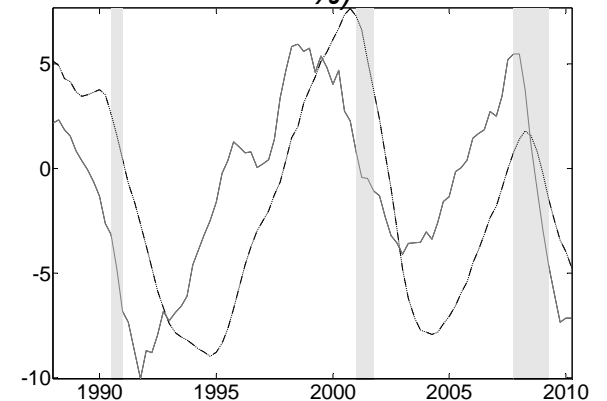
a. GDP growth (year-on-year %)



b. Equity (log-level)



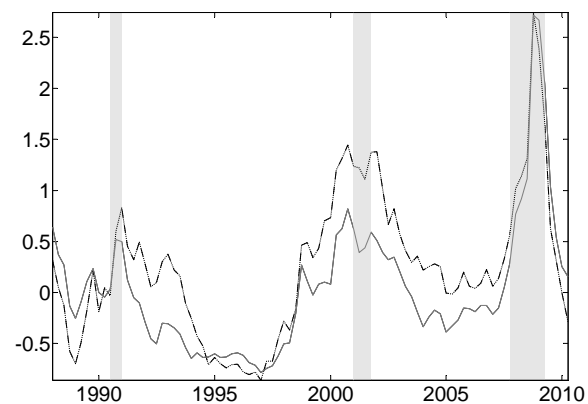
c. Credit growth (year-on-year %)



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e. Credit spread (p.p. per annum)



## Percent Variance in Business Cycle Frequencies Accounted for by Risk Shock

<i>variable</i>	<i>Risk, <math>\sigma_t</math></i>
<b>GDP</b>	62
<b>Investment</b>	73
<b>Consumption</b>	16
<b>Credit</b>	64
<b>Premium (Z – R)</b>	95
<b>Equity</b>	69
$R^{10 \text{ year}} - R^{1 \text{ quarter}}$	56

Note: 'business cycle frequencies means' Hodrick-Prescott filtered data.

# Why Risk Shock is so Important

- In the model:
  - jump in risk,  $\sigma_t$ , generates a response that resembles a recession

Figure 3: Dynamic Responses to Unanticipated and Anticipated Components of Risk Shock

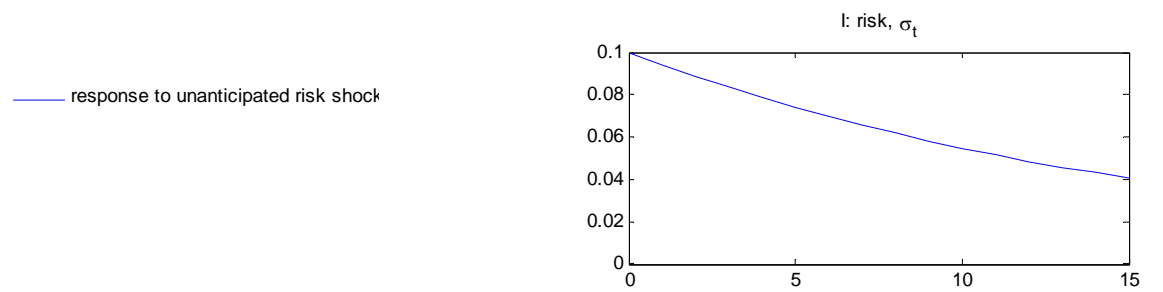
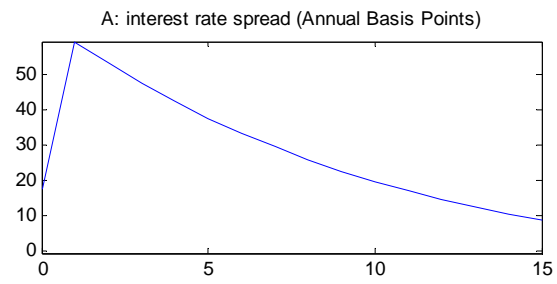


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— response to unanticipated risk shock

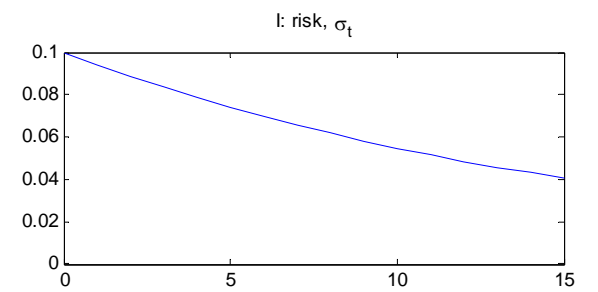


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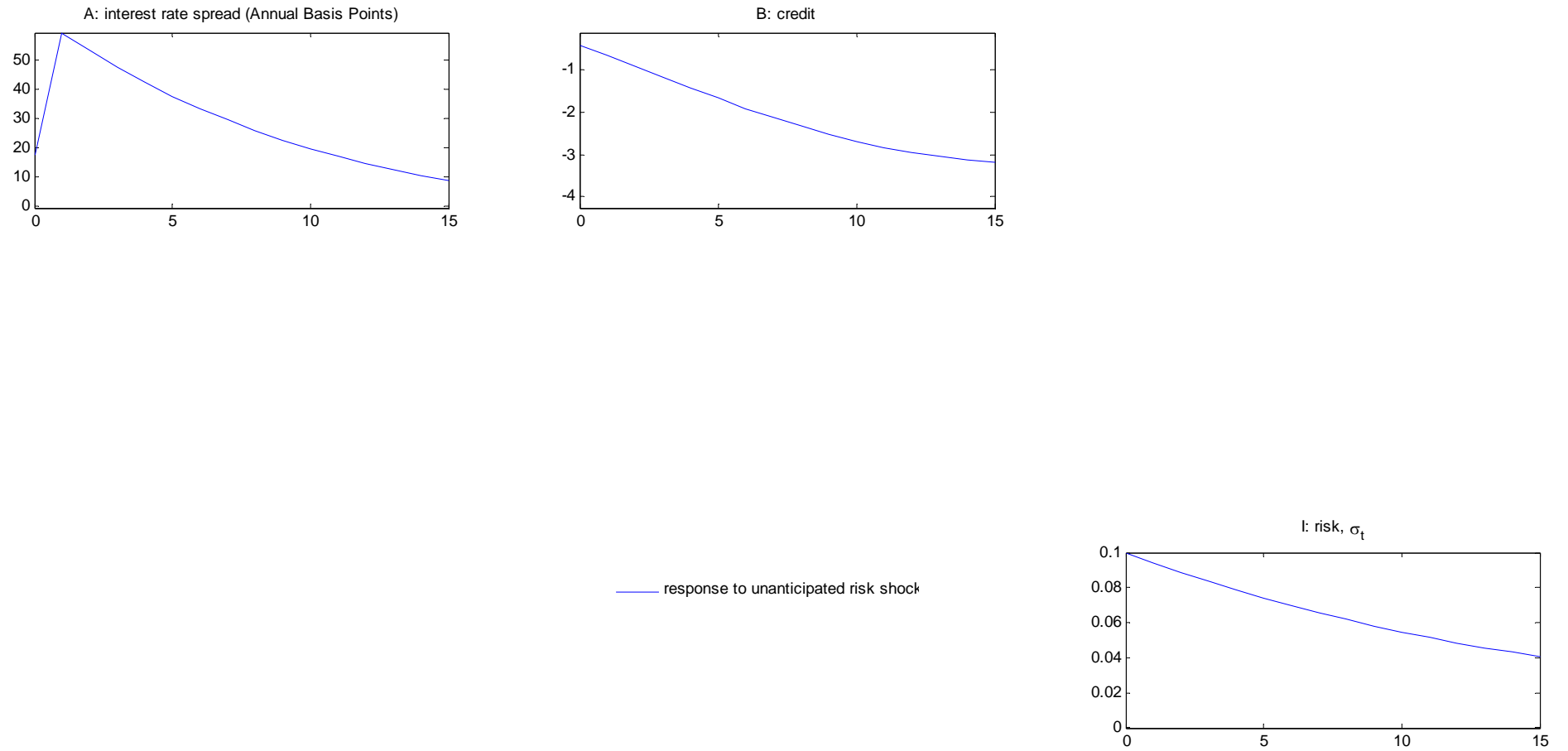


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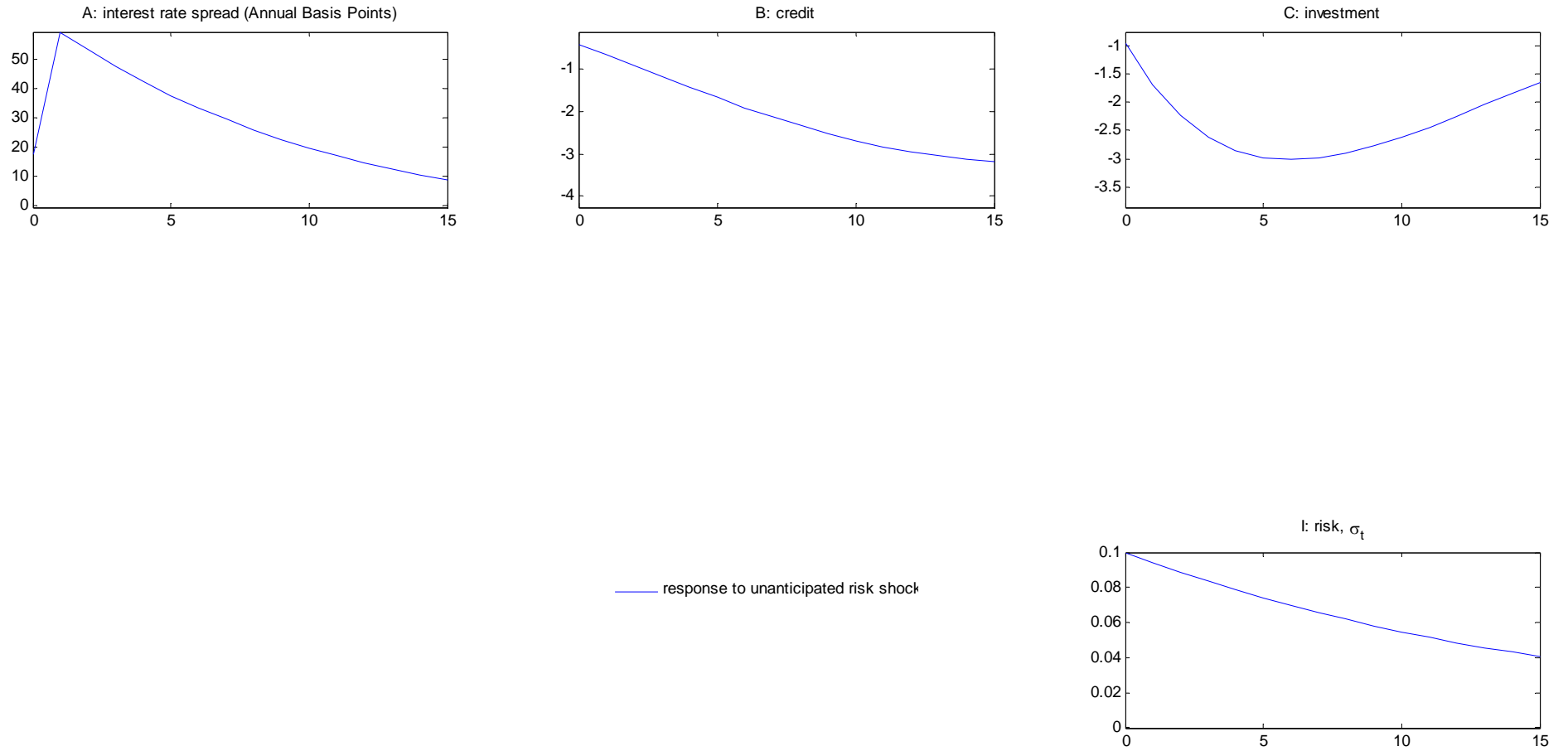


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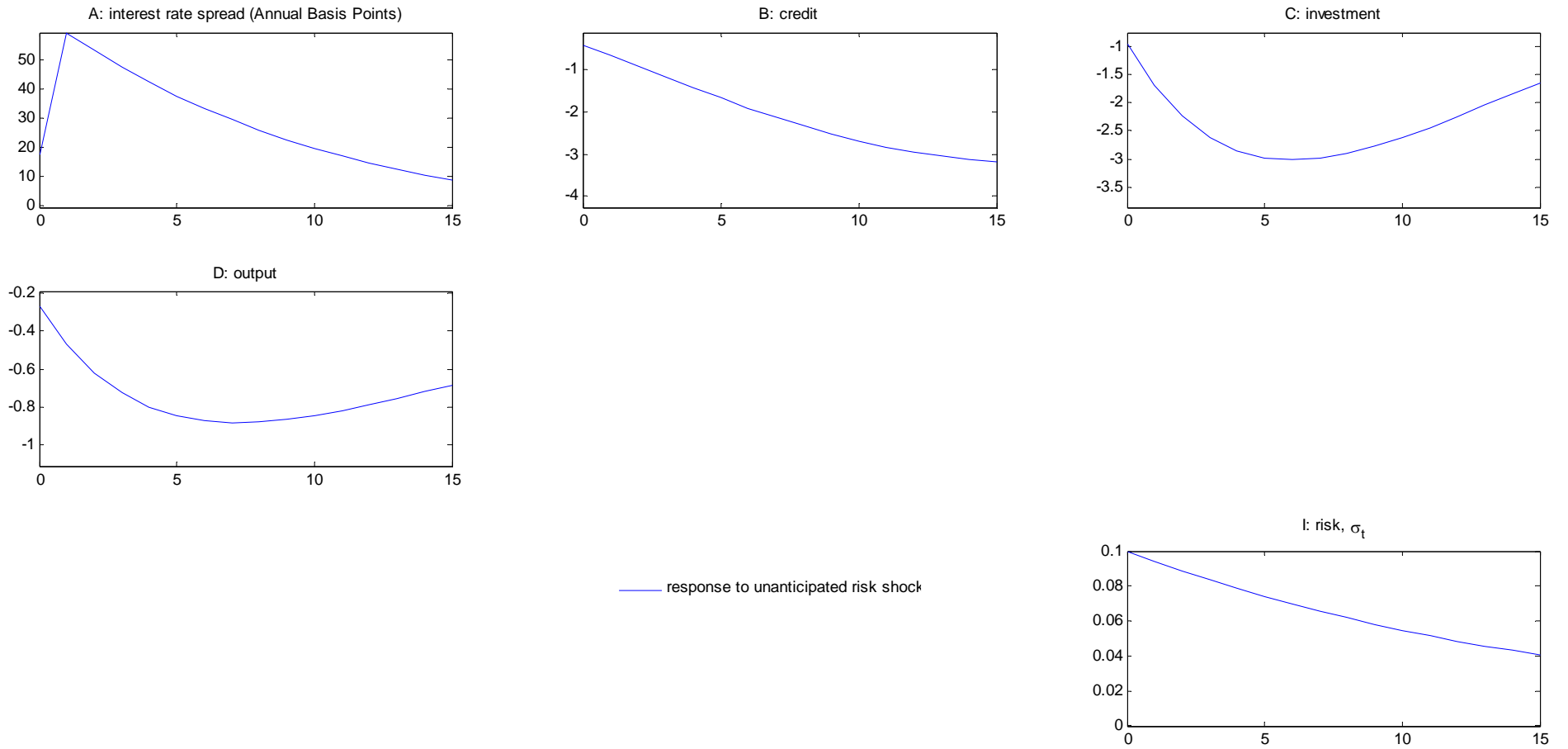




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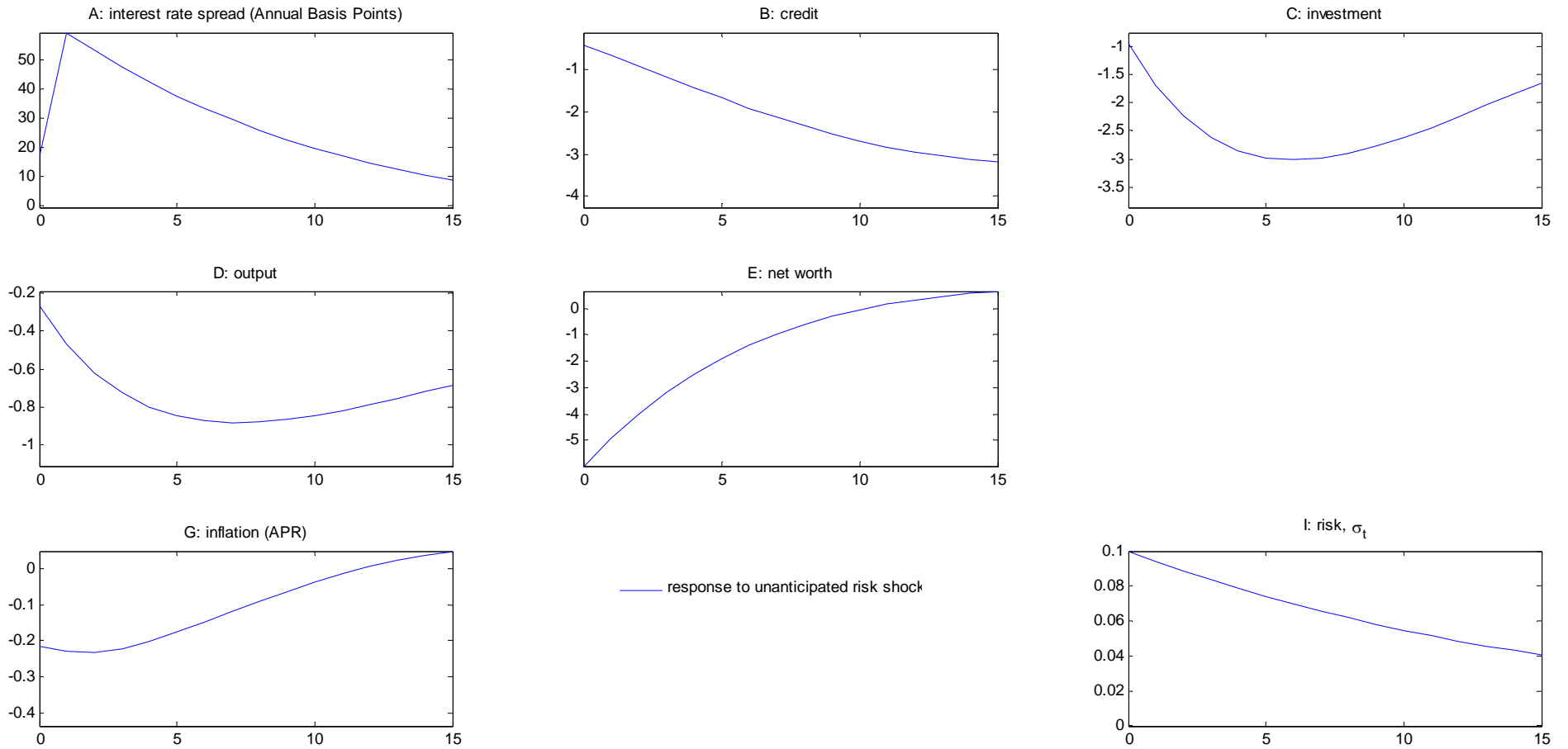
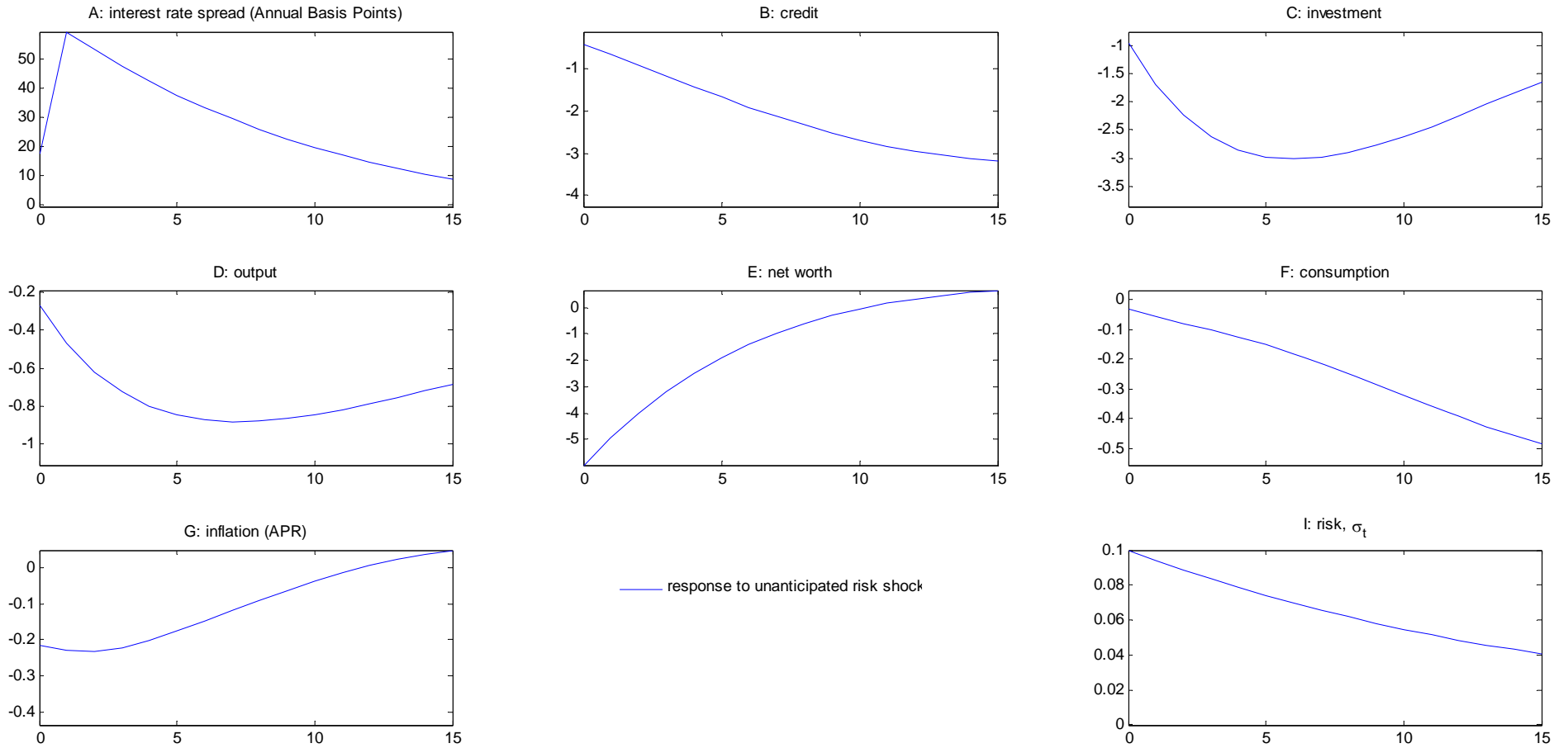


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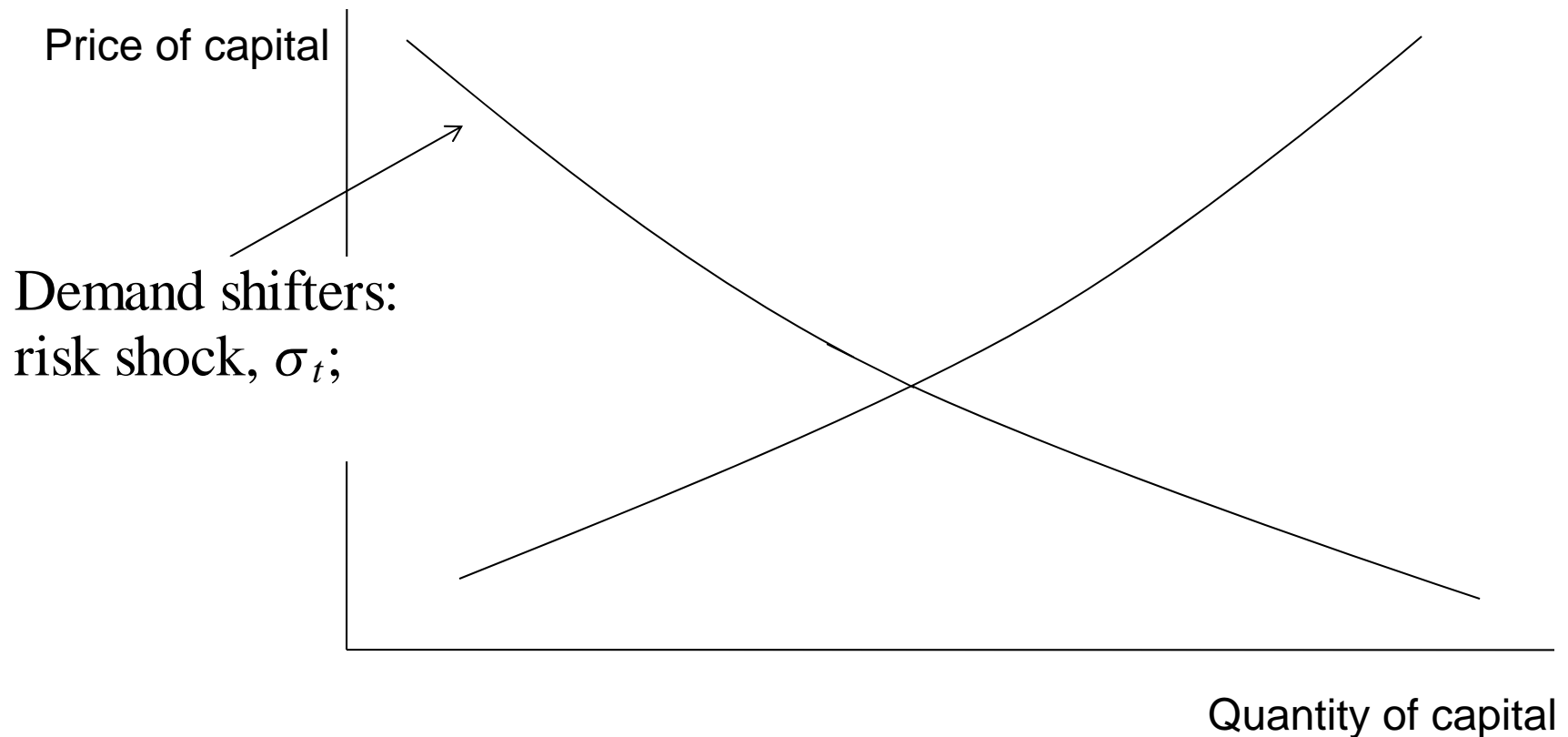


Looks like a business cycle

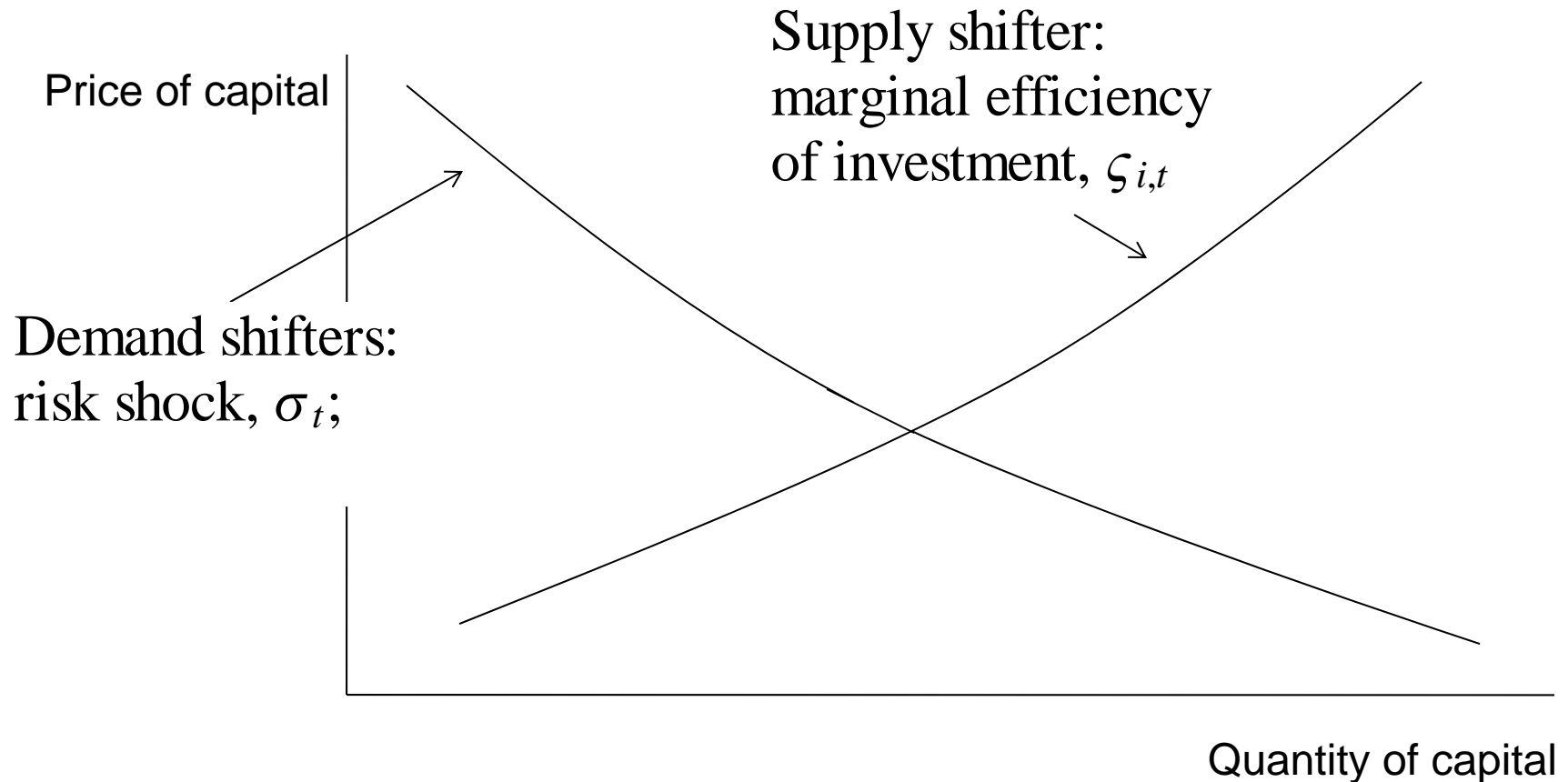
# What Shock Does the Risk Shock Displace, and why?

- The risk shock mainly crowds out the marginal efficiency of investment.

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- When the stock market is included, then explanatory power shifts to financial market shocks.
- When we drop ‘financial data’ – slope of term structure, interest rate spread, stock market, credit growth:
  - Hard to differentiate risk shock view from marginal efficiency of investment view.



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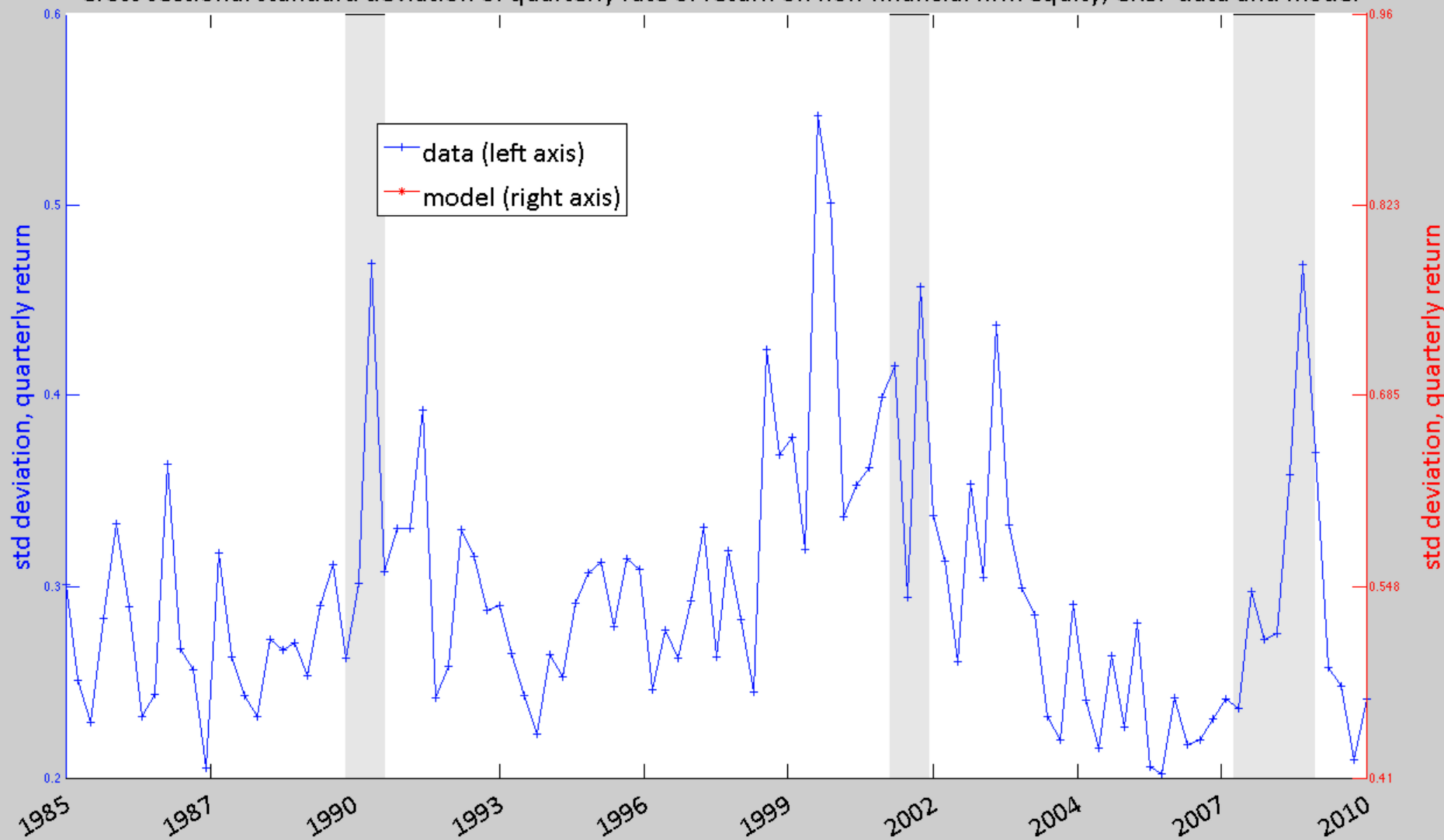
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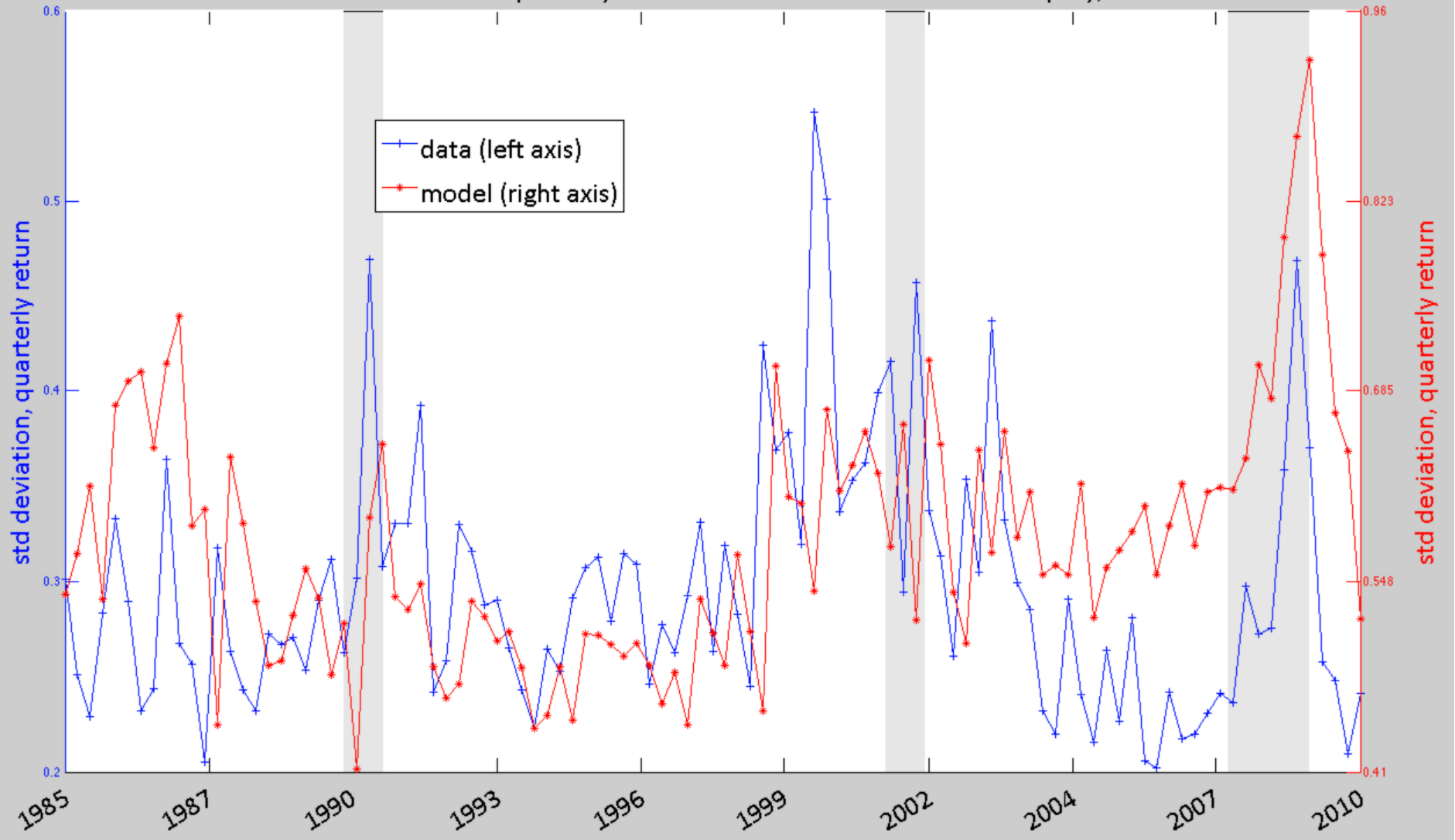
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  - Firm-level stock return data in CRSP.

Cross sectional standard deviation of quarterly rate of return on non-financial firm equity, CRSP data and model



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