

# **Real-Time Readings on U.S. Output and Inflation**

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## A neat line of research

- Successful research program making steady progress
  - “Tracking Greenspan” (Giannone, Reichlin, Sala) GRS I
  - “Monetary Policy in Real Time” GRS II
- New addition:
  - “Real-Time Readings...” or “News” GRS III (but different “S”)
  - ... still in progress
- So comments will be more on the line of research in general less specifically on GRS III

# Motivation of Research Line

- Central Banks are inundated by economic data.
- Thousands of series and other bits and pieces of information may be released between two policy meetings
- These may have different structure, frequency, coverage, etc
- Many of the most useful releases are also known to be noisy and subject to revision.
- Policymakers need to collect, digest, interpret all this information
- How?

## How to distill information?

- For structural analysis of economy:
  - Build small models using only few variables at a time, ignoring much of the information flow.
- For forecasting:
  - Concentrate on judgmental analysis, looking in great detail at small segments of the economy (e.g. sectoral analysts)
  - Develop atheoretical statistical tools that can usefully to summarize and interpret information about economy
- The emphasis in GRS I, II, III is on the latter: Build factor models that can collect and distill the information from a vast number of variables for forecasting purposes. [GRS I and II go on to do fascinating monetary policy exercises off that but I will not examine that aspect since that's not in this paper.]

## Progress

Do factor exercises help us forecast inflation/output better?

Examine inflation—which is harder to forecast.

- Early exercises appeared promising. (e.g. Stock and Watson, 2002-SW)
- Specifically, SW showed that a factor model on about 200 variables could help outperform univariate AR inflation forecasts.
- But that exercise was not informative as it relied on ex post available data to simulate forecasting

## Progress (continued)

- GRS I and II also promising.
- GRS II most promising as it indicated that factors helped forecast as well as Greenbook, impressive! Also, it moved slightly towards real-time—used real-time series for real GDP and the deflator
- But with the reliance on ex post available data for simulated forecasting (“quasi-real” analysis) for everything else verdict still out.
- A real-time comparison proved to be a mixed bag. (Bernanke and Boivin, 2003-BB)
- BB replicated “superior” forecasting performance of SW (215 variables)
- They then put together a true real-time dataset to examine whether this held in real time. Problem: Their real-time data set contained *only* 78 series, fewer than half of the SW study.

## Progress?

- With real-time dataset BB showed that using the factor produced inflation forecasts *worse* than a univariate AR.
- So from BB study, we have no useful evidence that factor models help forecast inflation in real time
- But BB also performed exercise with the revised versions of the same smaller set of SW. Again, forecasts were *worse* than a univariate AR.
- So small ray of hope. Perhaps we could get better results if we had a real-time dataset with 200 plus variables.

## Enter GRS III

- An important premise of this paper is the collection of the larger dataset. With about 200 hundred series,
- ... and most impressive, account very carefully for timing of information flow.
- ... but data collected only for a dissappointingly short period: June 2003-March 2004
- ... will likely need to wait a few more years of data to evaluate
- ... or go back to expand dataset backward
- ... *we need more real time data!!!*

## What are “Real-Time Readings” or “News”?

- Data announcements (first/current releases)  
(e.g. payroll employment for March 2005 on April 1, 2005)
- Data revisions of past announcements  
(e.g. employment for March as revised on May 6 or June 3)
- Revisions in beliefs about economy/market reactions
  - By households?/businesses?/traders?/policymakers?
- Survey information on market beliefs/business plans/consumer sentiment
- Changes in asset prices
  - Short-term rates/Long-term yields/Exchange rates/Equity prices

Release Date	Indicator	Expected Value	Released Value
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1-Apr-05	Auto Sales, in million	5.20	5.51
1-Apr-05	Construction Spending, percent	0.60	0.35
1-Apr-05	Hourly Earnings, percent	0.20	0.25
1-Apr-05	Manufacturing Payrolls, in thousan	5.00	-8.00
1-Apr-05	ISM, index	55.00	55.20
1-Apr-05	Nonfarm Payrolls, in thousan	225.00	110.00
1-Apr-05	Truck Sales, in million	7.90	9.12
1-Apr-05	Unemployment, percent	5.30	5.20
1-Apr-05	Michigan Consumer Sentiment	92.90	92.60
7-Apr-05	Consumer Credit, in billion	7.00	-11.08
7-Apr-05	Initial Claims, in thousan	335.00	337.00
12-Apr-05	Exports, in billion	101.50	100.48
12-Apr-05	Imports, in billion	160.00	161.52
12-Apr-05	Treasury Budget, in billion	-70.00	-71.23
13-Apr-05	Retail Sales, in percent	0.70	0.26
13-Apr-05	Retail Sales x Autos, in percent	0.50	0.15
14-Apr-05	Business Inventories, percent	0.60	0.49
14-Apr-05	Initial Claims, in thousan	330.00	333.24

15-Apr-05	Capacity Utilization, percent	79.50	79.41
15-Apr-05	Industrial Production, in percent	0.30	0.30
19-Apr-05	Housing Starts, in million	2.08	1.84
19-Apr-05	PPI, in percent	0.60	0.72
19-Apr-05	PPI x Food and Energy, in percent	0.20	0.06
20-Apr-05	CPI, percent	0.50	0.63
20-Apr-05	CPI x Food & Energy, percent	0.20	0.35
21-Apr-05	Leading Economic Indicators, in percent	-0.30	-0.43
21-Apr-05	Initial Claims, in thousan	326.00	299.89
21-Apr-05	Philadelphia Fed Business Outlook	13.00	25.30
25-Apr-05	Existing Home Sales, in million	6.80	6890.00
26-Apr-05	Consumer Confidenc	98.00	97.70
26-Apr-05	New Home Sales, in thousan	1200.00	1431.00
27-Apr-05	Durable Goods Orders, percent	0.30	-2.82
28-Apr-05	Real GDP Adv, in percent	3.50	3.09
28-Apr-05	Initial Claims, in thousan	320.00	323.42
29-Apr-05	PCE, in percent	0.40	0.60
29-Apr-05	Personal Income, in percent	0.40	0.48
29-Apr-05	ECI Civilian Workers, in percent	1.00	0.62
29-Apr-05	Chicago PMI, percent	62.50	65.70
29-Apr-05	Michigan Consumer Sentiment	88.80	87.70

## Why is this so hard? ... Some possible weaknesses

- One possible problem is that factor analysis is perhaps overly rigid. A reduced-form, linear, fixed-coefficient structure is imposed on the data to summarize it in a useful manner.
- By contrast, consider how sectoral experts can allow for nonlinearities and time-variation in their reasoning. And sector “experts” can always peek underneath key published numbers, read footnotes and discount what’s not important, highlight what is. They can flexibly adjust for suspected structural change, allow for changes in “trends” and “constants.”

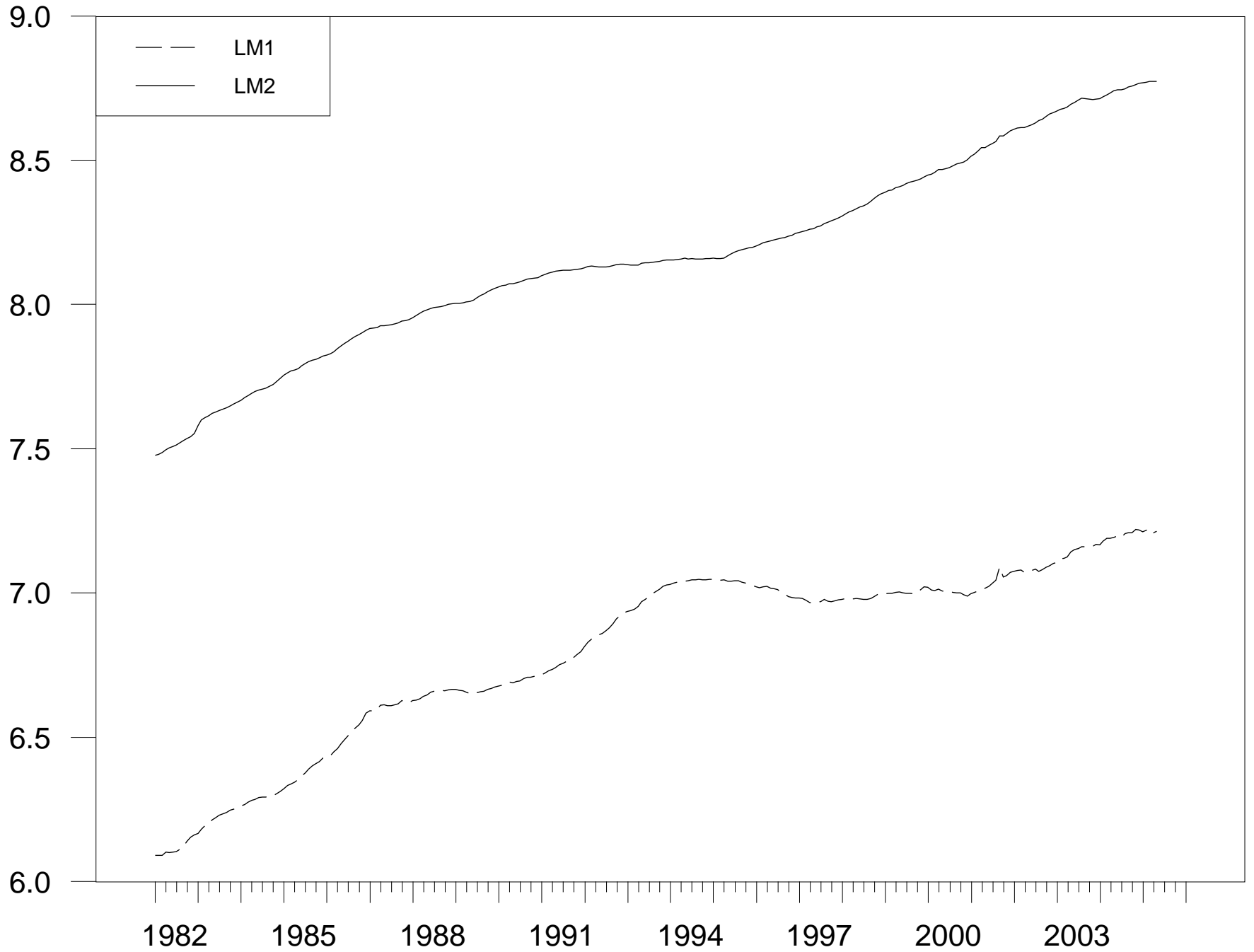
## More on “Trends” and “constants”

- An illustration of one of the places where the model is rather rigid and mechanical concerns the preliminary transformations that take place.
- Data are transformed before factorization to make them stationary, e.g.:
  - The 3rd difference of 12th difference of prices
  - The third difference of interest rates
- Approach followed seems to err on side of overdifferencing data.
- A lot of information may be lost in this process. Often the most difficult aspect of policy analysis is to understand “trends” and “constants.”
- Detrending/demeaning should become more explicit part of the analysis. Sensitivity to alternative assumptions would be helpful.

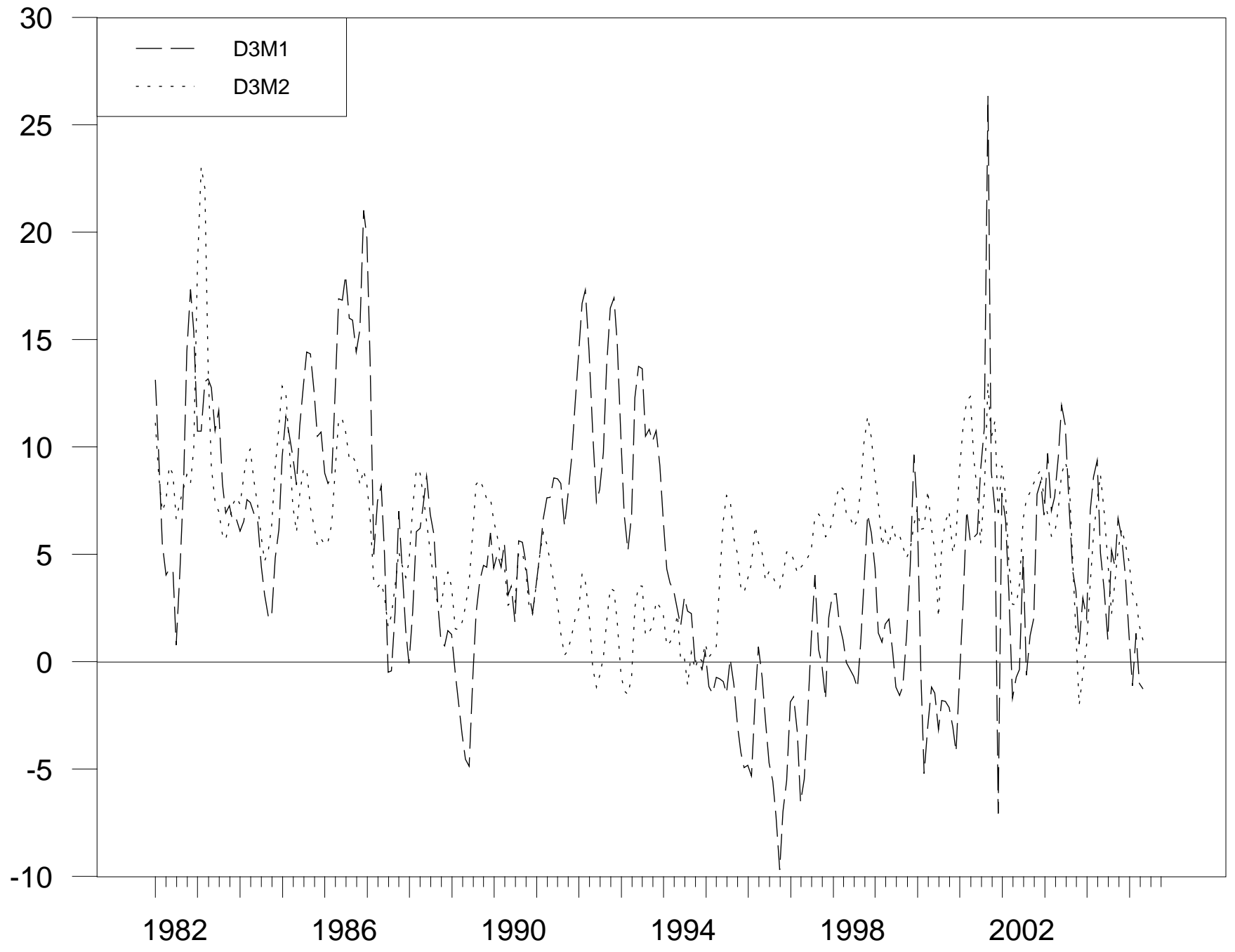
## An Example with money

- Money data can “look” quite different depending on how they are transformed to achieve stationarity.
- Compare differencing, vs linear detrending, versus cointegrating relationship (e.g. income velocity of money)
- Potential gains from adding structure (e.g. track opportunity cost of money and indirectly nest money demand modelling).

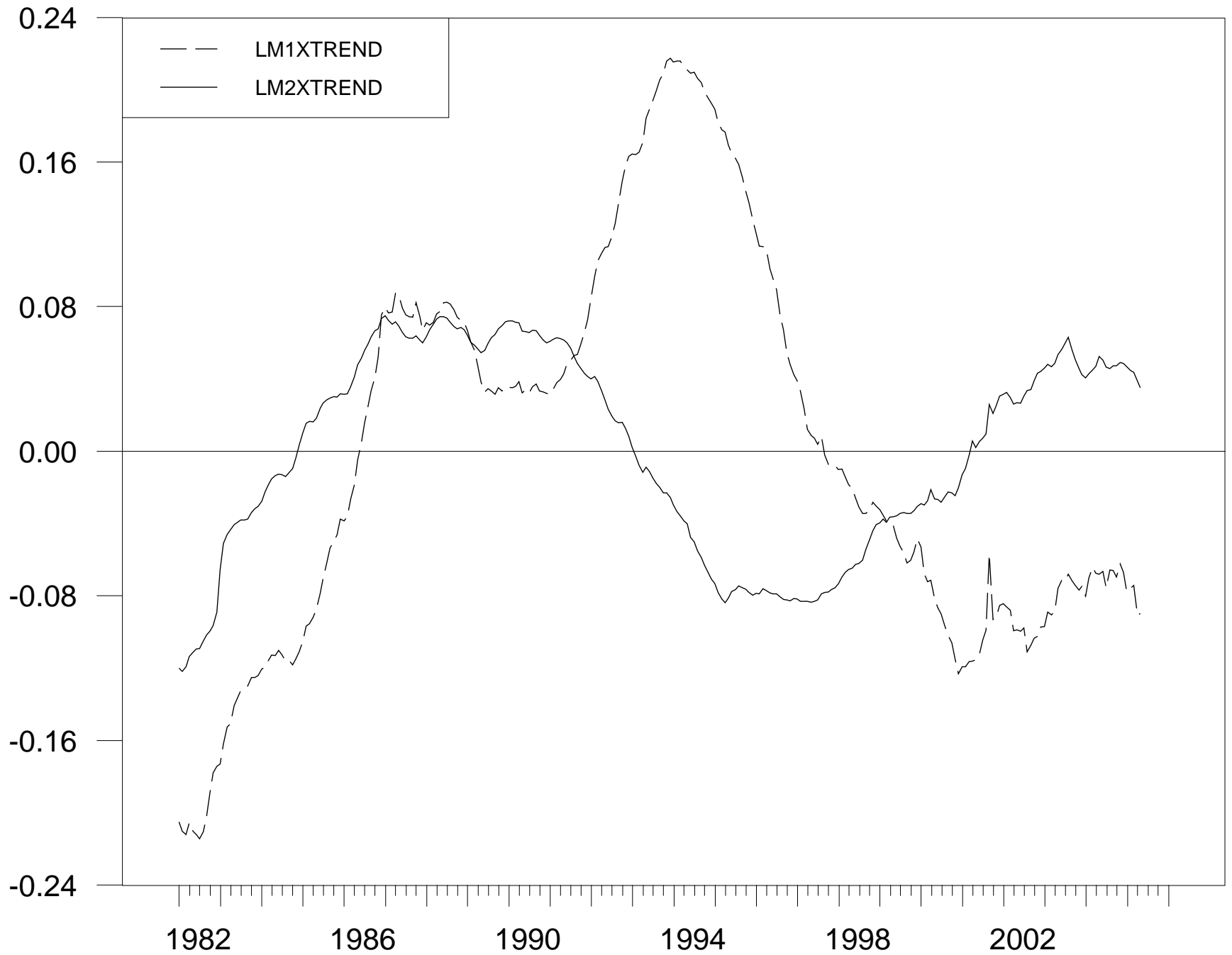
# Money (log-level)



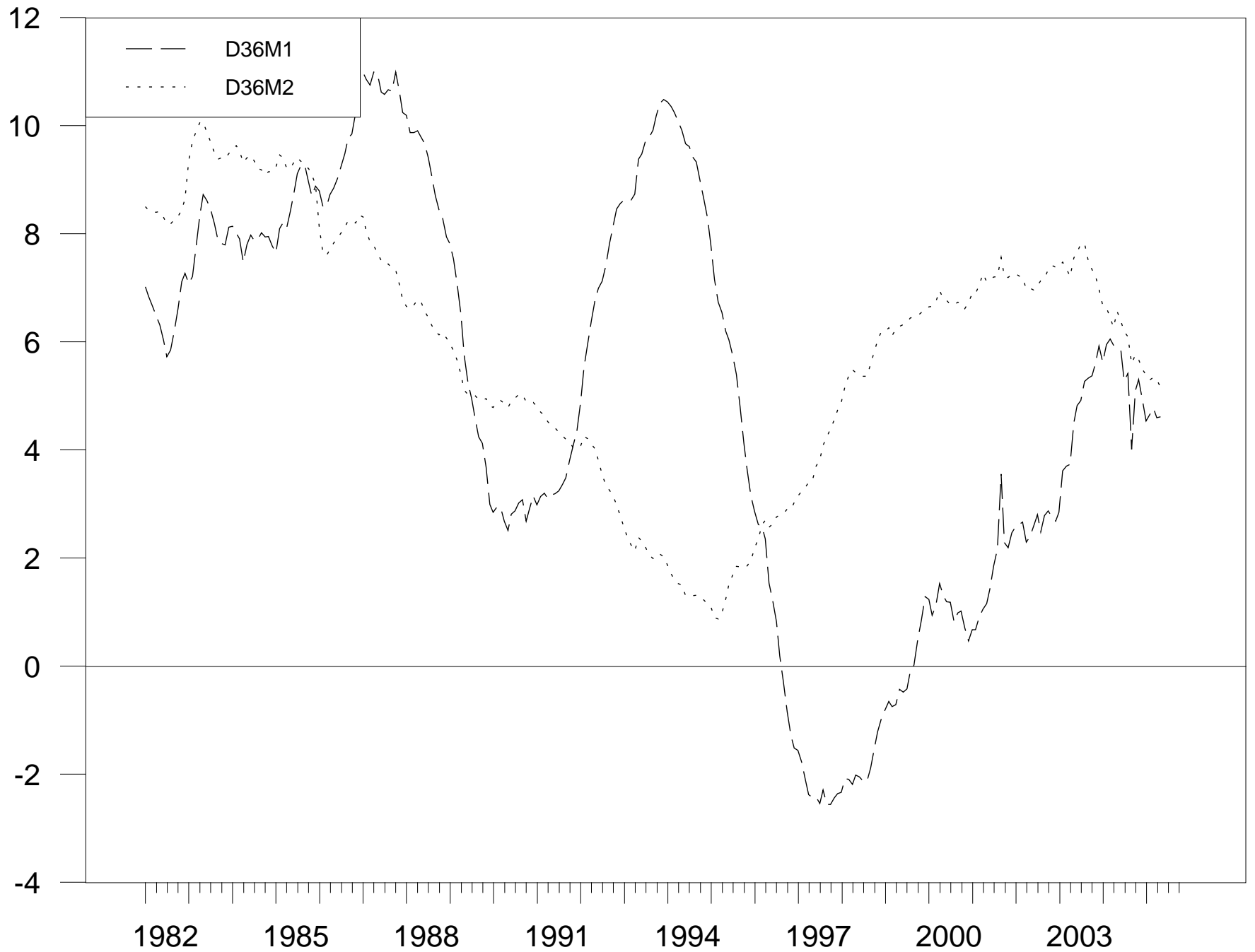
# Money (3-month log-difference)



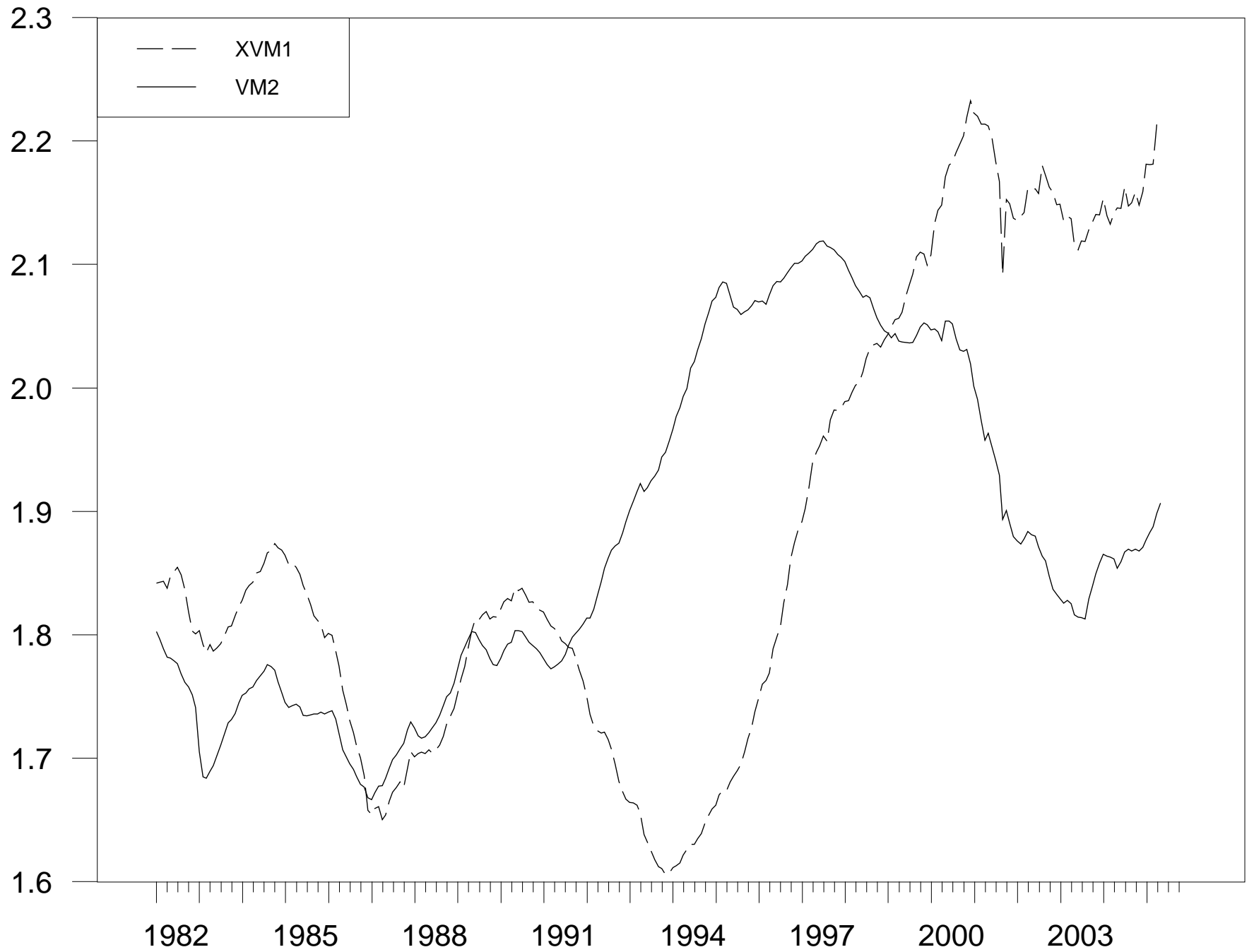
# Money (deviation from log-trend)



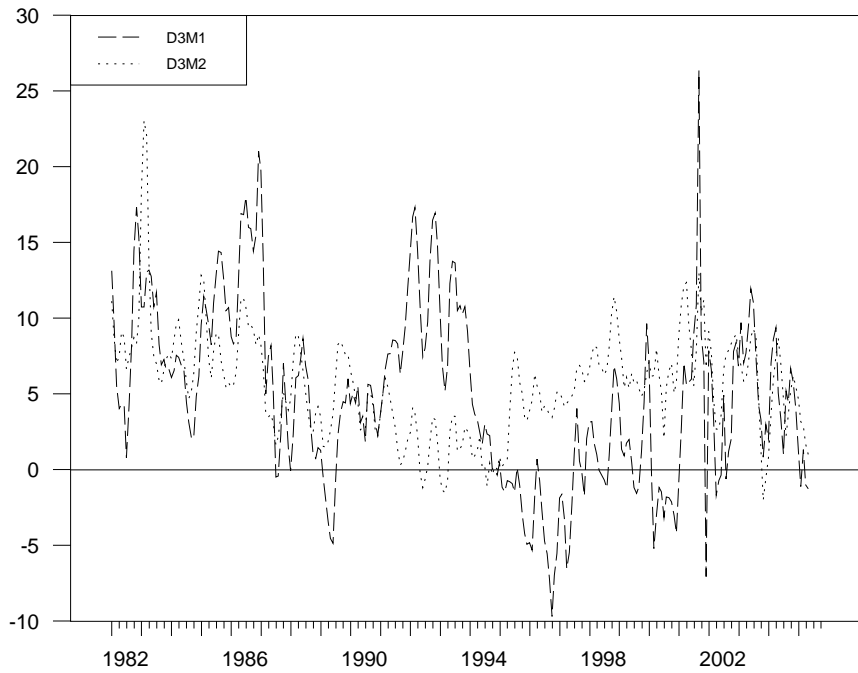
# Money (36-month log-difference)



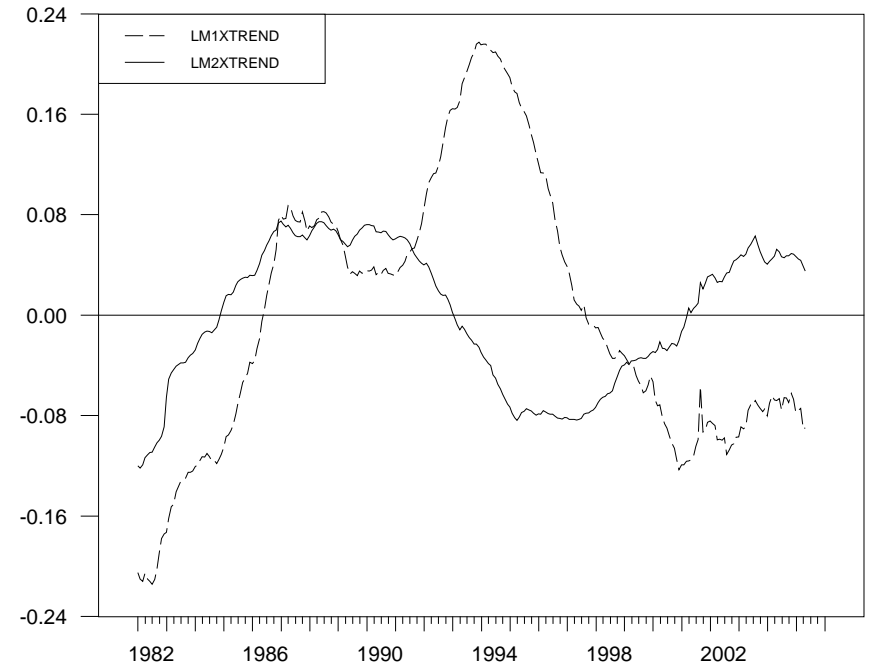
# Money Velocity



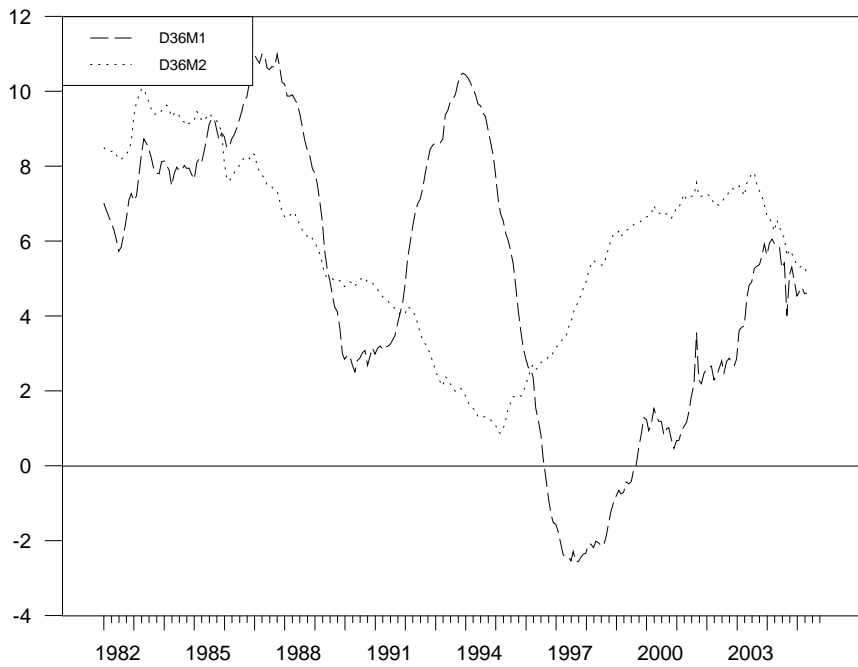
**Money (3-month log-difference)**



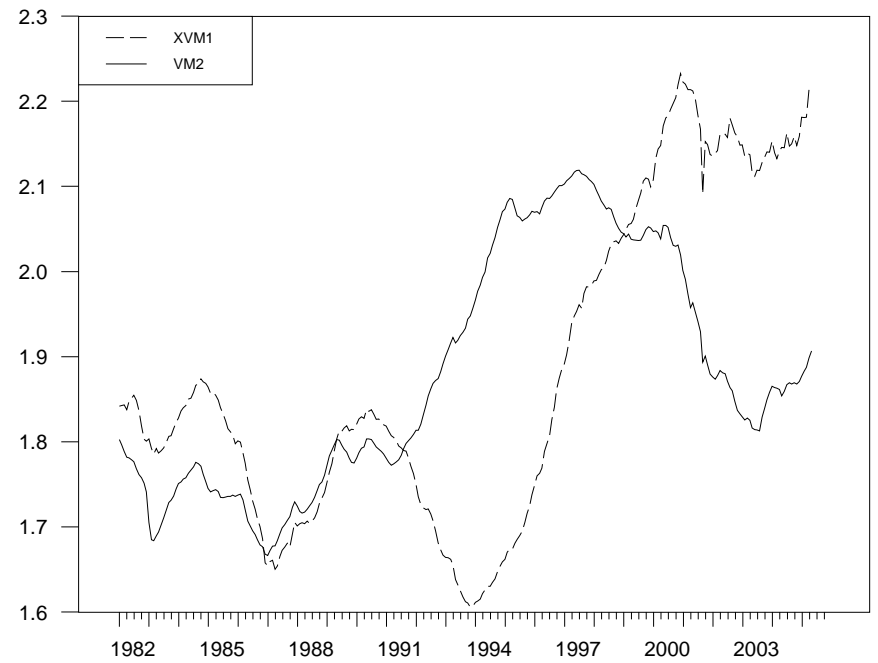
**Money (deviation from log-trend)**



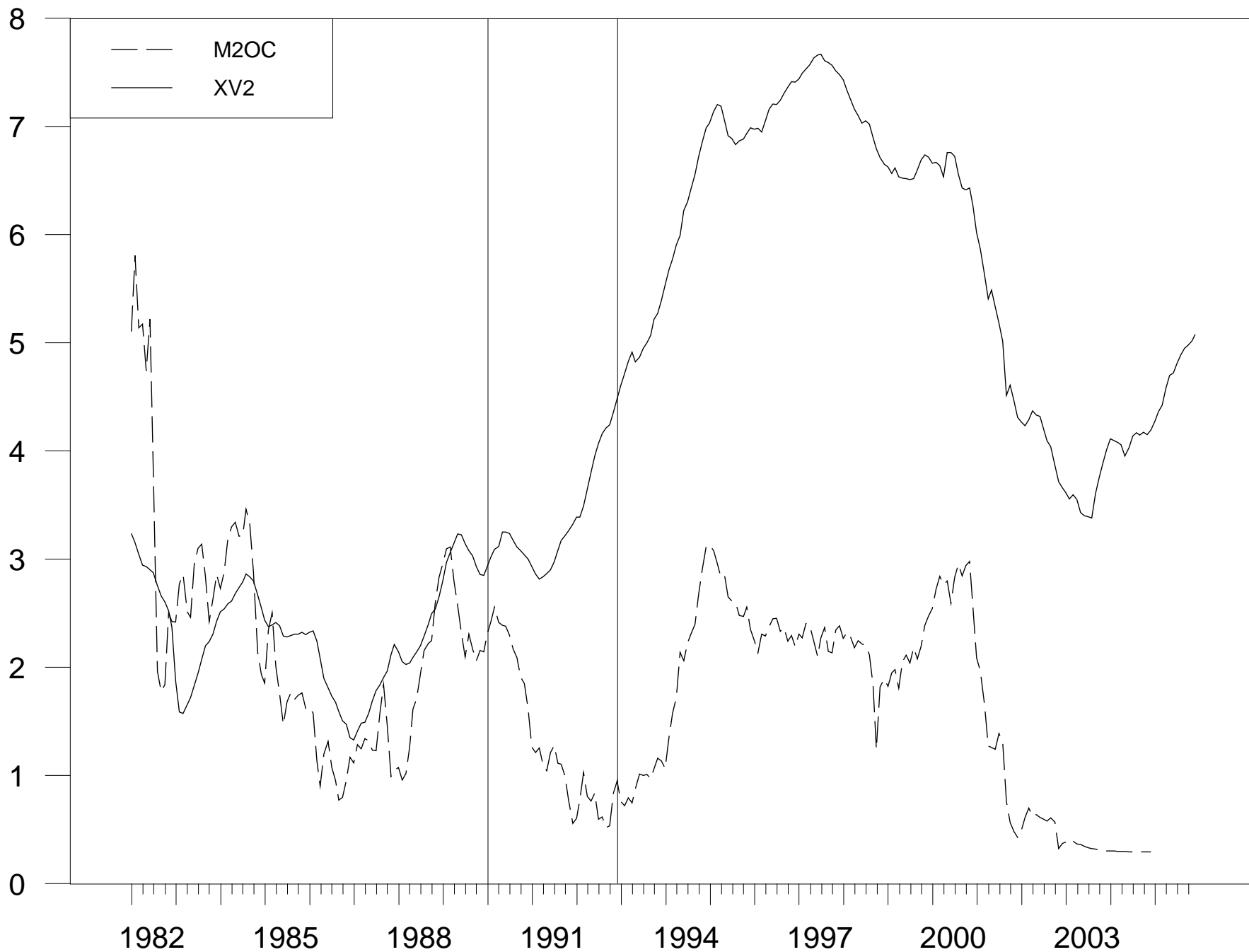
**Money (36-month log-difference)**



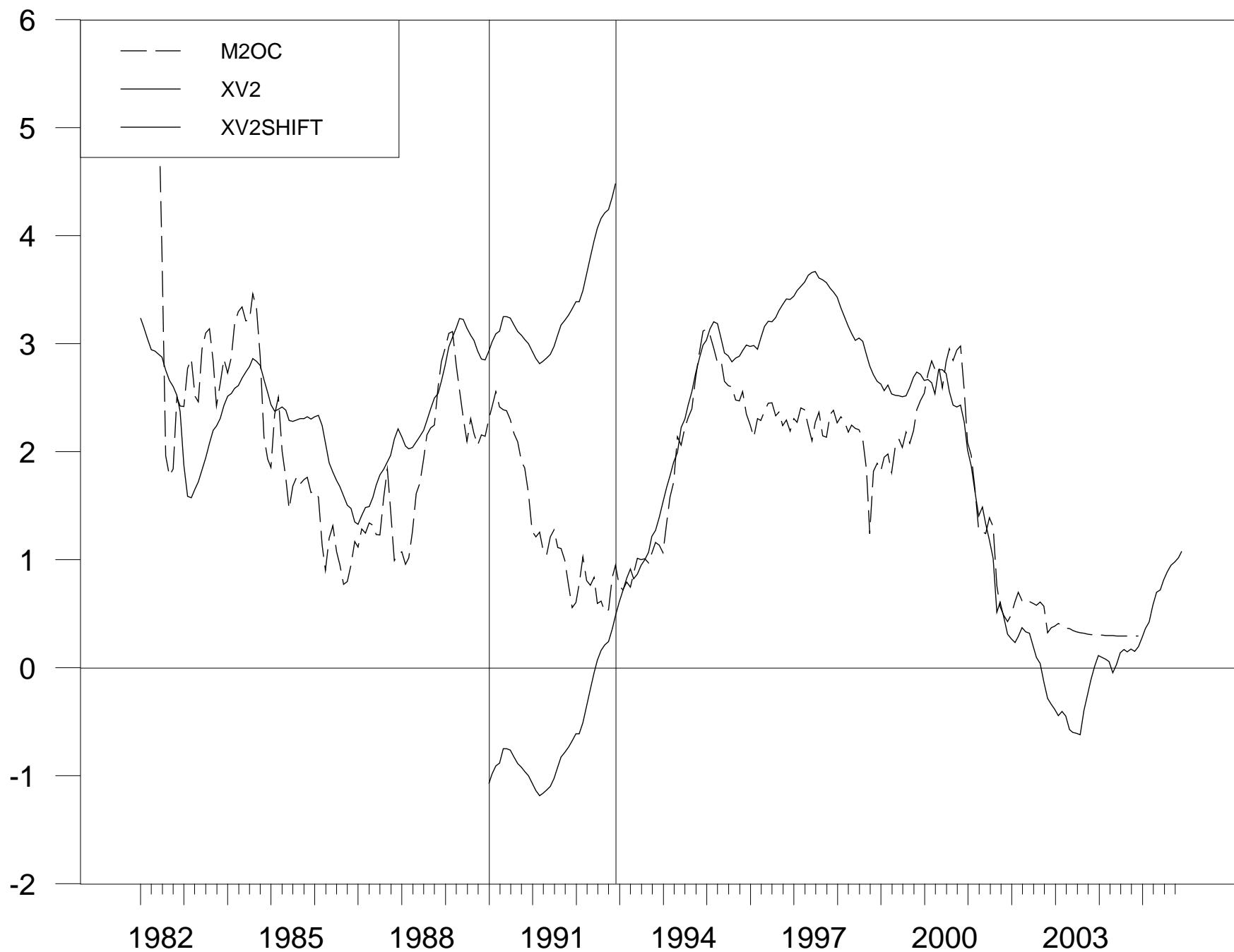
**Money Velocity**



# M2 Velocity and Opportunity Cost



# M2 Velocity and Opportunity Cost



## So where do we stand?

- Successful research program
- Steady (if slow) progress
- Sorely need more data to complete analysis

