Commnents; Alternative Programmes: Renewing Macroeconomics

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I. Specific Comments on the Papers

II. General Comments

III. Conclusions

I. Specific Comments...

=>The Background of the papers are different paradigms: ABM and DSGE

=> They preent some unconventional results

Giovanni Dosi et al. : Uses an ABM – shows integration of (Schumpeterian) long run growth dynamics with (Keynesian) short run

Xavier Ragot et al: Uses a DSGE model – shows amplifying force in DSGE model: precautionary saving makes consumption fall in recessions

I. Specific Commnents, Giovanni ..

Giovanni Dosi et al.: Integration of Schumpeterian long run growth with Keynesian and short run: 1) normative model, 2) empirical model (through filtering)

=> The results are obained on the basis of an ABM, currently widely used developed in Europe, funded by the 6th and 7th framework program (in the US R. Axtell, D. Farmer et al.)

=> On the micro level: it allows for heterogeneity of agents, externality, interconnectedness, contagion effects

=> Areas of succcess: Innovation and diffusion of technology, trading and market dynamics, issues of inequality of income and wealth, early warning systems (interconnectedness of banks)

=> Crucial assumption in this paper: Innovation is demand driven, thus Keynesian short run policy (tax and unemployment benefits) have persistent, long run growth effects (exhaust full potentials of Schumpeterian innovations)

=>Is the ABM framework successful to integrate long and short run macro; heterogeneity and aggregate outcome? to some extent

=>Explains the dynamics on a "meso level", and impact of policies

I. Specific Comments, Giovanni ..

Specific comments:

=> the creation of innovations, (using resources) not modeled

=> fiscal tools not extensively explored (different taxes, innovation subsidies)

=> time steps in simulations and in empirics? do the simulated time series represent business cycle frequencies?

=> empirical test: in some sense impressive short and long run properties of the model, but it sets itself a low hurdle; matching moments (danger: too many degrees of freedom in modeling)

=> very complex, but in some sense still simple in terms of behavioral rules, reaction functions, markets and institutions etc

=> Integration of short and long run achieved? To some extent, here a positive persistence effect, but: a) could be negative, b) employment issue, wavelets?)

=> Is it a renewal of macro? to some extent; can it replace macro? I will get back to this later (lack macro feedback mechanims)

I. Specific Comments, Xavier...

Unconventional results from DSGE models--- with a (Keynesian) twist ("Precautionary Saving...")

=>amplifying force: in a recession fall of consumption faster than income

$$u(c) = \begin{cases} A\frac{c^{1-\xi}-1}{1-\xi}, \; A,\xi > 0 & \text{if } c \leq \check{c}, \\ B + \eta c, \; \eta > 0 & \text{if } c > \check{c}, \end{cases}$$

=>Twist: patched preferences, incomplete markets (workers are imperfectly insured against unemployment), real wage stickiness,

=>Solution: Linearization and VAR with exog technology shock (?)

=>Empirial estimat $\Delta c_t = \mu + \sigma_r r_t + \lambda_y \Delta y_t + \eta_E LMS_t + \varepsilon_t$

Remark 1: asset "a", here treated as a flow? (Precautionary savings) , not a stock?

Remark 2: Should one use technology shocks as driving force for recessions? See Basu et al (2006)

I. Specific Comments, Xavier ...

Unconventional (Keynesian) results from DSGE models--- with a twist ("Fuzzy Capital Requirements...")

=> Financial Fragility built up from 2000-2007: high leveraging but low default premia

Assets	Liabilities
X_S	E
PX_R	B

Banks: risk shifting due to imperfect information on required capital:

$$E \geq \Delta PX^R$$

For households: high asset prices seems to indicate a decline of risk

Thus higher higher exposure of banks to risk; but: Is the bulk of bank loans to fund risky positions coming from households?

II. General Comments; On Traditional Macro
2. The Core of Macro

Traditional Keynesian Macro Dynamics - The Core of Macro:

1. Phillips-Curve (Gali et al. versus Fair, Gordon)

$$\dot{\pi} = \beta_Y(Y - Y*) + ...\kappa\pi_{t-1} + (1 - \kappa)\pi_{t+1}$$

2. IS equation (Rudebusch and Svensson)

$$\dot{Y} = \beta_y(Y - Y*)... - \alpha_r(r - \pi_{t+1})$$
$$Okun's \quad law = ...$$

3. Monetary policy rule

$$\dot{r} = \gamma_r(r - r_o) + \gamma_p(\hat{p} - \overline{\pi}) + \gamma_Y(Y - Y*)$$

II. General Comments; On Traditional Macro
3. Important Feedback Mechanisms

(In)stability of macroeconomic feedback mechanisms:

Nominal Changes–have Real Effects	Keynes Effect	$w \uparrow p \uparrow r \uparrow I \downarrow C \downarrow Y \downarrow L^d \downarrow w \downarrow$
	Pigou Effect	$w \uparrow p \uparrow M/p \downarrow C \downarrow Y \downarrow L^d \downarrow w \downarrow$
	Real wage	$w/p \uparrow I \downarrow C \uparrow\uparrow Y \uparrow L^d \uparrow w \uparrow p \uparrow\uparrow w/p \downarrow$
	Real wage	$w/p \uparrow I \downarrow C \uparrow\uparrow Y \uparrow L^d \uparrow w \uparrow p \uparrow\uparrow w/p \uparrow$
	Mundell Effect	$w \uparrow p \uparrow \pi^e \uparrow r - \pi^e \downarrow I \uparrow C \uparrow Y, L^d \uparrow p \uparrow w \uparrow$
	Fisher Debt Effect	$w \downarrow p \downarrow D/p \uparrow I \downarrow C \downarrow Y, L^d \downarrow w, p \downarrow$
Real Feedbacks (Accelerator Mechanisms)	Harrod Type Investment Accelerator	$y \uparrow \Rightarrow Y^d \uparrow\uparrow \Rightarrow Y^e \uparrow Y \uparrow$
	Kaldor Type Dynamic Multiplier	$Y \uparrow \Rightarrow Y^d \uparrow\uparrow \Rightarrow Y^e \uparrow Y \uparrow$
	Metzler Inventory Accelerator	$Y^e \uparrow$ planned inventories: $\mathcal{J} \uparrow Y = Y^e + \mathcal{J} \uparrow$ $C \uparrow I \uparrow Y^d \uparrow$ actual inventories $\downarrow Y^e, \mathcal{J} \uparrow$
Financial Accelerator Mechanisms	Anti-Cyclical Behavior of Interest Spreads on Loans	$Y \uparrow$ Screening-costs $\downarrow r \downarrow$ $I, C \uparrow Y^d, Y^e \uparrow Y \uparrow$
Asset Markets Expectations and Bubbles => Finally: Contagion Effects	Capital Gain Accelerator: Equities Externalities	$p_e^c \uparrow$ Expected Return $\uparrow E^d \uparrow p_e \uparrow p_e^c \uparrow$ Interconnectedness (Stability?)

II. General Comments; On Traditional Macro
Proof of (In)stability of those

Dynamics of high dim systems: Cascade of stable Matrices, proceeding from lower to higher order matrices

Lemma. Let $J^{(n)}(\beta)$ be $n \times n$ matrices, $h(\beta) \in \mathbb{R}^n$ row vectors, and $h_{n+1}(\beta)$ real numbers, all three varying continuously with β over some interval $[0, \varepsilon]$. Put

$$J^{(n+1)}(\beta) = \begin{bmatrix} J^{(n)}(\beta) & z \\ h(\beta) & h_{n+1}(\beta) \end{bmatrix} \in \mathbb{R}^{(n+1) \times (n+1)},$$

where z is an arbitrary column vector, $z \in \mathbb{R}^n$. Assume $h(0) = 0$, $\det J^{(n)}(0) \neq 0$, and let $\lambda_1 ..., \lambda_n$ be the eigen-values of $J^{(n)}(0)$. Furthermore for $0 < \beta \leq \varepsilon$, $\det J^{(n+1)}(\beta) \neq 0$ and of opposite sign of $\det J^{(n)}(\beta)$. Then for all positive β sufficiently small, n eigen-values of $J^{(n+1)}(\beta)$ are close to $\lambda_1, ..., \lambda_n$, while the first eigen-value is a negative real number. In particular, if matrix $J^{(n)}(0)$ is symptotically stable, so are these matrices $J^{(n+1)}(\beta)$.

II. General Comments; On DSGE models:

1. Have lost part of the macro tradition---macro feedback mechanisms

=>With dynamic optimization, smooth, unconstrained choice, continuous adjustments to marginal conditions, market clearing, and the use of FOC:

(i) the Euler equation that ensures an equality in the intertemporal trade off of consumption in consecutive periods,

(ii) the marginal rate of substitution equal to the real wage (the cost of trading off leasure against consumption is equal to the real wage),

(iii) the optimizing of the firm ensures the equality of the marginal product of labor equal to the real wage.

II: General Comments; On DSGE models:

2. Missing regime dependence of behavior and reactions: These are in some sense one regime models, solved through linearization and then VAR applied

In DSGE Models:

- Agents find themselves always in the same regime
- In that regime the agents make smooth (unconstrained) choice of consumption and employment (variables driven by technology shocks)
- It is solved through linearizations (log-linear, first- and second-order approximations)
- Yet, with linearizations the timing and size of shocks do not matter (always symmetries with respect to sign and size)
- But, linearizations and VAR may lead to distortions as compared to nonlinear models, see Becker et al. (2007)

II. General Comments; Multi Regime Models
and tradition of non-linear modeling is more attractive

Business Cycle Analysis and Regimes:

- Neftci (1982): Regime switching model in terms of time

- Hamilton (1989, 1994, 2002,): Regime switching model in terms of state (Markov Switching VAR, MSVAR)

- Tong (1978, 1998) and Tsay (1998): Threshold autoregression models (TAR)

- Granger and Teräsvirta (1996): Smooth transition regression model (STR model)

Regime dependence of impulse responses:

- Potter (1994), univariate impulse-response,

- Koop, Pesaran and Potter (1996), multivariate impulse response

II. **Comments,** Multi regime models..

Multi Regime VAR, Tong (1983), Tsay (1998) version

2) Multi-regime autoregression (TAR, MRVAR)

$$y_t = c_i + \sum_{j=1}^{p_i} A_{ij} y_{t-j} + \varepsilon_{it}, \ \text{if} \ \tau_{i-1} < r_{t-d} \leq \tau_i, \ \varepsilon_{it} \sim NID(0, \Sigma_i), \ i = 1, \ldots, M.$$

r_{t-d} is the value of the threshold variable observed at time $t - d$

threshold levels $-\infty = \tau_0 < \tau_1 < \cdots < \tau_M = \infty$

Rather than estimating (best-fitting) threshold, we define it according to the type of analysis we would like to conduct

Advantages:

(i) Piecewise linearization around "interesting locations"

(ii) Straightforward linear least-squares estimation for the regimes

II. General Comments, with multi regime impulse - responses

Response Analysis: Two types of Responses

- Regime-specific (or within-regime) response:

    Hypothetical responses if process stays within a regime. They reveal regime-specific response dynamics; only depend on regime-specific AR coefficients (analogue to VAR case).

- Generalized responses:

    More realistic in the sense that possibility of regime changes are considered. Computed (via simulations) by:

$$GIR_h(z_t, v_t) = \mathrm{E}\left(y_{t+h} \mid z_t, u_t + v_t\right) - \mathrm{E}\left(y_{t+h} \mid z_t, u_t\right)$$

II. General Comments, Two regime model,
Example 1: Regime Dependence of Fiscal Multiplier
(Mittnik and Semmler 2009)

Two-regime model (Gang and Semmler 2006, 2009), intertemporal but allows for two regimes, Malinvaud tradition (1978, 1994)

•**First regime (stage)** of decision making: unconstrained consumption - employment choice (similar to Gali et al. 2007, Ricardian consumers). Can be associated with high growth rates:

$$c_t^d = G_{11}A_t + G_{12}k_t + g_1$$

•**Second regime (stage)** of decision making: with labor market not cleared, there is constrained choice, consumption depends on actual employment, and firms` production depends on actual demand

$$c_t^d = G_{21}A_t + G_{22}k_t + G_{23}n_t + g_2$$

II. General Comments, Two regime model,

Example 1: Regime Dependence of Fiscal Multiplier
(Mittnik and Semmler 2009)
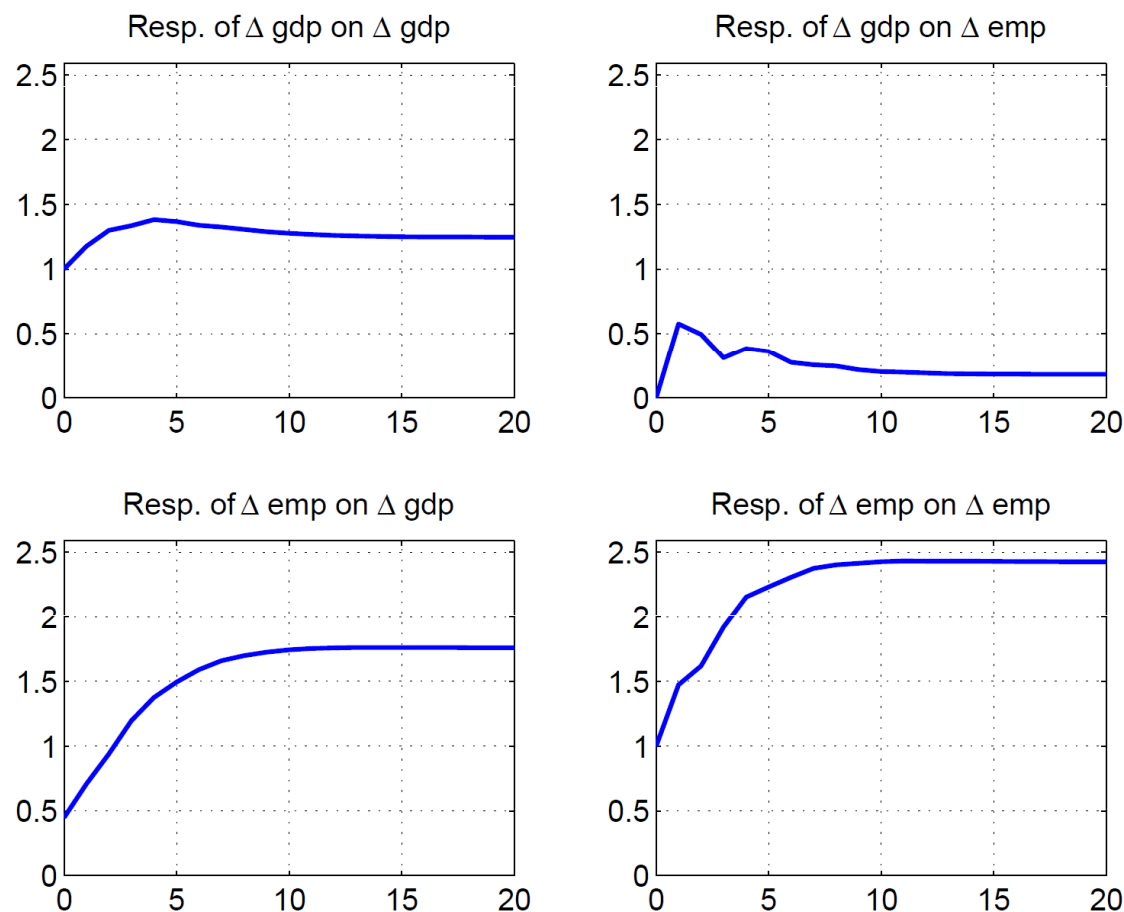
MRVAR Responses within Low-growth Regime

Figure 2: Cumulative Responses in the Low–growth MRVAR–Regime

II. General Comments. Two regime model,
Example 1: Regime Dependence of Fiscal Multiplier (Mittnik and Semmler 2009)
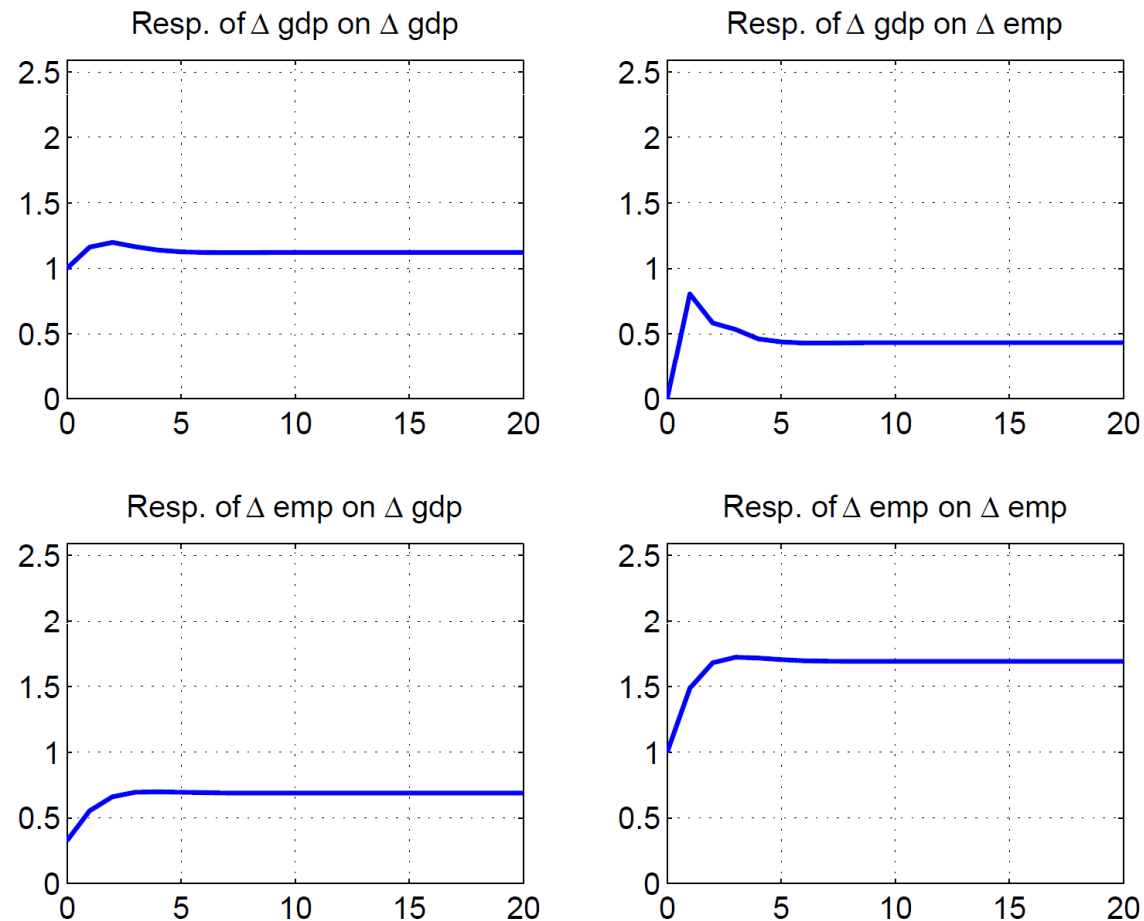
MRVAR Responses Within High-growth Regime

Figure 3: Cumulative Responses in the High–growth MRVAR–Regime

II. General Comments, Two regime model,
Example 2: Dependence of Monetary Policy
(Mittnik and Semmler 2010)

The model: Instability of financial intermediaries; 2 Regimes: **high and low financial stress**, Brunnermeier et al. (2009, 2010), He and Krishnamurthy (2008) etc,,)

→ Show local instability (not mean reverting)

→ We can solve globally the model with DP (Multi Regimes)

→ Estimate the model with MRVAR
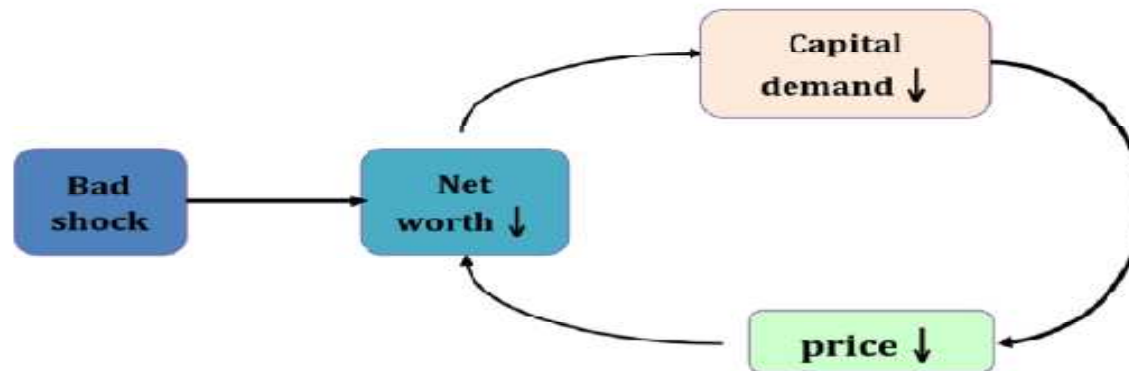
The Unstable Mechanism -- Vicious cycle of amplification for financial intermediaries (unstable financial accelerator)

II. General Comments, Two regime model,
Example 2: Regime Dependence of Monetary Policy
(Mittnik and Semmler 2010)

Balance sheets

Assets	Liabilities
$p_t k_t$	d_t
	$n_t = p_t k_t - d_t$
total assets	$\alpha(p_t k_t - d_t) + (1-\alpha)(p_t k_t - d_t)$

Basic model with two decision variables and two state variables

$$dp_t - \mu_t p_t dt + \sigma_t p_t dZ_t$$

$$dk_t = (\varphi(i_t/k_t) - \delta)k_t dt + \sigma_t k_i dZ_t$$

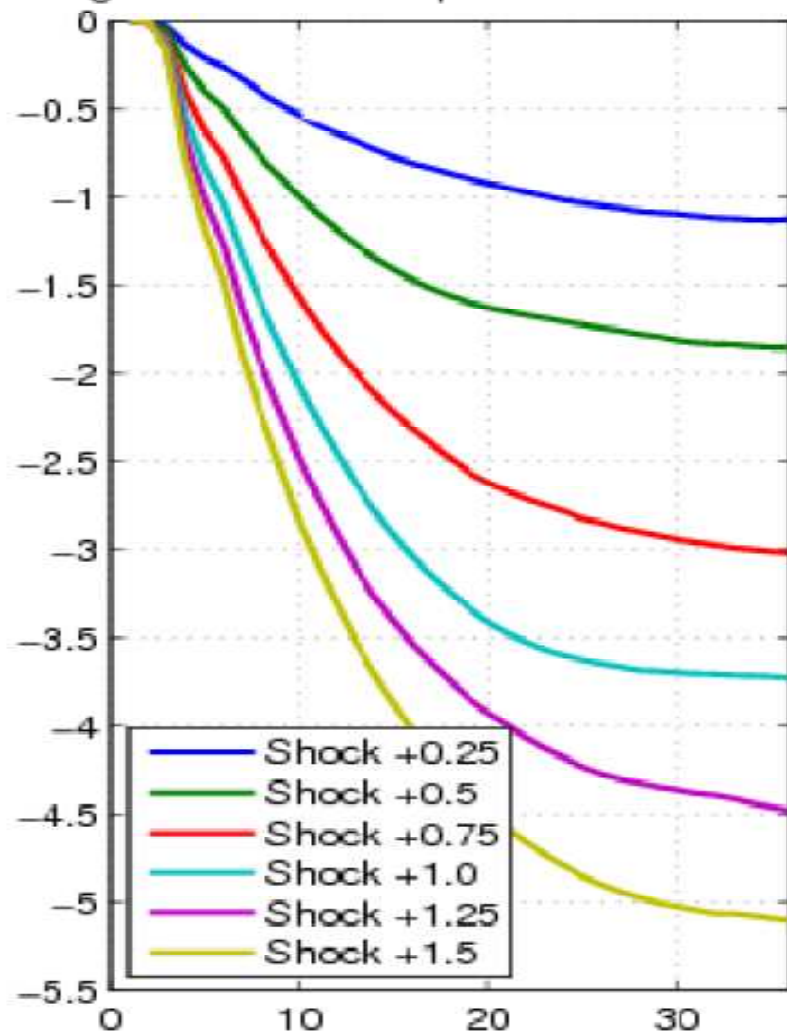$$dd_t = (rd_t \quad (ak_t \quad i_t))dt$$

$$V(\omega_t) = \max_{\tilde{c}_{tt}, g_t} \int_0^\infty e^{-rt} U(\tilde{c}_t) dt$$

$$d\omega_t = ((g_t - r + \sigma^2)\omega_t + a - \tau(g_t))dt - \tilde{c}_t + \sigma_t \omega_t dZ_t$$
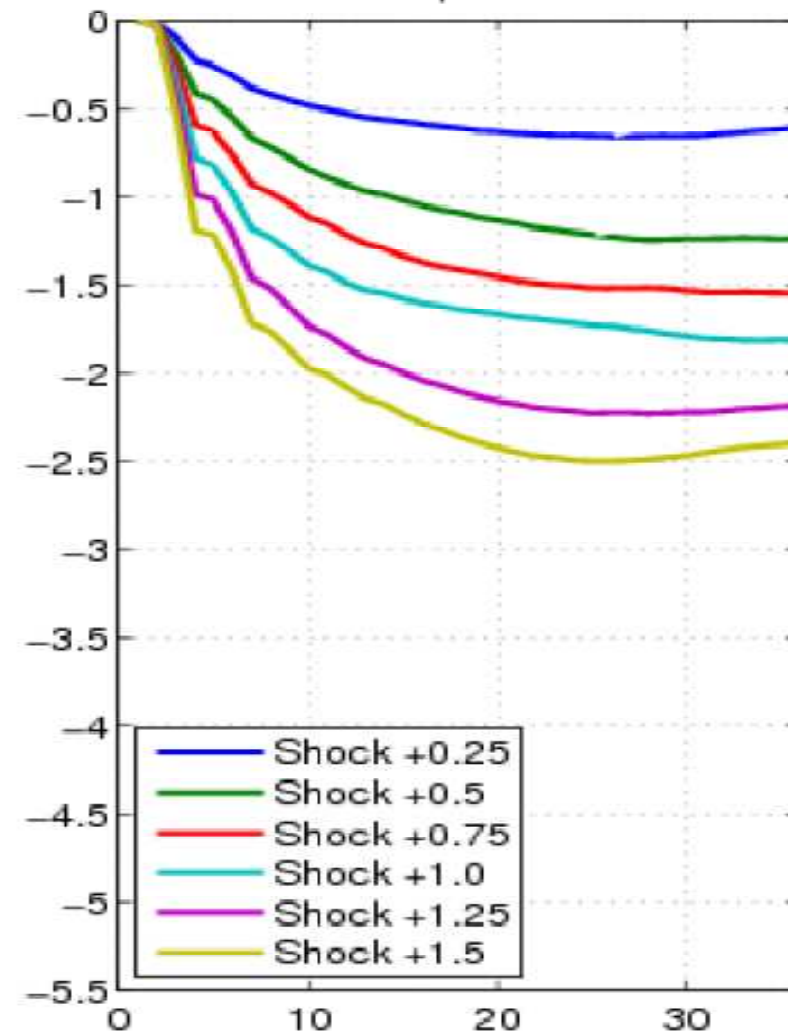
II. General Comments, Two regime model,
Example 2: Regime Dependence of Monetary Policy
(Mittnik and Semmler 2010)

Cumulative responses for the MRVAR: **positive shock** to fin stress index

High Growth: IP Resp to Pos KCFSI Shock

Low Growth: IP Resp to Pos KCFSI Shock

Shock +0.25
Shock +0.5
Shock +0.75
Shock +1.0
Shock +1.25
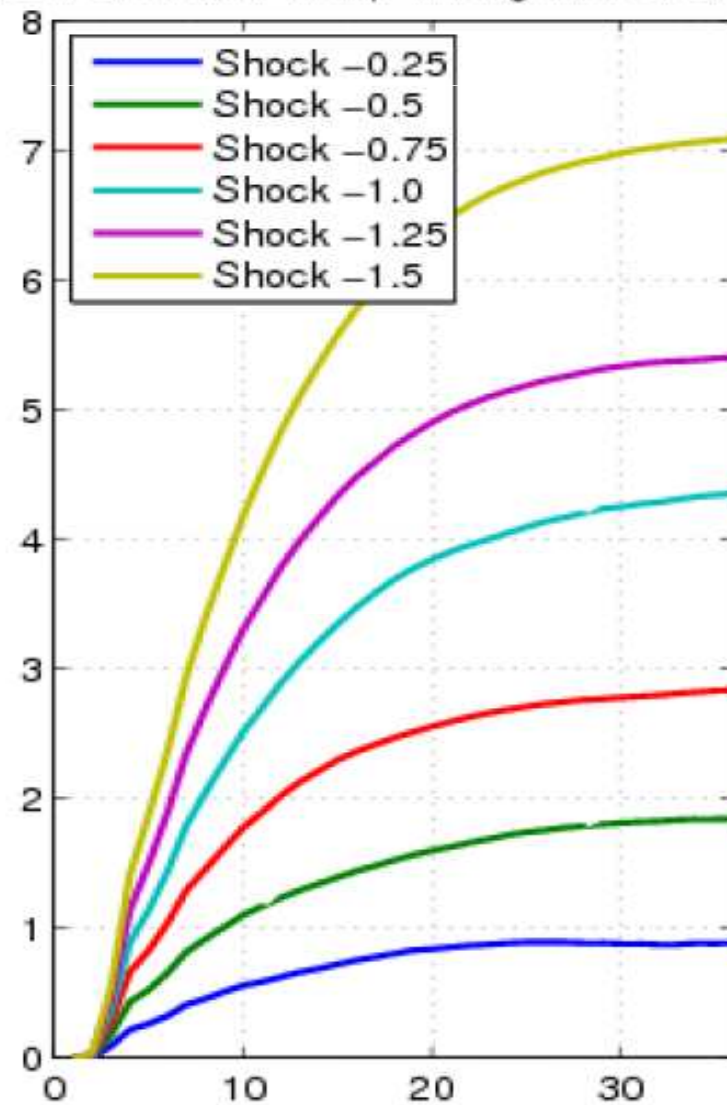Shock +1.5

II. General Comments, Two regime model,
Example 2: Regime Dependence of Monetary Policy
(Mittnik and Semmler 2010)

High Growth: IP Resp to Neg KCFSI Shock

Low Growth: IP Resp to Neg KCFSI Shock

Shock −0.25
Shock −0.5
Shock −0.75
Shock −1.0
Shock −1.25
Shock −1.5
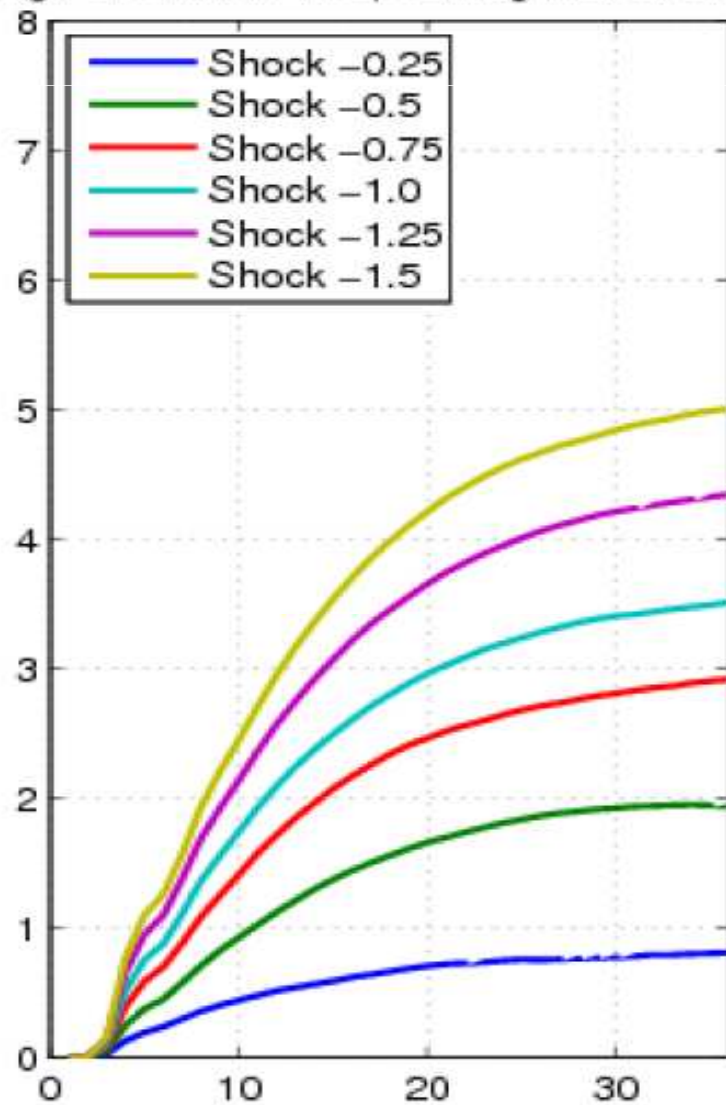
II. General Comments; What makes MR Models and Regime Dependence of Fiscal and Monetary Policies plausible? Timing matters! (Mittnik and Semmler 2009, 2010)

=> **Fiscal policy** is regime dependent: In the different regimes policy has different effects

- Firms face sales constraints and households face employment constraints
- Additional spending has strong externality effects: It relaxes income, liquidity and credit constraints
- The more so, the more it is supported by liquidity provision and low interest rates

=> **Monetary policy** is regime dependent: ...

- Balance sheet dynamics of financial intermediaries may be unstable
- Financial intermediaries maybe in a stage of low of high financial stress, face different constraints in different regimes...
- Monetary policy effects (impulse- responses) will be different in different regimes, one needs to use a MRVAR

III. Conclusions

=> There seems to be some agreement on a useful "Core of Macroeconomics"

=> Macroeconomic (stabilizing, destablizing) feedback mechanisms have been neglected (to some extent in both ABM as well as DSGE models)

=> Regime dependence behavior and reaction is neglected, multiple regime models needed; and policy effects may need to be studied by MRVARs, timing matters

ABM,,, Giovanni

Evaluation of Agent Based Models

- ABM are as good as the economists behind them...

- In terms of microeconomics (markets and behavior) its complex, but still simple, miss many market and institutional aspects...

- Incomplete with respect to the macroeconomy, ABM cannot replace macroeconomics and dynamics, in particular, they often miss macroeconomic feedback mechanisms...

- But excellent for certain aspects: trading and market interactions, connectedness of agents, innovation and skills, income and distribution and inequality, early warning systems...

II. General Comments..
typical structure and feedback mechanisms:

Monetary Policy

Asset markets:
Real Balances, Real Bonds, Expected Profit Rate, Capital Gains Expectations: determine Tobin's q

Expected Rate of Return on Equities

$$\begin{pmatrix} M \\ B \\ E \end{pmatrix} : \begin{pmatrix} -i & 0 \\ +i & -r_e^e \\ 0 & +r_e^e \end{pmatrix}$$

Real Wage Changes (Rose-Effects)

$I(q,.)$

Fiscal Policy

Goods Market:
Aggregate Demand and Expected Sales: determine Actual Output (plus Intended Inventory Changes); Metzler (and Harrod) Accelerator-Effects

$$\begin{pmatrix} output \\ growth \\ r-wage \\ growth \end{pmatrix} : \begin{pmatrix} - & \pm \\ \\ \pm & - \end{pmatrix}$$

Wage Changes

$F(L^d,.)$

Price Changes

Labor Market:
Goods Market dependent Employment Decisions of Firms

Demand pressure / cost push determined wage-price spiral

Deflation danger?

INFLATION IN THE EURO AREA

Change from previous year in %

Average of DM: 2.7%

Inflation rate

July 1.7%

Sources: Eurostat, Database Economy and Finance, Prices, 30 July 2010; Deutsche Bundesbank, Time Series Database, Consumer Price Index; Ifo Institute calculations.

New Macro...
Challenges in Macro theory

Krugman: NYT, September 6, 2009

So here's what I think economists have to do. First, they have to face up to the inconvenient reality that financial markets fall far short of perfection, that they are subject to extraordinary delusions and the madness of crowds. Second, they have to admit – and this will be very hard for the people who giggled and whispered over Keynes – that Keynesian economics remains the best framework we have for making sense of recessions and depressions. Third, they'll have to do their best to incorporate the realities of finance into macroeconomics.

New ...directions

Publications: New School (Willi Semmler, Christian Proano), Bielefeld University (Peter Flaschel, Alfred Greiner), UTS Sidney (Carl Chiarella), Toichiro Asada (Chuo University), see www.newschool.edu/nssr/cem

=> **Book** (with A. Greiner and W Zhang) , „Monetary and Fiscal Policy in the Euro-Area", Elsevier, Euro- Area a new emerging macroeconomy...

 => Two **new papers**: „Stabilizing an Unstable Economy", „Instability of the Banking Sector" (narrow banking)

=> A **new book** (P. Flaschel and C. Chiarella,,,,): „Disequilibrium, Debt and Fluctuating Growth", Cambridge University Press