Question from a rat : Where Shall I Go?

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"What's right with Macroeconomics?"
Cournot Center

Is macroeconomic theory useless ?

Most economist did not forecast the crisis, to say the least...
I will argue that the reason may not be in macroeconomic theory but in a *Weltanschauung* in the profession.
Some economists believed that:

- market economies are stable
- market outcomes are constrained efficient.
- Governments and central banks may destabilize the economy.
- State may be useful to redistribute wealth (social justice) or to smooth the business cycle (New Keynesian).

What about mainstream macroeconomic theory?

Roadmap

1. What is the mainstream
   - DSGE
   - New directions
   - A definition
2. My own research agenda in macroeconomics: Precautionary savings
   - A foundation for Keynesian economics?
   - Risk-taking and financial fragility

1- A specific tools: DSGE

Early 80s : RBC : A research program representative agent with frictions. Adopted by new Keynesian framework.
DSGE literature with a representative agents.

Institutions in search of quantitative tools have promoted this research program : the most quantitative in the short-run.
Bayesian estimation of DSGE models is a academic sport.

DSGE is only a part of mainstream.

What is the mainstream ? Many Models

- Involuntary unemployment (Mortensen Pissarides)
- Sticky prices (Mankiw)
- Imperfect information (Asymmetry of information, Akerlof)
- Dispersed information (Global games, Morris and Shin)
- Political economy and institutions (Acemoglu)
- Financial frictions (Bernanke Gertler Gilchrist, Kiyotaki Moore)
- Banking crisis (Diamond and Dybvig)
- Inequality and Heterogeneity (Bewley-Aiygari-Huggett)
- Temporal inconsistency (Laibson) and inattention
- Learning (but it is hard to say if it is really mainstream) (lots of recent work is based on models of expectations formations)
- Inaction theory.: Rational inattention (Sims)

All these models have different additional assumptions and belong to the mainstream. What do they share?

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2. Methodological constraint : there must be **no arbitrage opportunity** : if in the model some agents may have interest to do something, you should explain why they do not do it (my understanding of microfoundations)

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1. Rely on **equilibrium** notions
2. Methodological constraint : there must be **no arbitrage opportunity** : if in the model some agents may have interest to do something, you should explain why they do not do it (my understanding of microfoundations)
3. Not everything is in the mainstream:
   -Giovanni Dosi studies equilibria notion (as in the agent-based models : a statistical definition of equilibria) but he has an ad hoc notion of rationality (behavior rules)
   - Paul De Grauwe studies small scale models where agents follow behavioral rules
   - WIlli Semmler in some of his work (but not all), follows the same logic ("Overconsumption, Credit Rationing and Bailout Monetary Policy: A Minskyan Perspective,").

2 - Precautionary savings

Keynesian idea : Savings can be harmful

In recessions or in crisis, agents stop spending money ("wait and see") and save to avoid any risk.
Households, firms, banks or financial intermediaries do some precautionary savings.
Private demand can fall a lot in recession.

Here, I focus on households and on aggregate consumption:

Motivation

Only 3 times in US postwar data did consumption fell more than GDP: 1974Q3, 1980 Q1, 2008Q2.

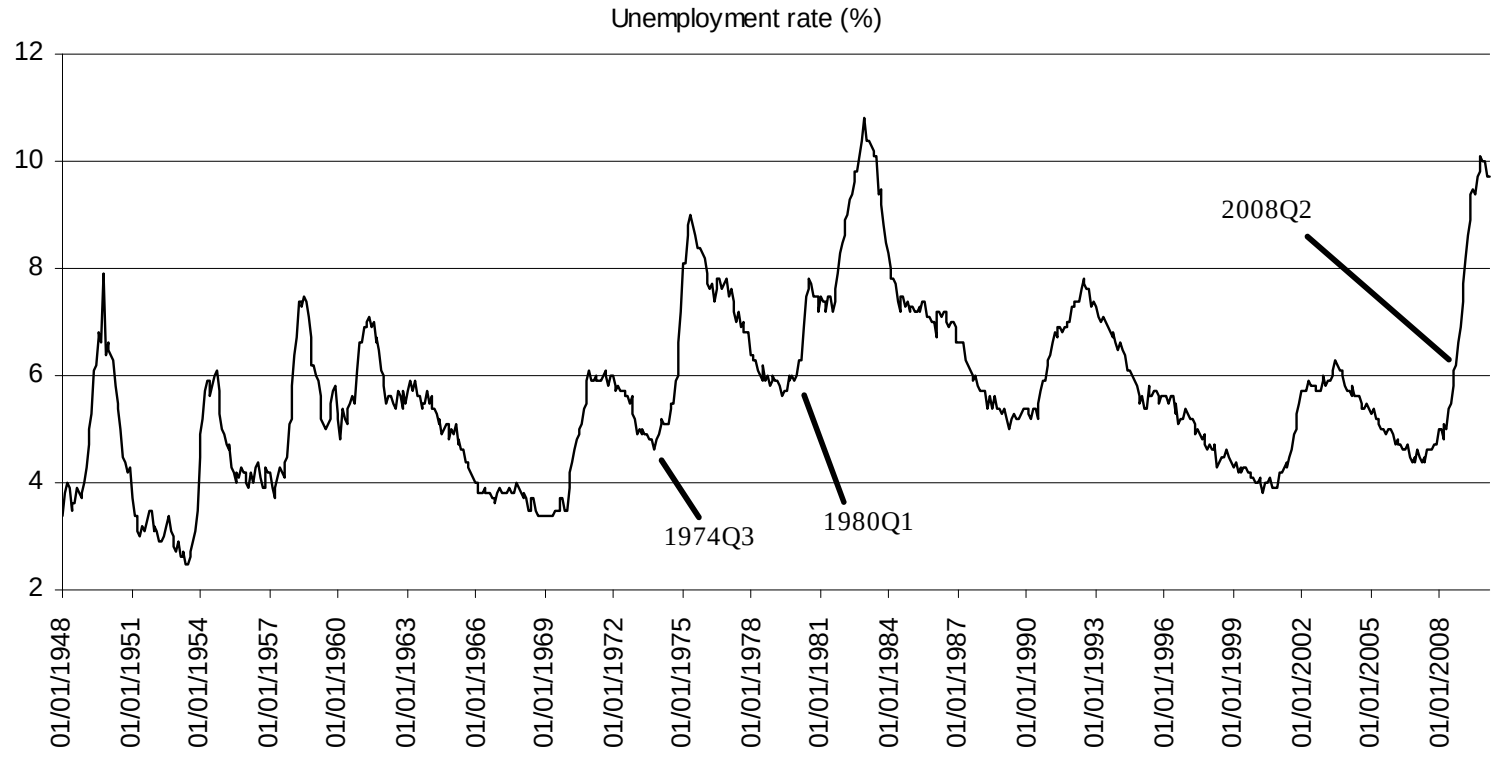

Figure: Unemployment Rate, 1948-2009 (Bureau of Labour Statistics)

Motivation

Also the case during the Great Depression (Temin, 1976)

Precautionary saving to explain the behavior of aggregate consumption (Romer 1990; Flocco and Parker 1992 among others). Increase in the probability of uninsurable idiosyncratic shocks $\Rightarrow$ increase in savings to self-insure $\Rightarrow$ fall in consumption.

Consistent with households data : Unemployment = typical uninsurable risk (Cochrane 1991; Carrol 1992; Guisi et al. 1996)

Precautionary savings

- Absent from the RBC (DSGE type) literature, even when involuntary unemployment is introduced.
  (Merz 1995; Andolfatto 1996, Den Haan et al. 2000; recently Gertler and Trigari 2009; Hall 2009).
  Not based on economic rationale but on tractability. (Keep the representative agent assumption)

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- Second, Incomplete market models are not tractable (or heterogeneous agents models : Bewley, 1980; Huggett 1993; Aiyagari 1994; Krussel and Smith 1998; recently Krussel Mukoyama and Sahin 2009; Nakajima 2009).
  Reproduce the distribution of wealth in the US with precautionary savings.
  Incomplete markets are not relevant for small technology shocks (typically two states process). Results may be model dependant.

Our contribution

1. Exhibit a *tractable* class of incomplete market models with a Mortensen and Pissarides type model of the labor market.
   $\Rightarrow$ reduced heterogeneity equilibrium.
   Model = Two linearized equations $\Rightarrow$ capture precautionary savings
   Introduce incomplete markets in the DSGE literature.

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1. Exhibit a *tractable* class of incomplete market models with a Mortensen and Pissarides type model of the labor market.
   $\Rightarrow$ reduced heterogeneity equilibrium.
   Model = Two linearized equations $\Rightarrow$ capture precautionary savings
   Introduce incomplete markets in the DSGE literature.
2. Two key conditions for precautionary savings to matter:
   - **wage formation**. Unemployment must increase and must be costly: sticky real wage: (Shimer 2005; Hall 2005, Hagedorn and Manovskii 2008)
   - **High persistence of the negative shock**.

   $\Rightarrow$ rationalize the behavior of consumption and unemployment in large recessions.

Other Related Literature

1. Krussel Mukuyama and Sahin (2009); Nakajima (2009) :
   Fully-fledged heterogeneous agents models with Mortensen Pissarides labor market, with Nash Bargaining
   Find that incomplete markets do not matter.
   $\Rightarrow$ Either unemployment does not fluctuate much or not costly.
   Not able to reproduce a realistic wealth distribution, nor the evolution of wealth after a negative shock
   $\Rightarrow$ We are less ambitious: we do not try to match the wealth distribution, be to capture precautionary savings.

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2. Tractable incomplete market models:
   No trade equilibria : Constantinides and Duffie (1996), Krussel Mukoyama Smith (2008),
   Positive trade: Toche (2204), Lagos and Wright (2005), Challe and Ragot (2010),
   Here realistic labor supply.

Households

Continuum of length 1. Either employed or unemployed.
Employment status $e_t^i \in \{0, 1\}$.

When **employed** $e_t^i = 1$ supplies one unit of labor (easy to generalize).
When **unemployed** $e_t^i = 0$ receive home production δ.

Program

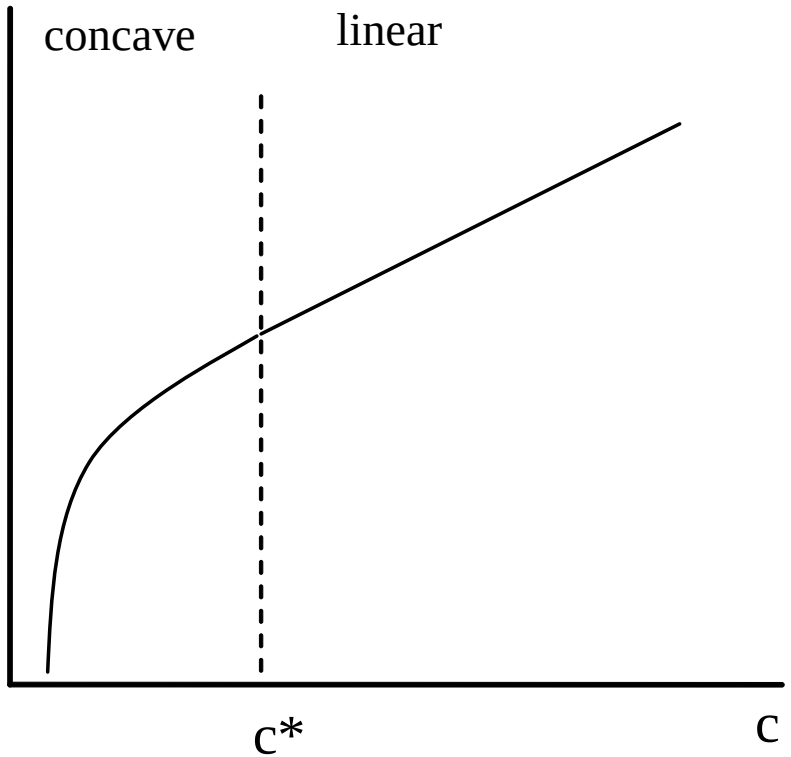
$$\max_{\{c_t^i, a_t^i\}_{t=0}^{+\infty}} E_0 \sum_{t=0}^{\infty} \beta^t u\left(c_t^i\right), \ \beta \in (0,1),$$

$$\text{s.t.} \quad a_t^i + c_t^i = e_t^i \left(w_t + \Pi_t\right) + \left(1 - e_t^i\right) \delta + R_t a_{t-1}^i,$$

$$a_t^i \geq 0,$$

Reduced Heterogeneity

Utility function (specific DARA function)



2. Production and labor market

Mortensen and Pissarides type. Timing:

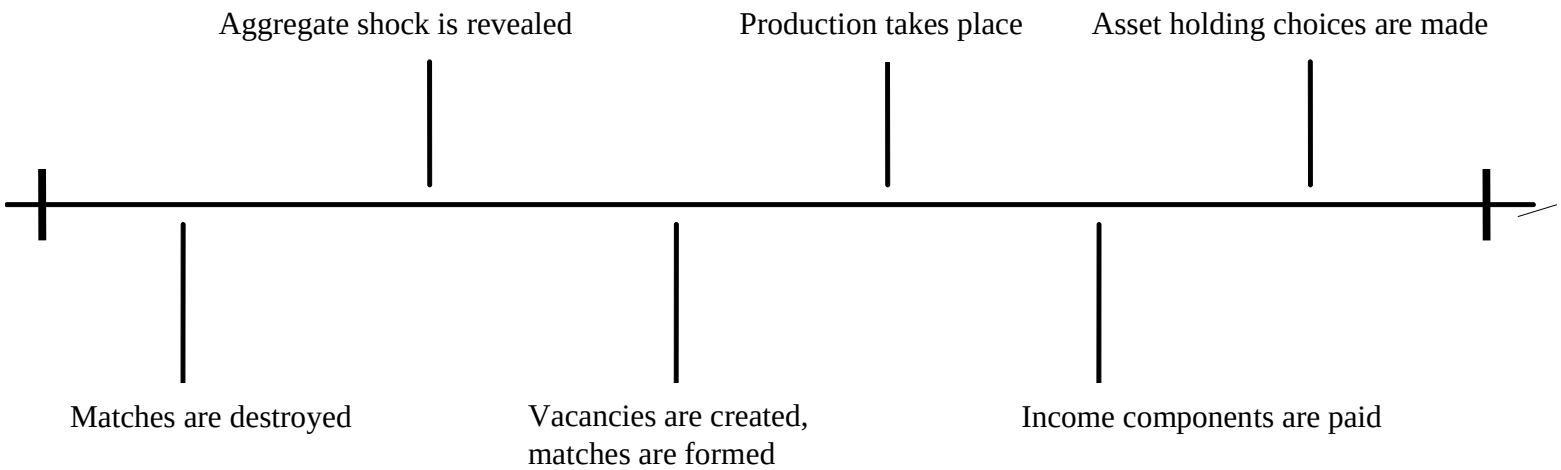


Figure: Sequence of events at date t.

Linearized Model

(Proportional deviations)
$\hat{a}_t$: savings of employed; $\hat{f}_t$ job finding rate; $\hat{R}_t$ real interest rate; $\hat{n}_t$ employment rate.

$$
\begin{aligned}
\hat{a}_t &= -\tilde{a}_1 E_t(\hat{f}_{t+1}) + \tilde{a}_2 E_t(\hat{R}_{t+1}), && \tilde{a}_1 > 0, \\
\hat{f}_t &= -\tilde{f}_1 \hat{R}_t + \tilde{f}_2 E_t(\hat{f}_{t+1}) - \tilde{f}_3 E_t(\hat{R}_{t+1}) + \tilde{f}_4 \hat{z}_t, && \tilde{f}_1, \tilde{f}_3, \tilde{f}_4 > 0,\ 0 < \tilde{f}_2 < 1 \\
\hat{R}_t &= \tilde{R}_1 \hat{z}_t + \tilde{R}_2 \left(\hat{n}_t - \hat{n}_{t-1} - \hat{a}_{t-1}\right), && \tilde{R}_1, \tilde{R}_2 > 0, \\
\hat{n}_t &= \tilde{n}_1 \hat{n}_{t-1} + \tilde{n}_2 \hat{f}_t, && 0 < \tilde{n}_1, \tilde{n}_2 < 1.
\end{aligned}
$$

A simple case

Increase in unemployment $\Longrightarrow$ increase in risks at the household level $\Longrightarrow$ precautionary savings
$\Longrightarrow$ fall in consumption $\Longrightarrow$ increase in unemployment.

Aggregate saving: Extensive margin $\hat{n}_t$, Intensive Margin $\hat{a}_t$.
Ambiguous effect of a negative shock shock.
The extensive margin of saving and consumption in the business cycle.

A calibration

Preference and technology

Parameter	Description	Value
β	Discount factor	0.98
ξ	Curvature of the utility function below $\check{c}$	3
η	Slope of the utility function above c^*	.1
α	Curvature of the production function	0.3
μ	Capital depreciation rate	0.025
R	Gross interest rate	1.01
δ / w	Home production to wage ratio	0.90
θ	Autocorrelation of technology shock	0.6/0.9

Preference and technology parameter Values

Parameters	Description	Value
f	Mean job-finding rate	0.83
s	Mean employment exit probability	0.063
$w/(w+y)$	Surplus ratio for workers	2/3
χ	Elasticity of the wage w.r.t. productivity	0.8

Labor market outcomes

Result

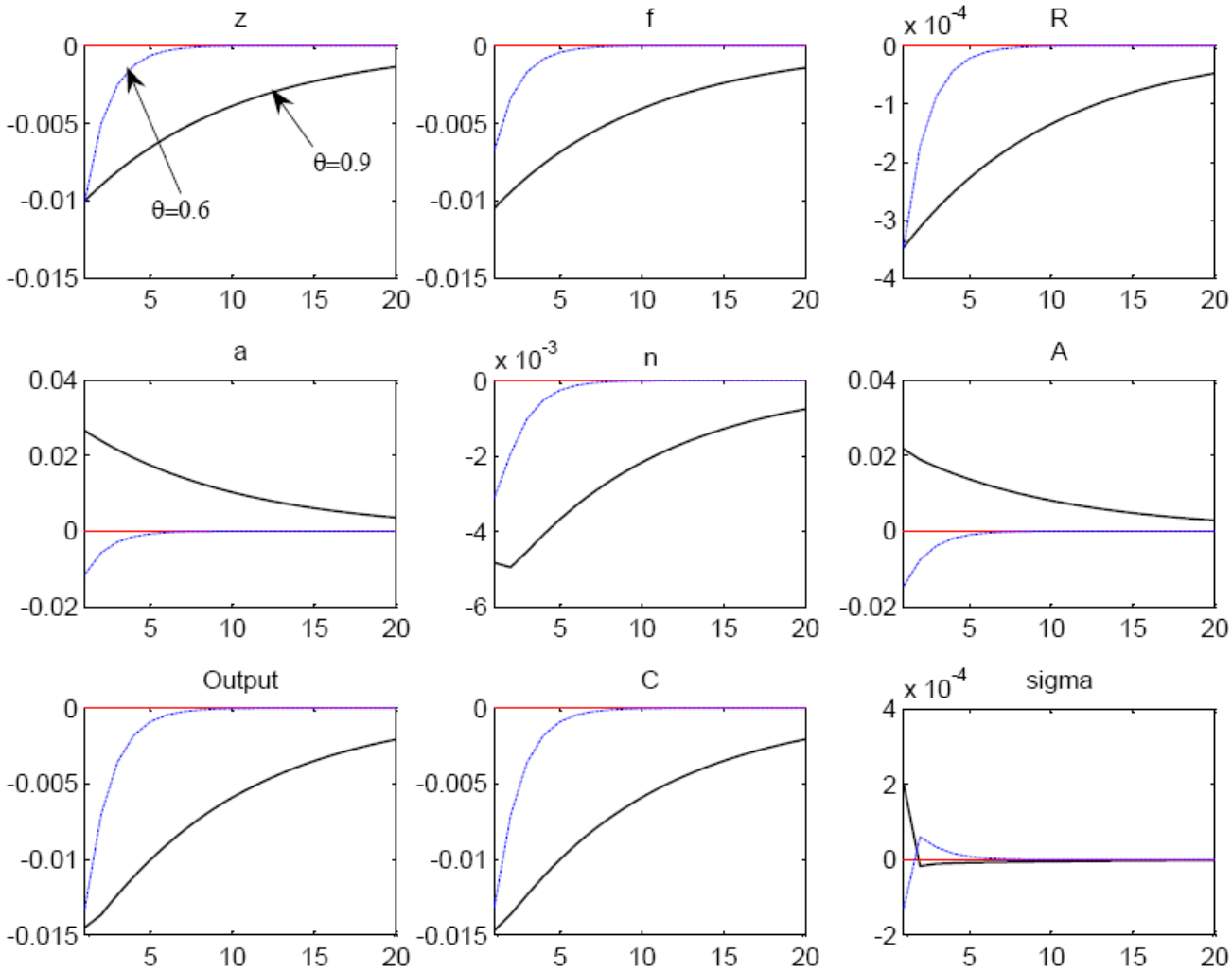


Figure: Job-finding rate (f), the interest rate (R), individual asset holdings (a), employment (n), total asset holdings (A), output (Output), aggregate consumption (C) and the saving rate (sigma) to a technology shock (z), with persistence $\theta = 0.6$ or $\theta = 0.9$.

GMM Estimation Consumption Growth rate

	Non-durable and services		
	(1)	(2)	(3)
μ	0.0046	0.0070	0.0062
	(0.0000)	(0.0000)	(0.0000)
r_t	0.0946	0.1120	0.0695
	(0.2684)	(0.0913)	(0.1688)
Δy_t	0.4267	0.2197	0.2365
	(0.001)	(0.0198)	(0.0236)
MHS_t	-	0.0001	-
		(0.0000)	
$u_{t+1} - u_t$	-	-	-0.0061
			(0.0003)
n	194	194	194
$\bar{R}^2$	0.11	0.39	0.38

An expected increase of unemployment of 1% over a quarter decreases quarterly consumption growth rate by 0.6%

The build-up of financial fragility

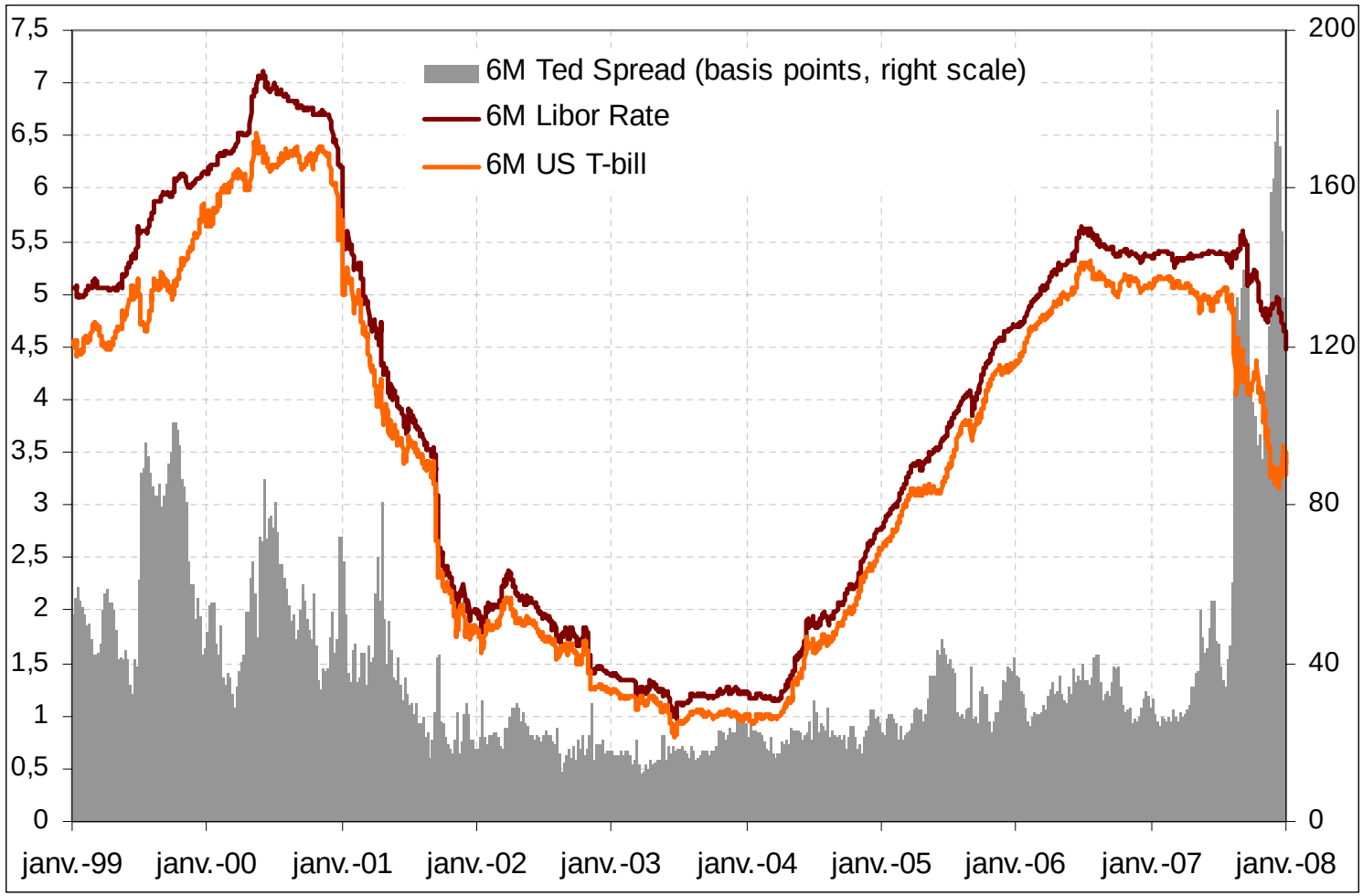


Fig. 1: Spread between US commercial banks' paper and US governmen

Source: Bloomberg

The model

Allen and Gale (2000) : debt contract and limited liabilities.
Agents play with the money of others. It is not enough to generate a flat risk premium.

Uncertain regulation :
- increase in risk due to lower capital requirement
- increase in price of risky assets
- Households believed that this was due to fundamentals.
- Felt rich and consume "too much"

Mix of rationality and un-known environment.

Conclusion

Rational expectations is not (always) a problem
Debate about tools hide a more fundamental debate : What are the main "imperfections" of market economies: inequalitites, risks, instability, growth...
Same theory can be modeled with various tools.

A deeper issue is the equilibrium notion : local logical consistency of some mechanisms.
Out-of-equilibrium is a difficult notion.