Financial Factors in Economic Fluctuations

Discussion by Wouter den Haan

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Overview

- Model at the frontier of Bayesian DSGE estimation/modelling
  - many shocks (15 or 16)
  - several frictions
  - many things to learn from this paper

Financial friction

- Costly state verification CSV
  - One period (nominal) debt
  - Idiosyncratic shocks
  - Unavoidable bankruptcy cost:
    - current-period resources $<$ debt $+$ interest $\Longrightarrow$ bankruptcy
  - debt and lending rate chosen under constraint that lender breaks even

Problems of CSV

- Aggregate productivity (return) $\uparrow \Longrightarrow$ default rate $\uparrow$
  - Firms face trade off between expansion and default
  - Aggregate productivity $\uparrow \Longrightarrow$ firms expand at the cost of increased default
- CMR find:
  - Aggregate productivity (return) $\uparrow \Longrightarrow$ lending rate $\downarrow$
- Result for lending rate does indeed seem ambiguous

$$\bar{\omega}\tilde{Q}K' = (1 + r^l)(K' - N)$$

- But easy to come with an example in which: $Z\tilde{Q} \uparrow \Longrightarrow r^l \downarrow$

Procyclical lending rate

- $\omega \sim U(0, 1.4)$
- bankruptcy costs 10%
- $\tilde{Q}$ increases from 1.09 to 1.091
- default rate increases from 18% to 19%
- lending rate increases from 4.8% to 5.7%

Problems of CSV

- Existence of friction **dampens** the impact of shocks
  - Suppose $\tilde{Q}$ plunges
  - This entrepreneur faces linear revenue function
  - Problem is not simply scaled down because net worth is fixed
  - $\Longrightarrow$
  - $\tilde{Q} \downarrow \Longrightarrow$ net worth is large relative to $\tilde{Q} \downarrow$
- It's popularity is due to effects of net-worth channel
  - profits $\uparrow \Longrightarrow$ net worth increases
  - price of capital $\uparrow \Longrightarrow$ market value net worth increases

Problems of CSV

- Easy implementation requires linearity
- Stability requires decreasing returns
- Solution:
  - Put financial friction in linear part of the model
  - Typically this is production of investment goods
  - Problem: effects are quantitatively small

Nice aspects of CMR's implementation

- Friction applies to complete capital stock not just investment
  - entrepreneurs buy and sell capital stock at end of period
  - In between buying and selling there is a "depreciation" shock
- CMR add a shock that makes default/risk premium countercyclical
  - time-varying variance of idiosyncratic shock, σ_t
- Nominal contracts: uncertainty about real cost of debt can magnify or dampen net worth channel

Contributions

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- History of business cycles: What shocks mattered when and how much
  - new result is that σ_t is very important for business cycle fluctuations
- Model building:
  - alternative way to implement CSV
  - interaction nominal contracts and net worth channel
- Technical: Showing what is feasible, a Herculean effort

Larry taming the 16-shock monster

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- What do we know about these techniques?
- Small sample bias?
- Speed of convergence?
- Behavior in presence of model specification?
- For what implementation of MH are these problems least severe?

Outline of a 2020 working paper

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- No more conferences with 7 papers per day

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- Chapter 20: understanding the shocks
  - What is the σ_t shock?

Shocks versus the model

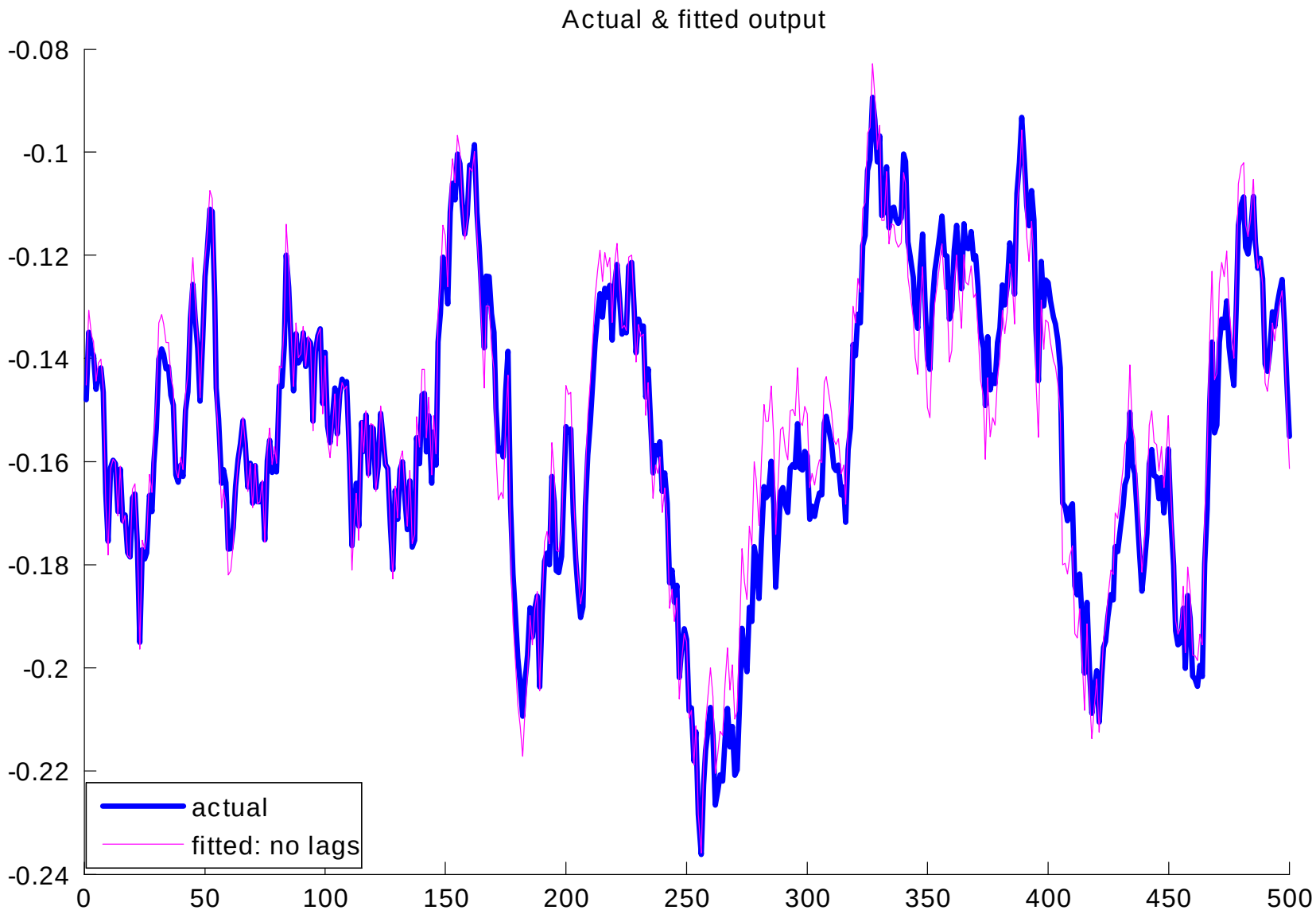
Policy rule in DSGE model:

$$z_{t+1} = a_0 + A_1 z_t + A_2 shocks_t$$

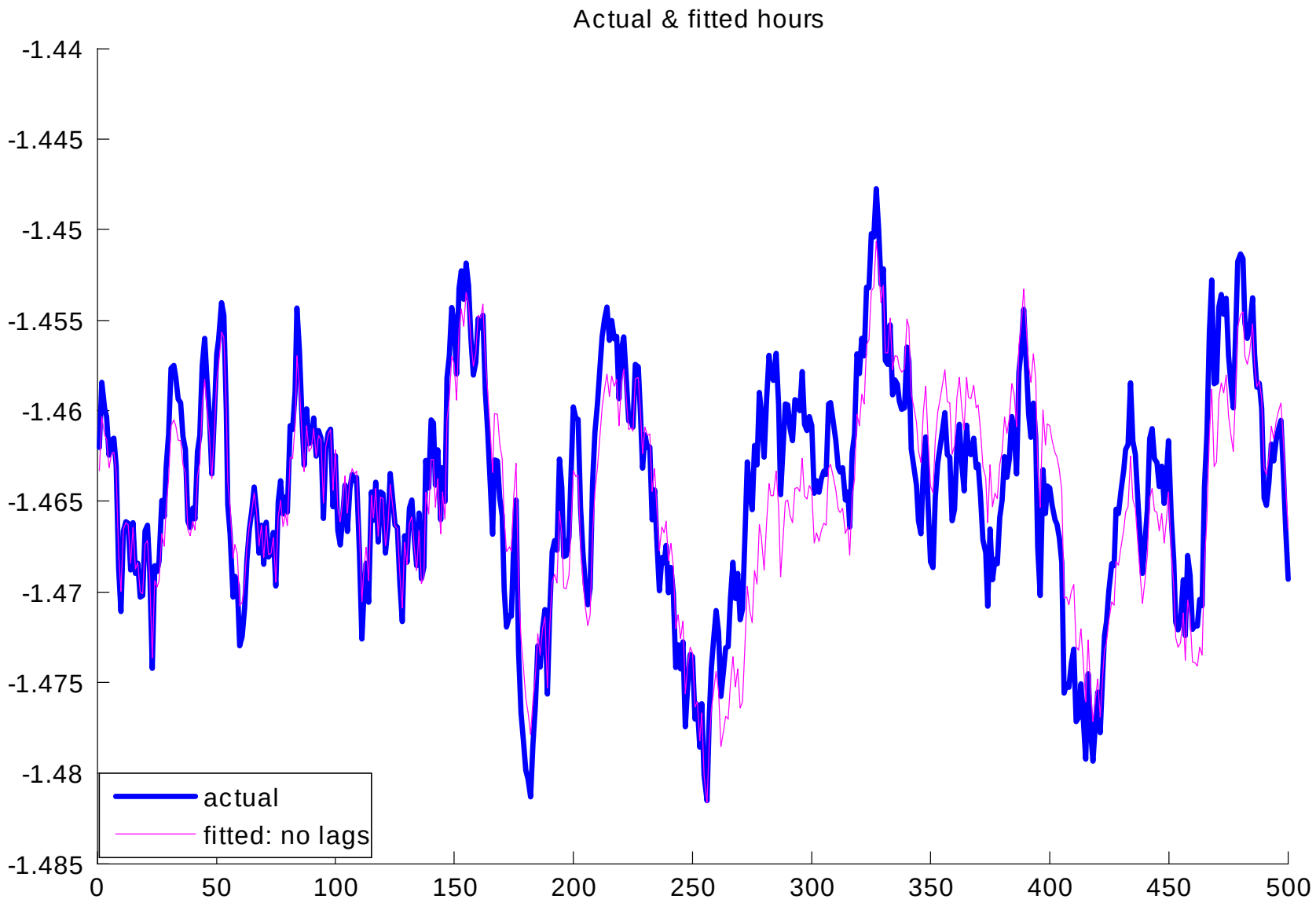
- How much can the contemporaneous values of the shocks explain by themselves?
- That is, how bad is this SGE model:

$$z_{t+1} = \tilde{a}_0 + \tilde{A}_1 z_t + \tilde{A}_2 shocks_t$$

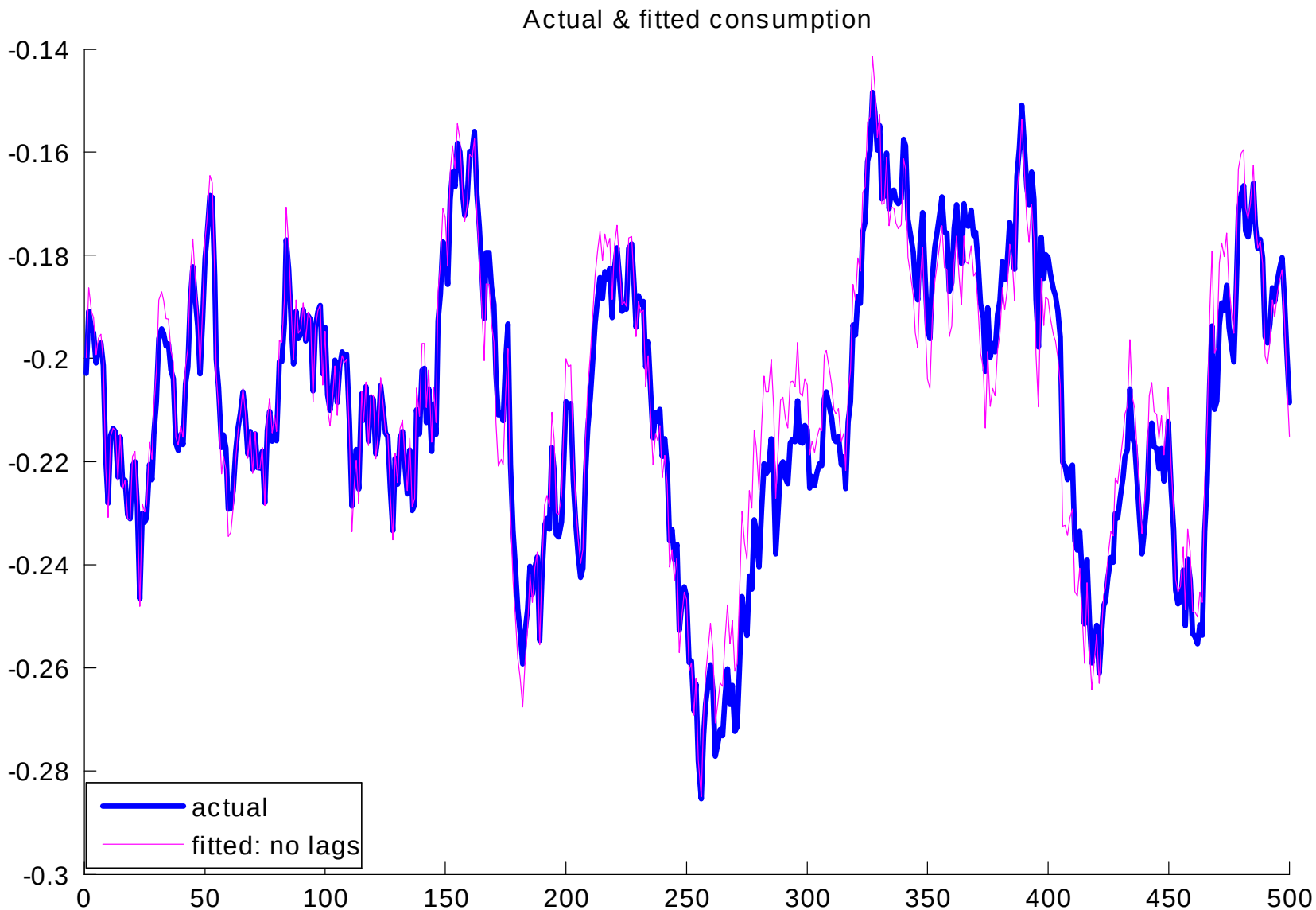
Output & current productivity shock



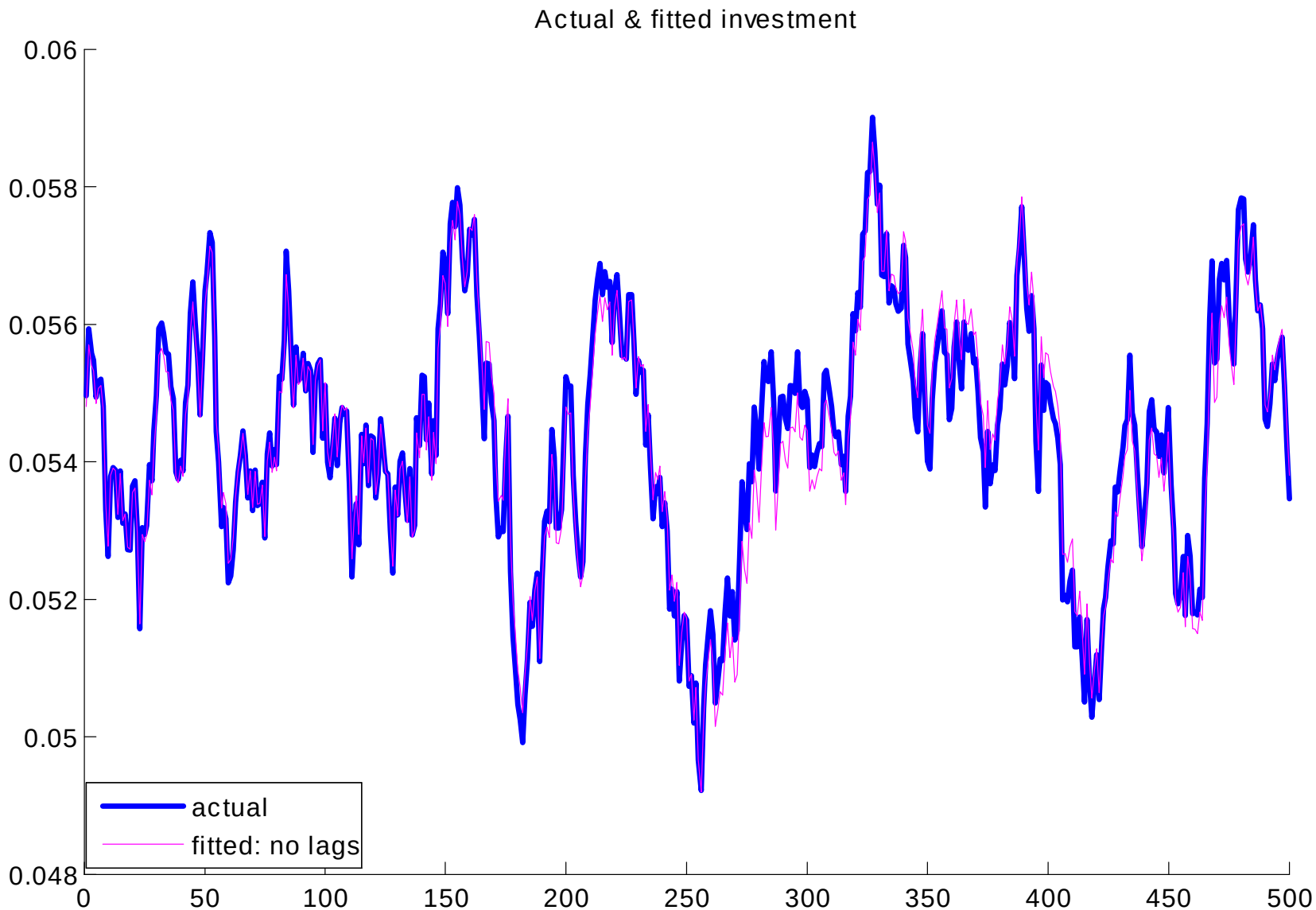
Hours & current productivity shock



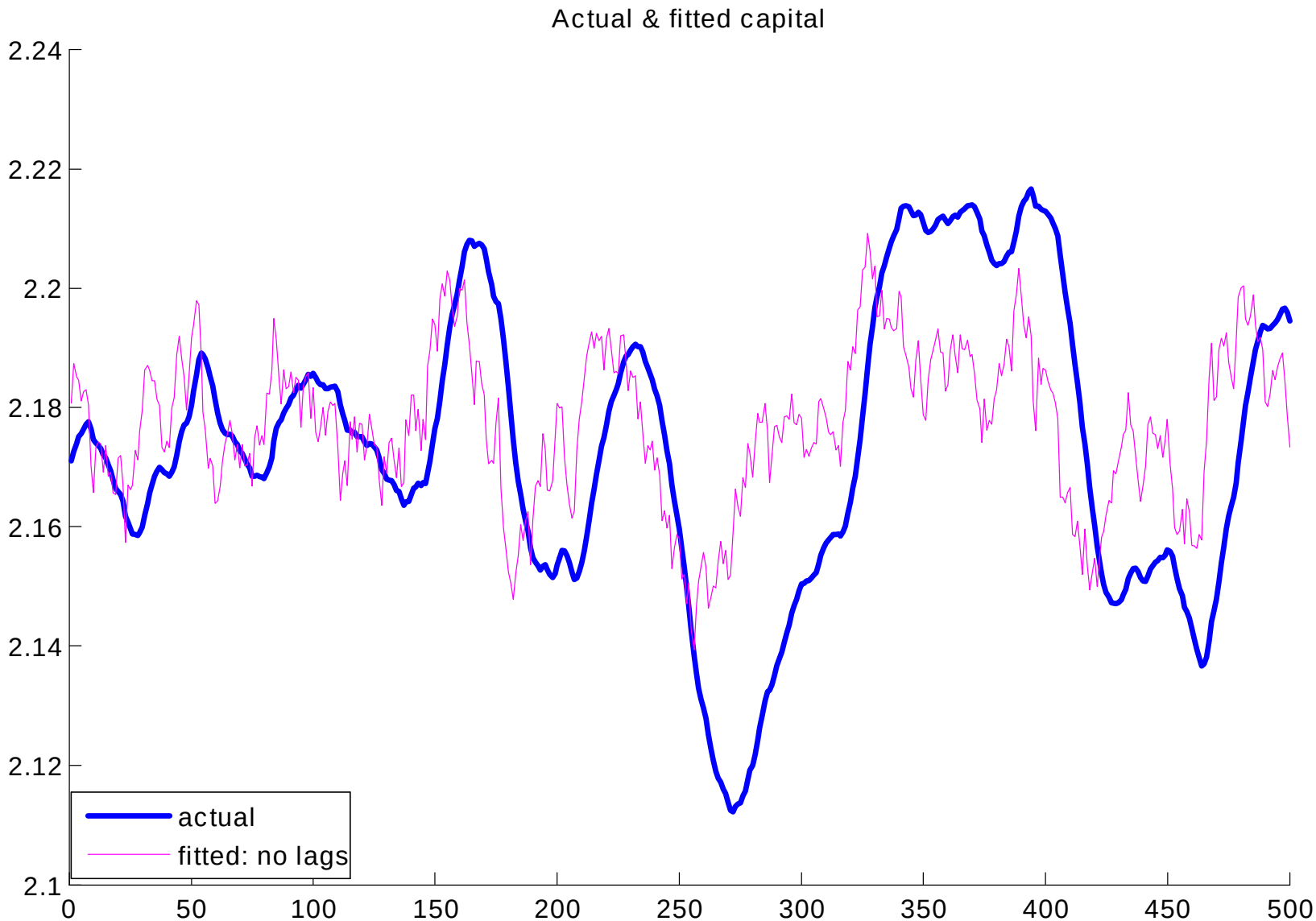
Consumption & current productivity shock



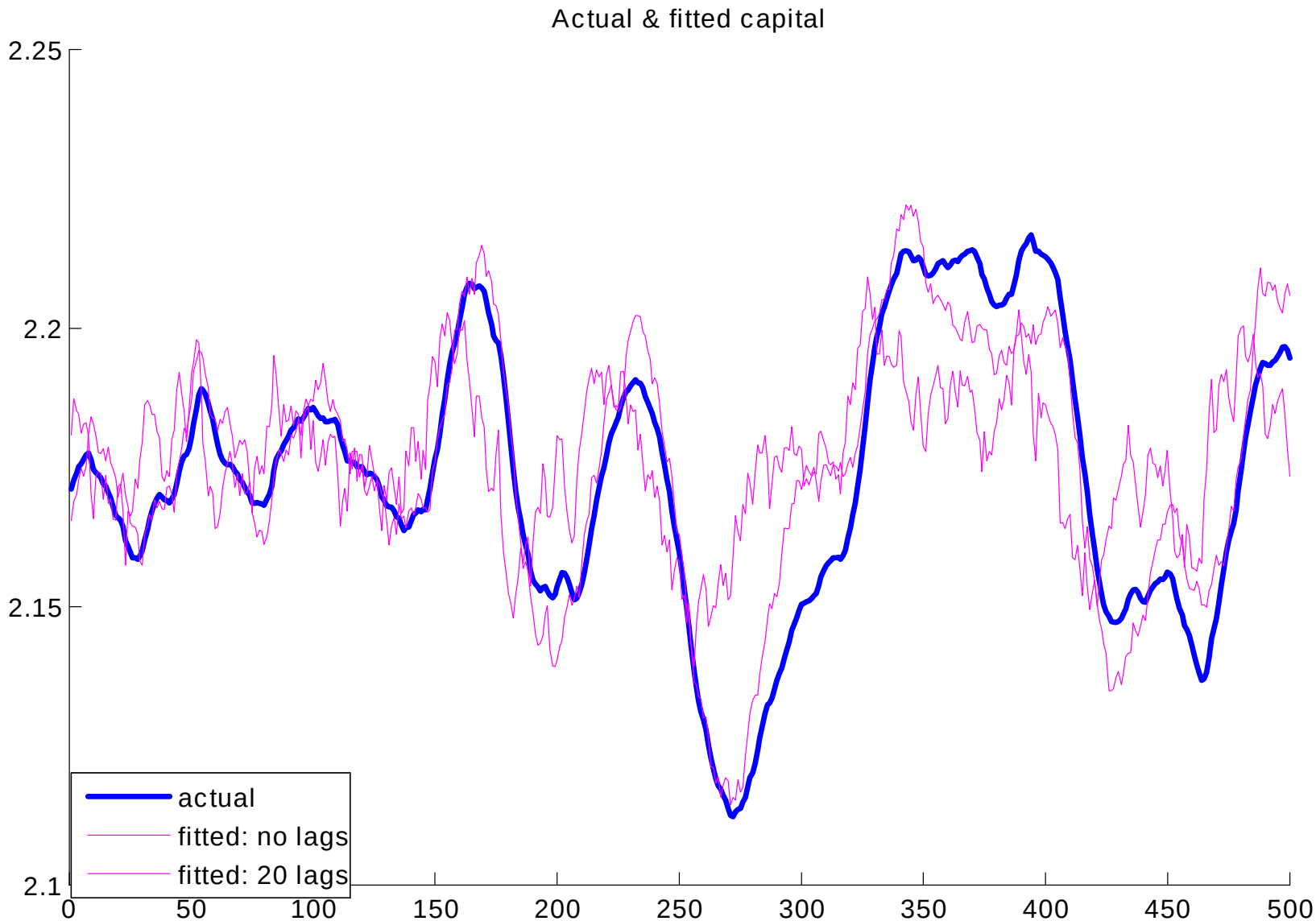
Investment & current productivity shock



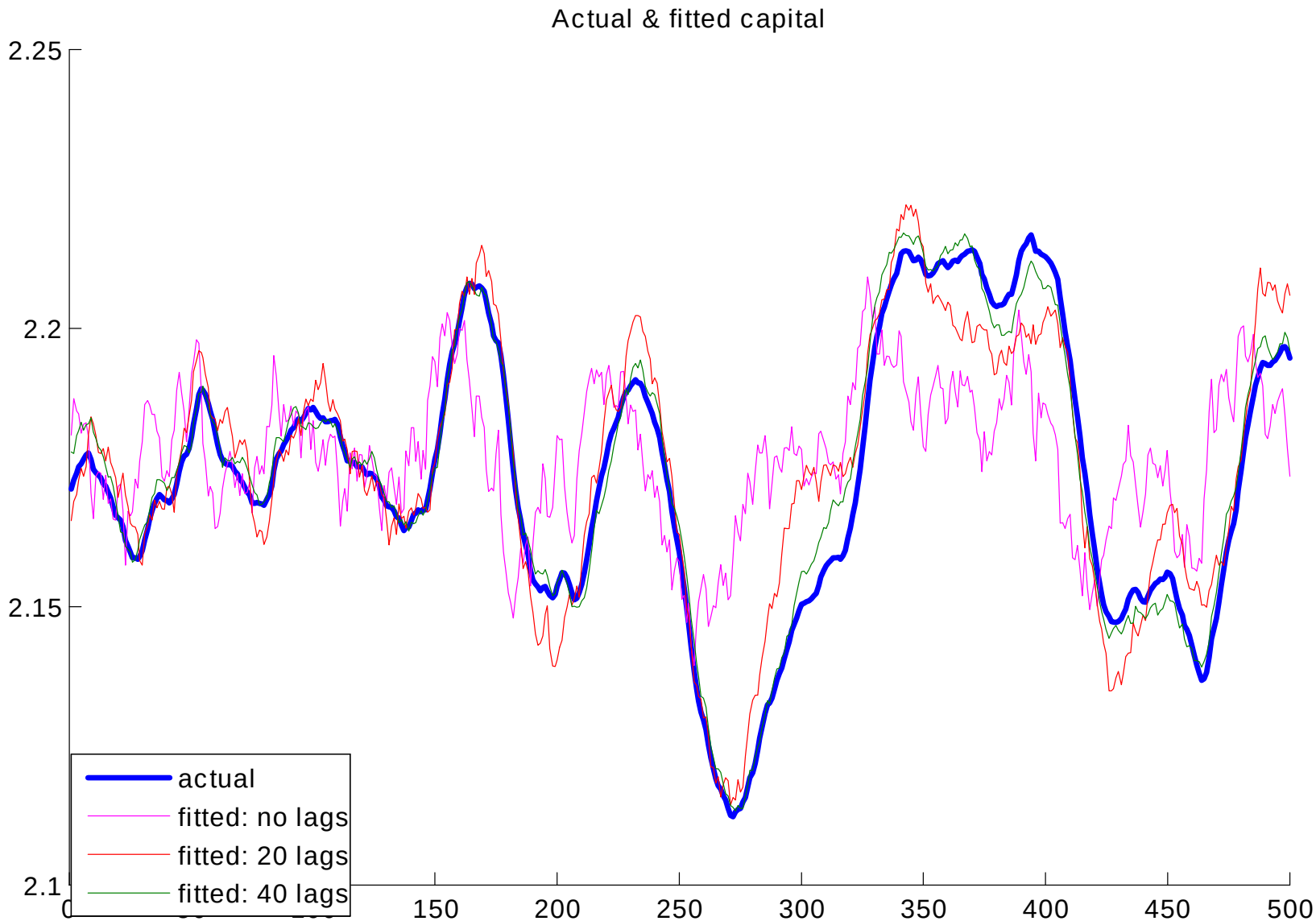
Capital & current productivity shock



Adding 20 lagged values of the shock



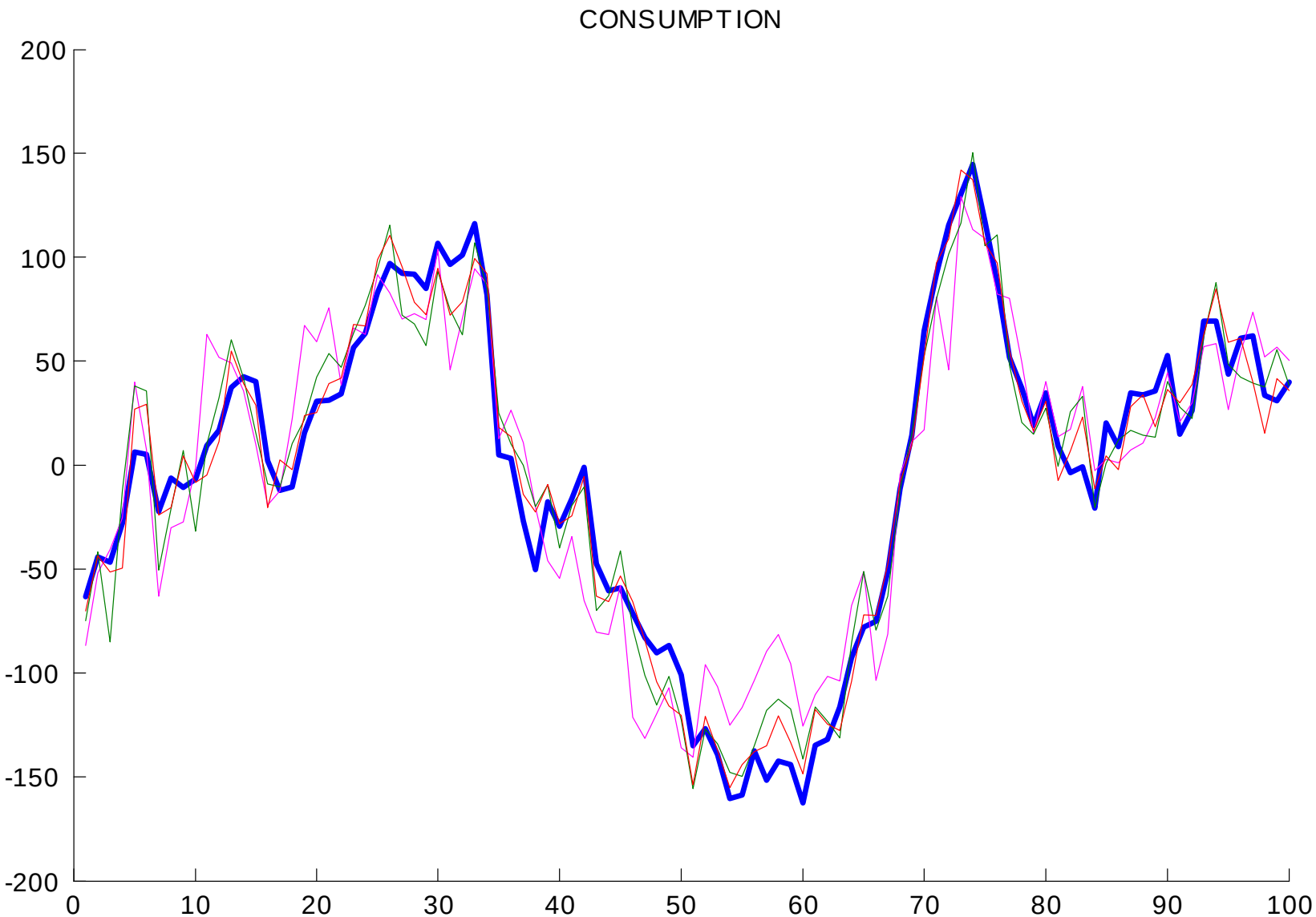
Adding 40 lagged values of shock



R2

	Only current	+20 lags	+40 lags
Output	0.958	0.993	0.999
Hours	**0.825**	0.971	0.994
Consumption	0.947	0.991	0.998
Investment	0.966	0.994	0.999
Capital	**0.288**	**0.880**	0.976

Using current shocks & 1 & 2 lags



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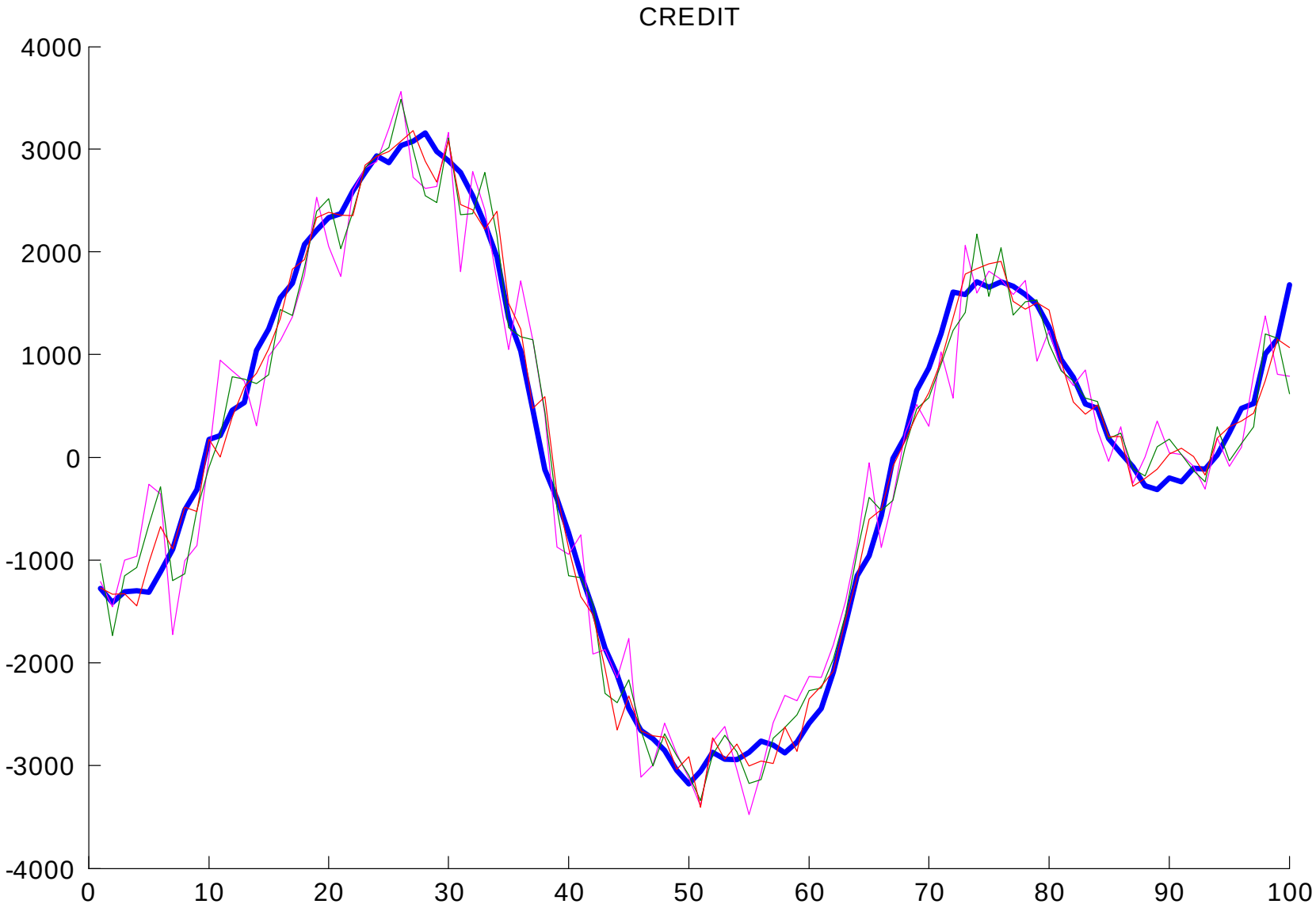

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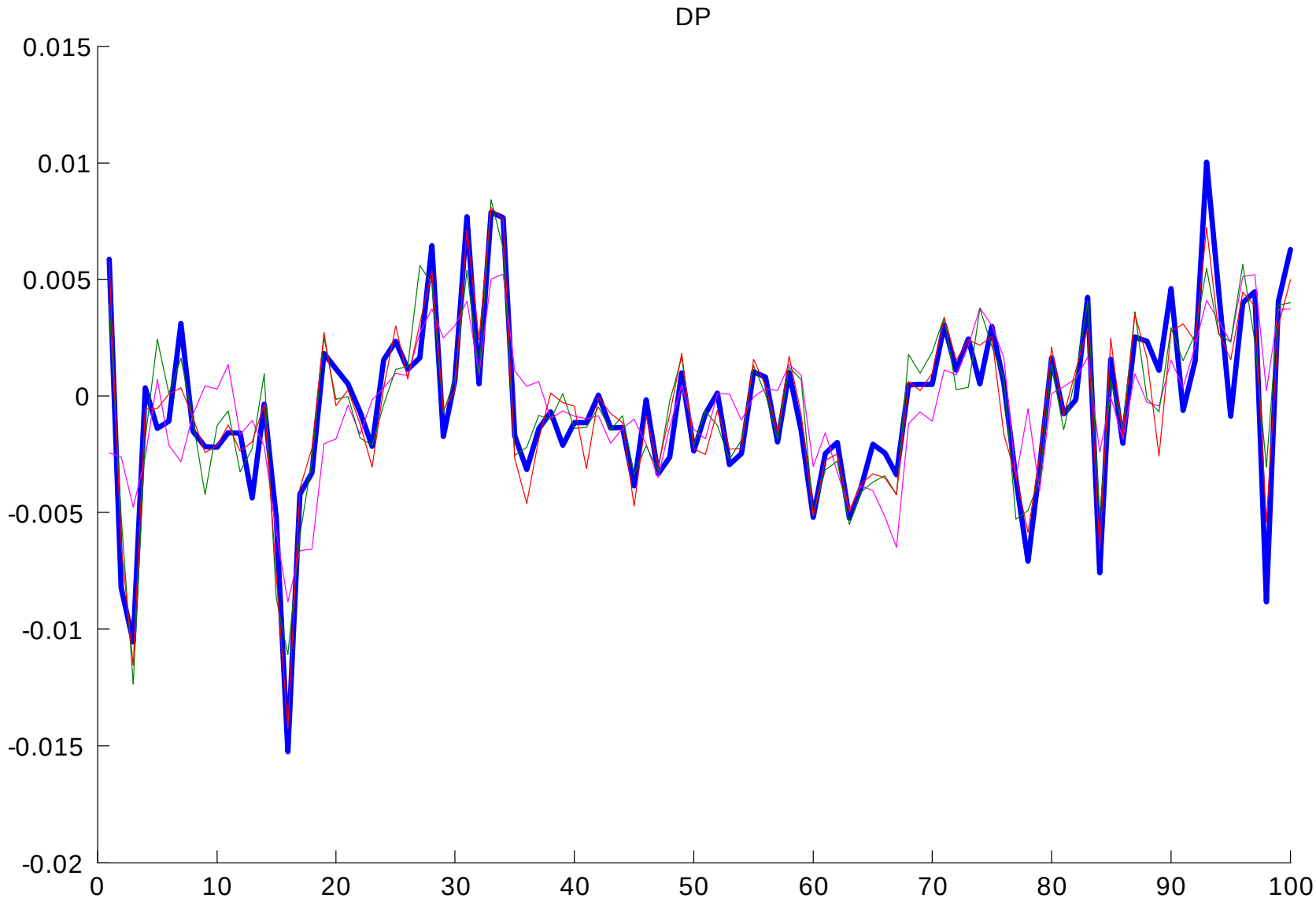

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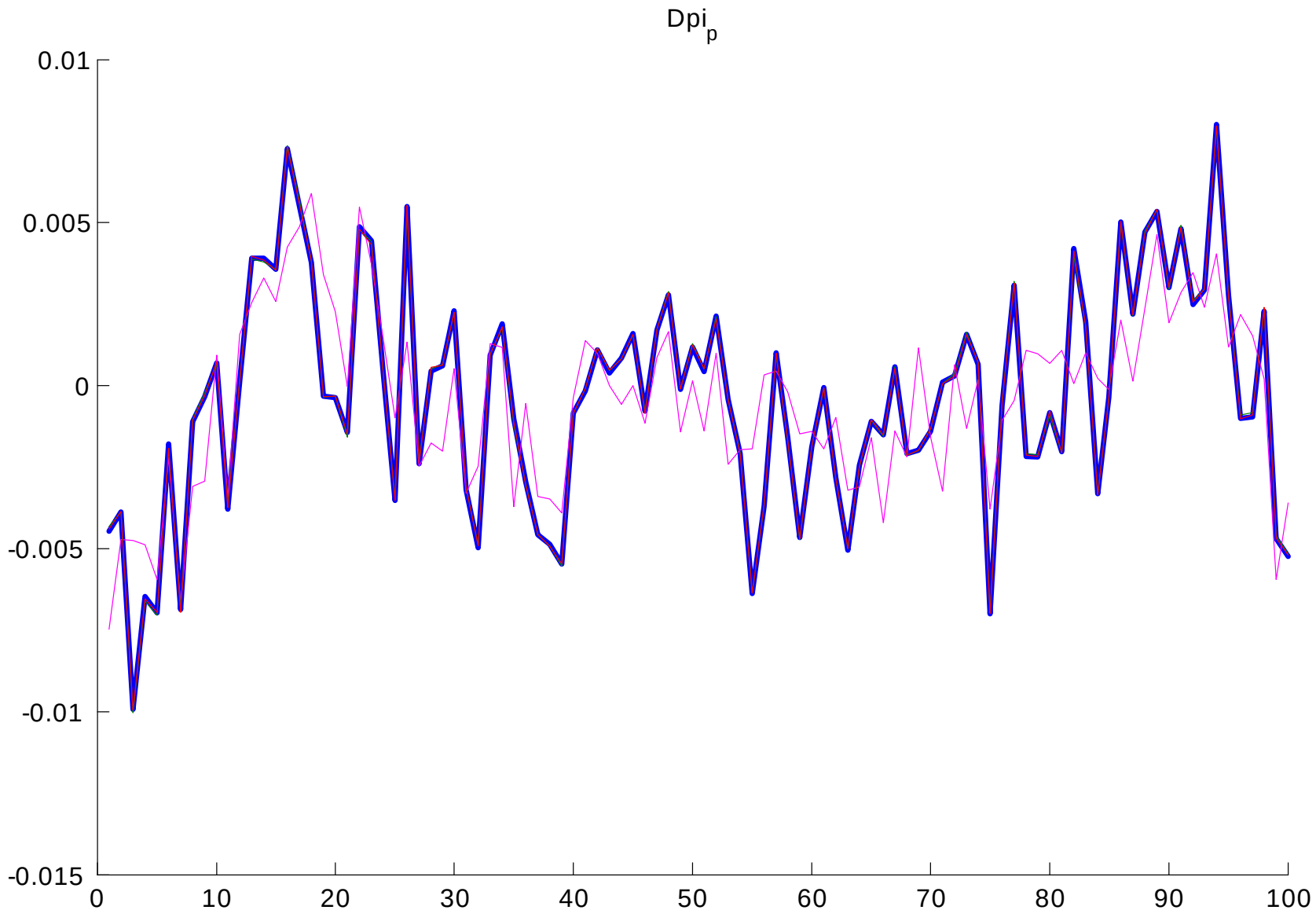

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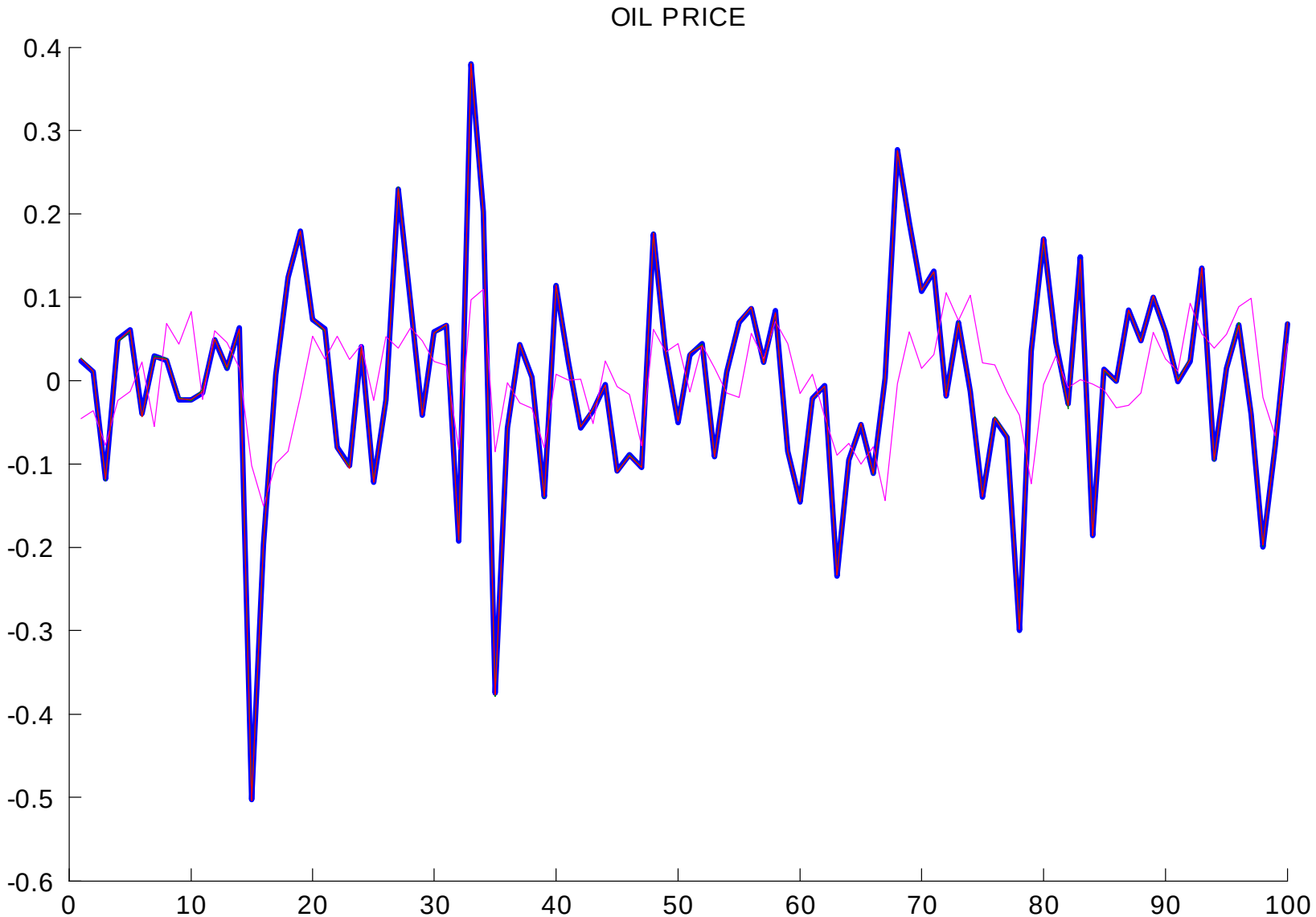

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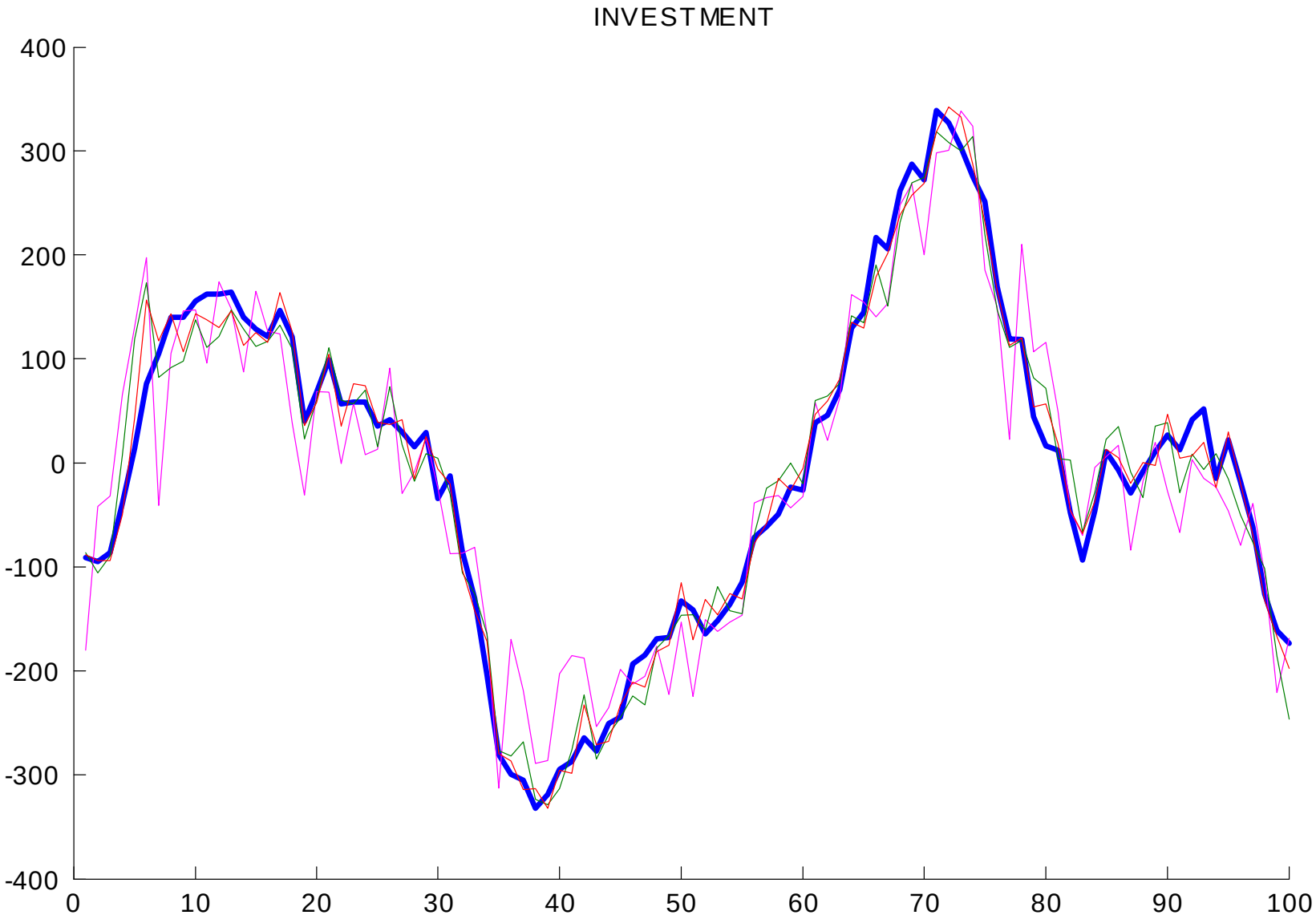

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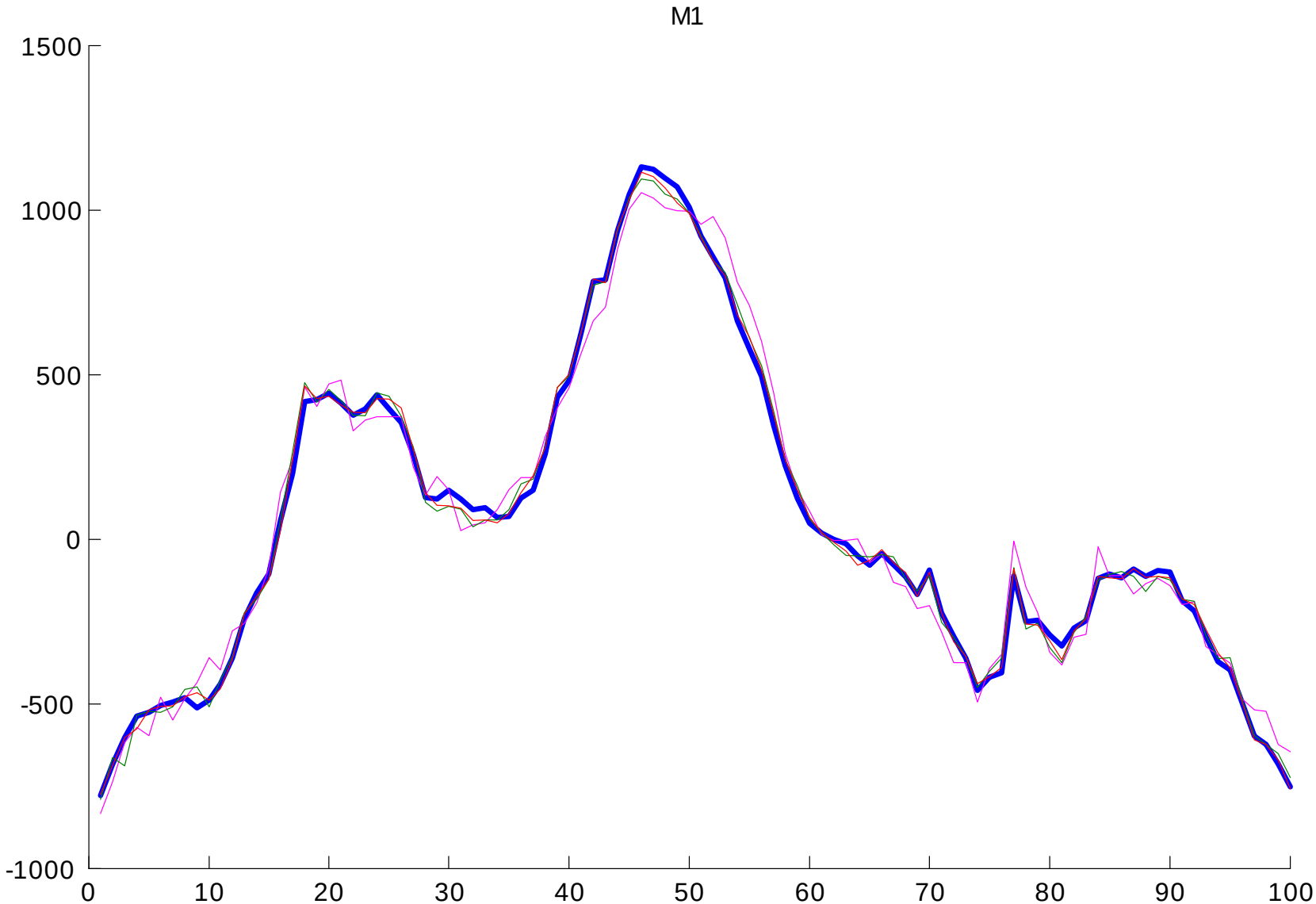

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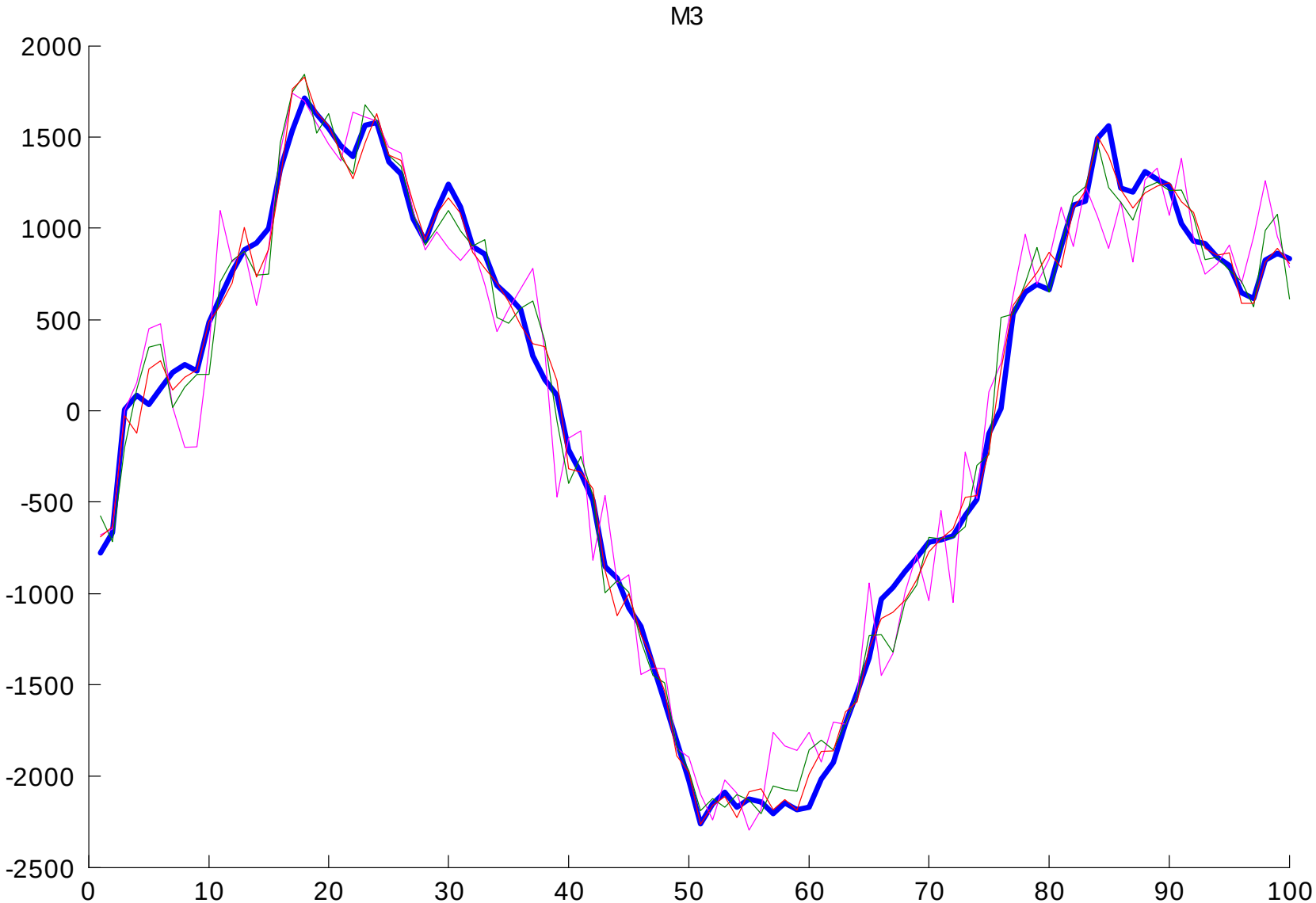

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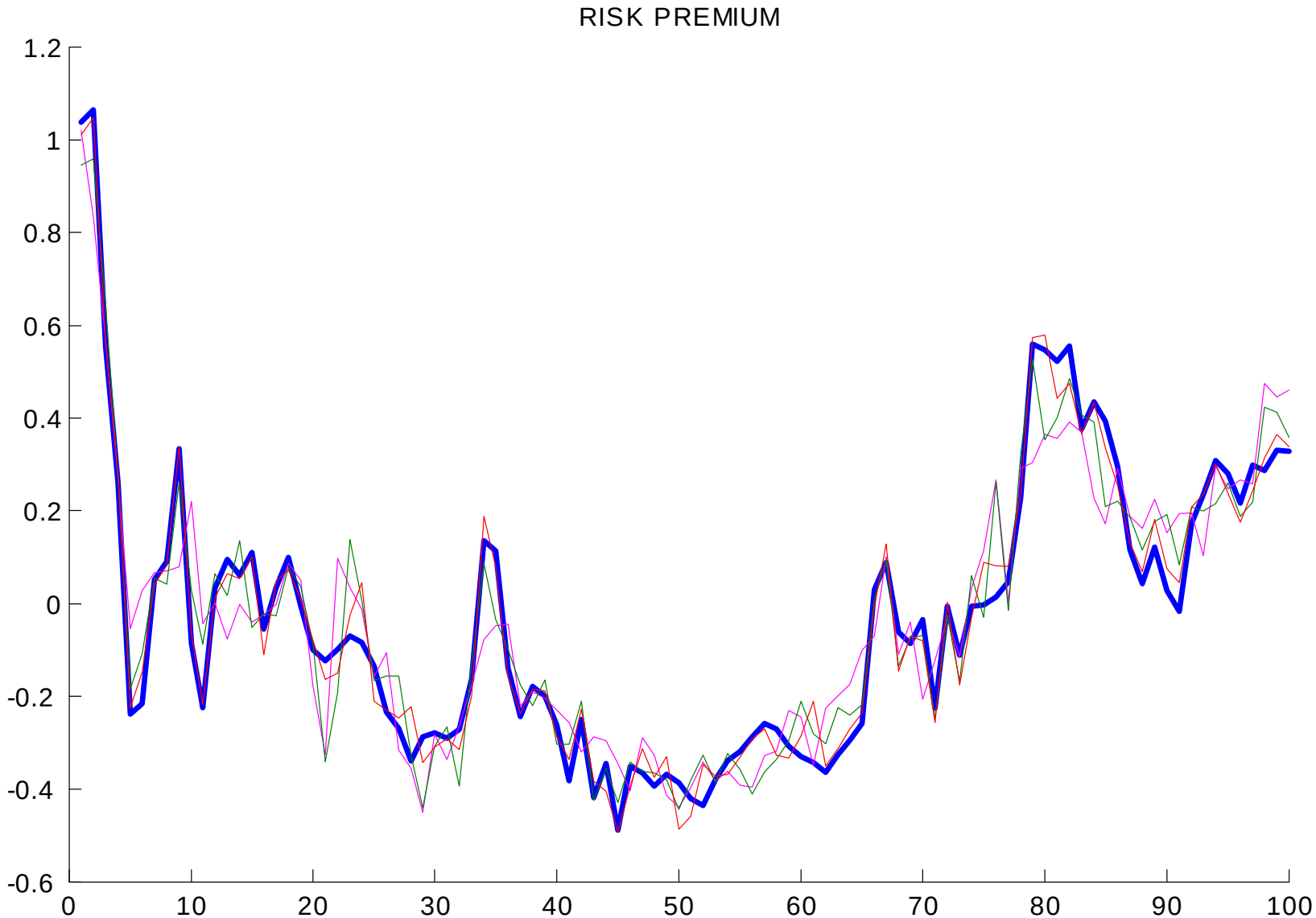

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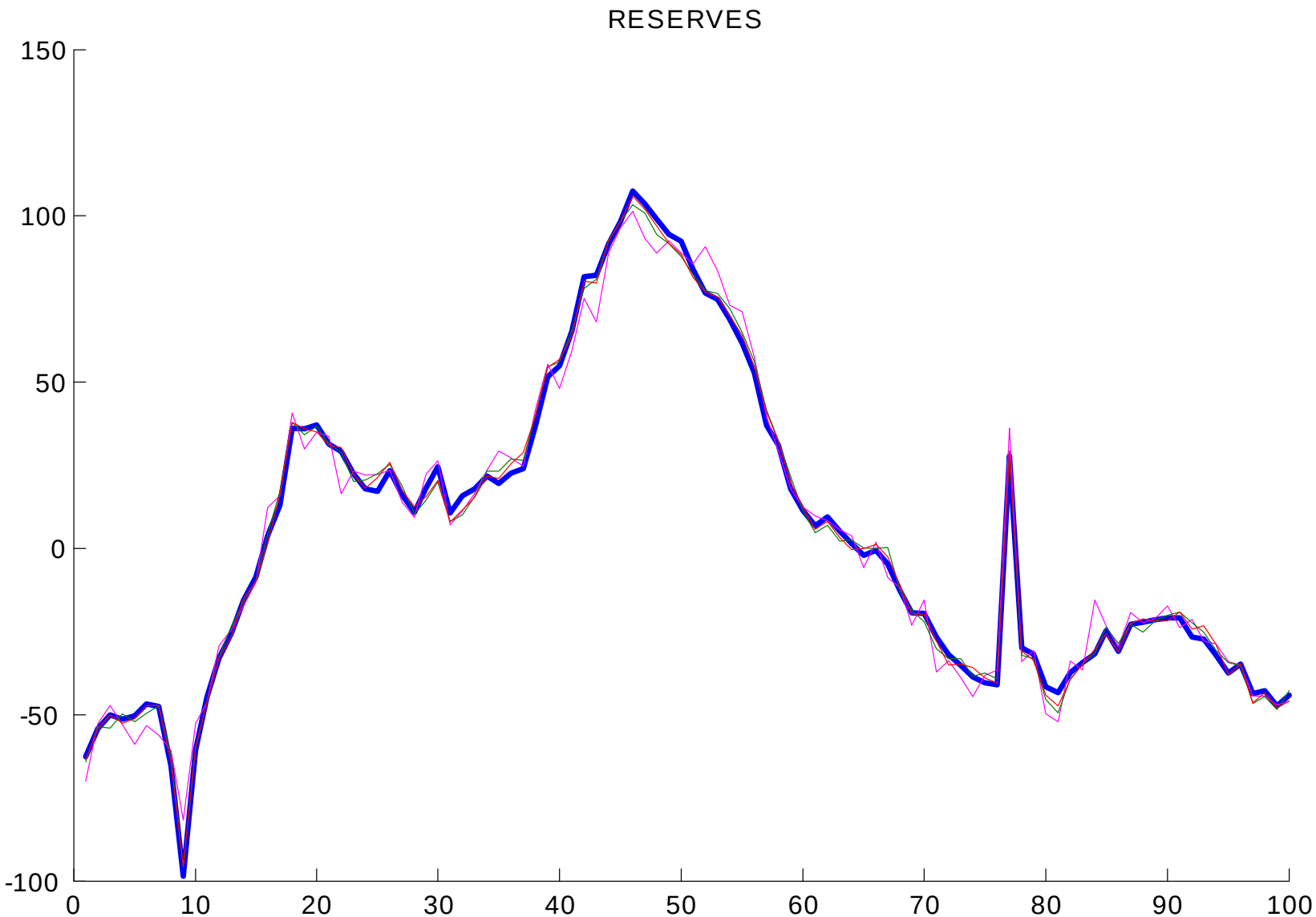

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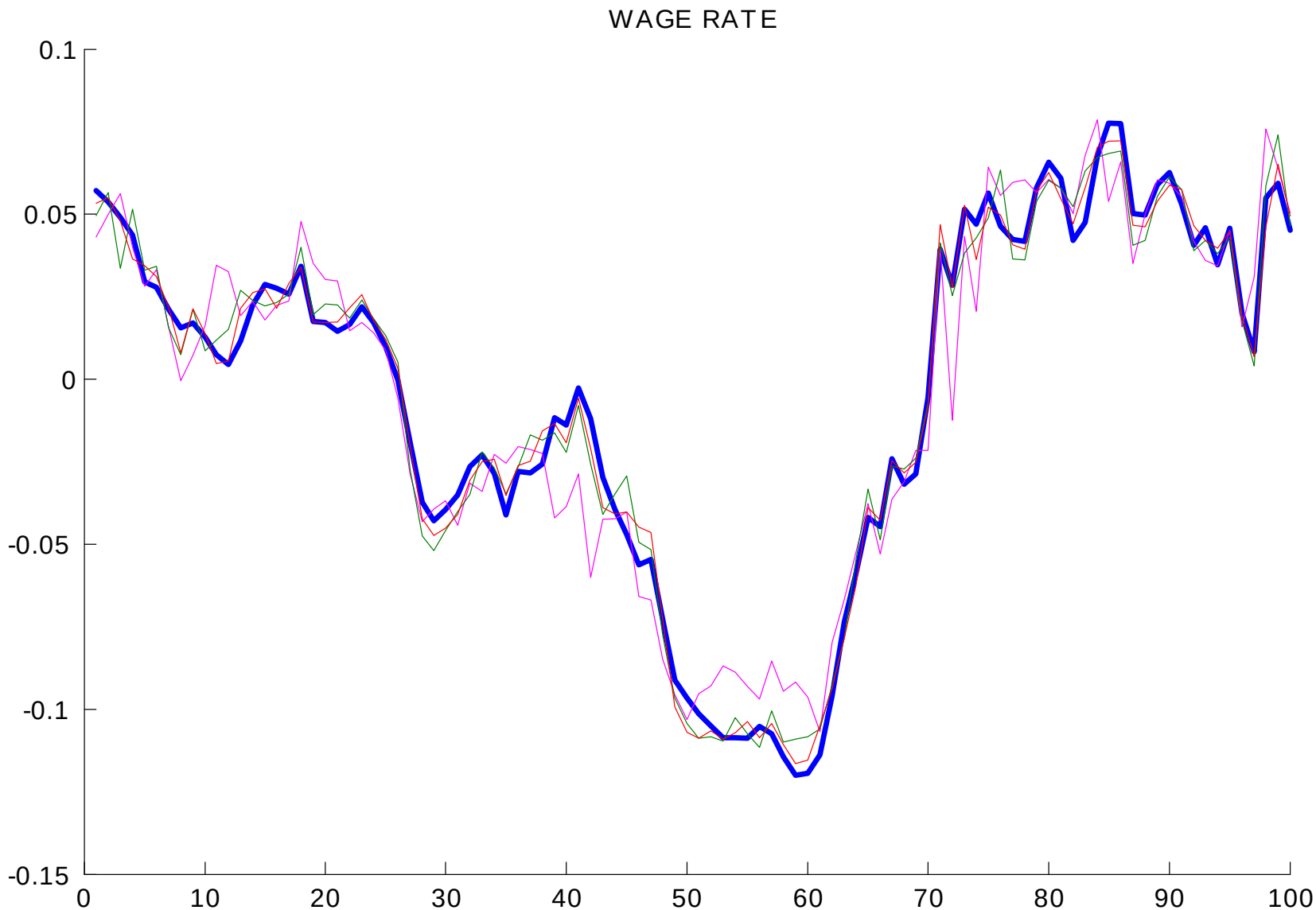

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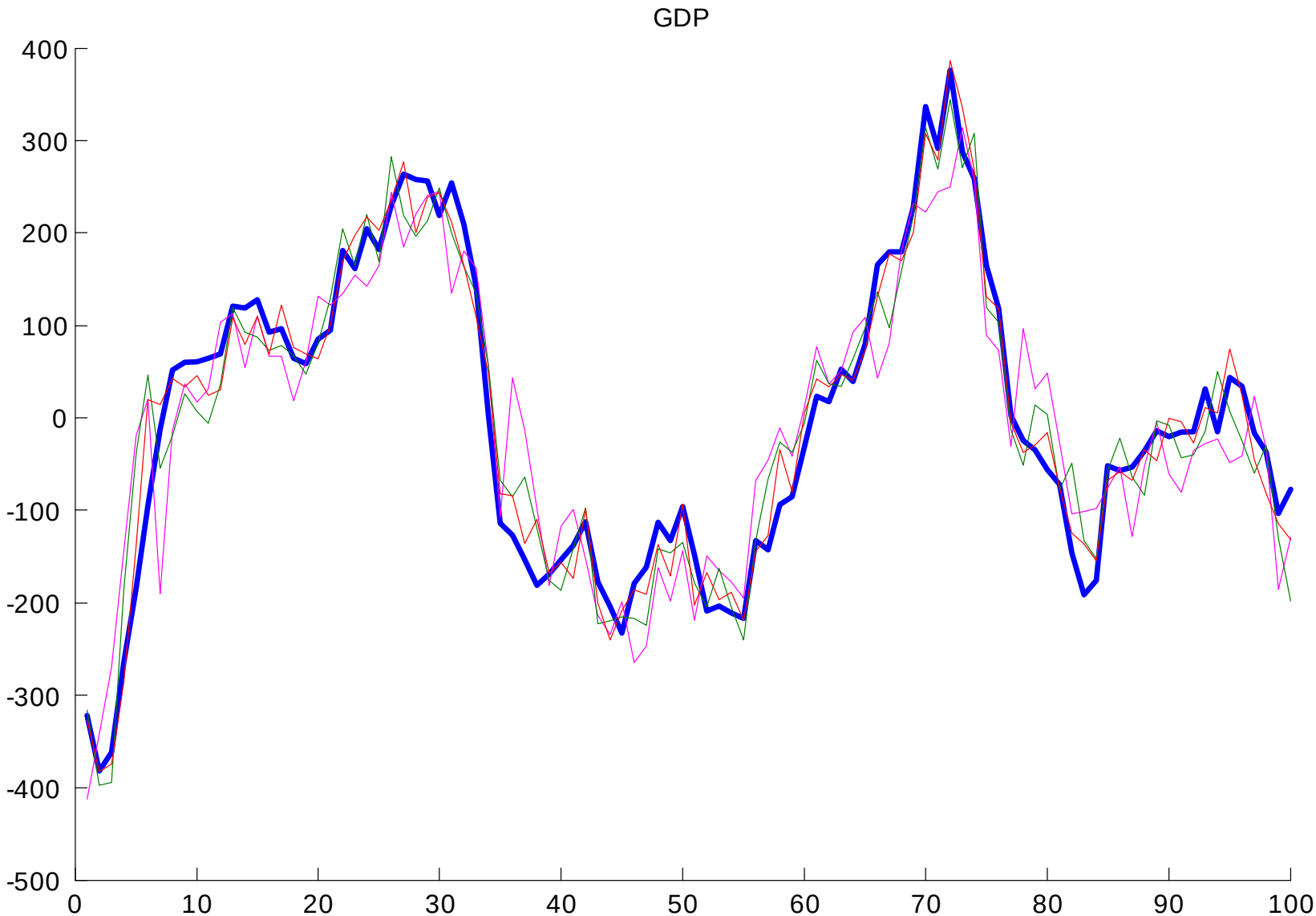

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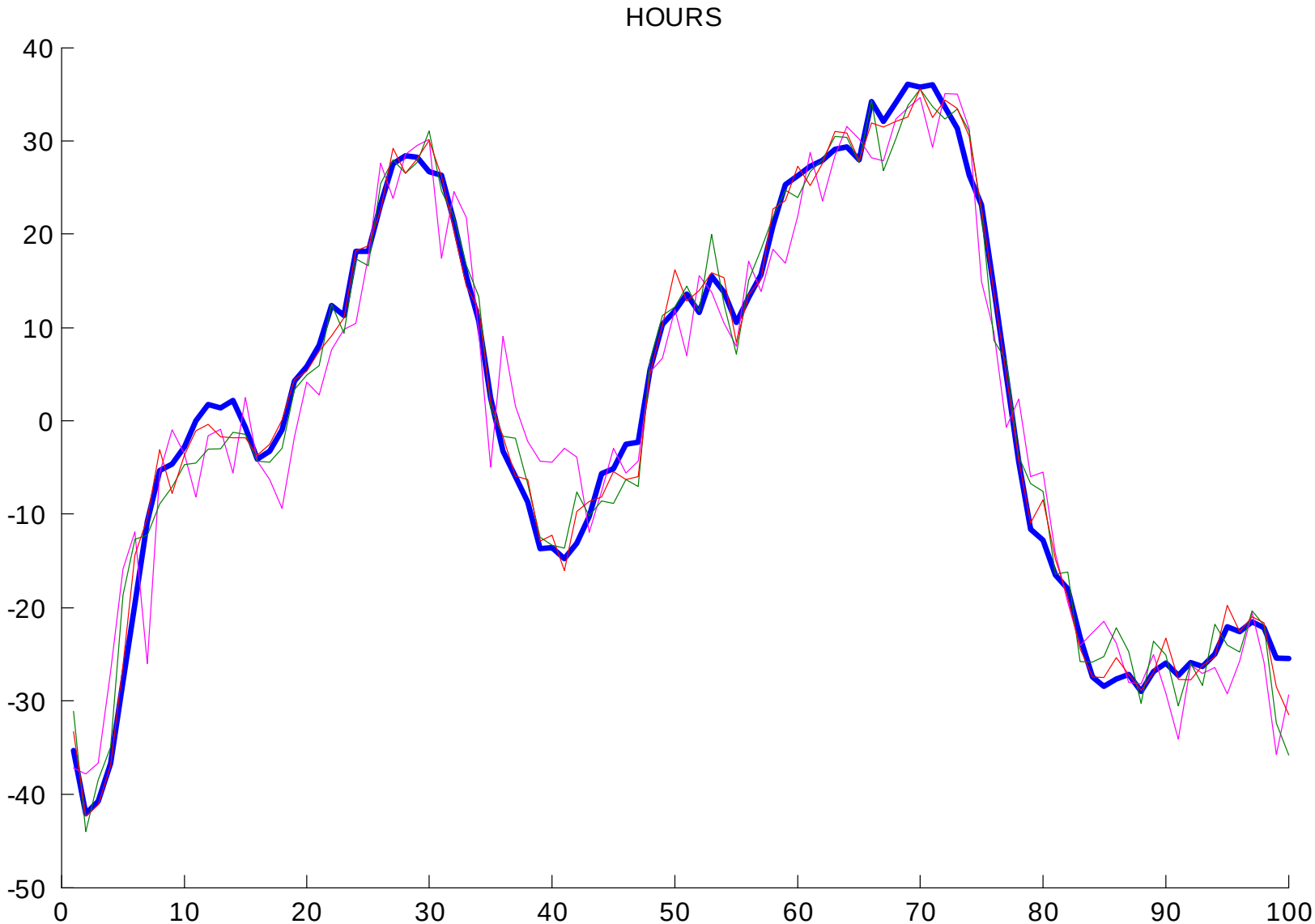

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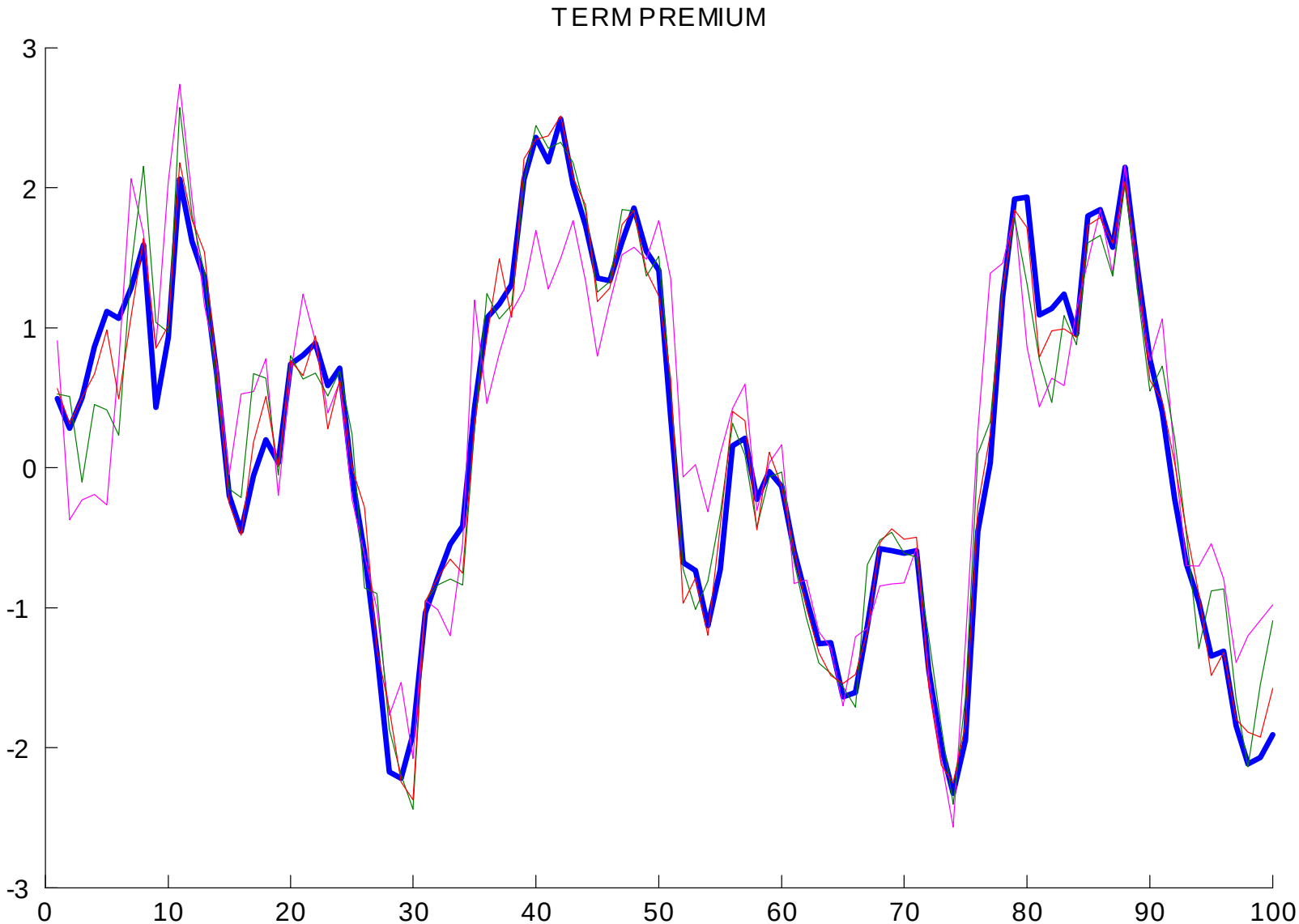

R2

	Only current	+1 lags	+2 lags
Consumption	0.87	0.95	0.97
Credit	0.95	0.97	0.98
Inflation	**0.51**	0.81	0.90
Inflation_inv	**0.63**	1.0	1.0
Oil price	**0.21**	1.0	1.0
Investment	0.89	0.96	0.99
risk premium	0.86	0.93	0.98
hours in RBC	*0.825*		

R2

	Only current	+1 lags	+2 lags
M1	0.98	1.00	1.00
M3	0.96	0.99	0.99
reserves	0.99	1.0	1.0
stock market	0.93	0.97	0.98
wage rate	0.94	0.98	0.99
GDP	0.83	0.92	0.97
hours	0.94	0.98	0.99
term premium	**0.80**	0.94	0.98
hours in RBC	*0.825*		

Shocks versus the model

- Is this bad?
- Maybe not, but perceived wisdom—and the language in the paper—suggests that *propagation* is very important

Shocks versus the model

Explaining US vs EA

DSGE model:

$$z_{t+1}^{us} - z_{t+1}^{ea} = \tilde{a}_0 + \tilde{A}_2(shocks_t^{us} - shocks_t^{ea})$$

- !!! Use the same model for US and EA
- Only differences are the shocks?

R2

	Only current	+1 lags	+2 lags
Consumption	0.72	0.88	0.94
Credit	0.83	0.90	0.94
Inflation	**0.53**	0.66	0.76
Inflation_inv	**0.31**	1.0	1.0
Oil price	**0.23**	1.0	1.0
Investment	0.88	0.94	0.96
risk premium	0.86	0.92	0.95
hours in RBC	*0.825*		

R2

	Only current	+1 lags	+2 lags
M1	0.96	0.98	0.99
M3	0.75	0.87	0.92
stock market	0.75	0.87	0.92
wage rate	0.80	0.87	0.92
GDP	0.83	0.93	0.96
term premium	0.93	0.96	0.98
hours in RBC	*0.825*		

What is this time-varying risk shock?

- Does the identified shock match, for example,
  - increased cross-sectional variance in stock returns
  - firm profits
- Is this really a structural shock?
  - US: highly correlated with financial wealth shock (0.77 after HP filtering)
  - EA: highly correlated with financial wealth and investment technology shock

Concluding comments

- Frontier paper

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- Real frontier paper

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- Real frontier paper
    - You see science advancing even though things also sometimes get ugly