# INSPECTION OF THE AWM DATA SET AND ESTIMATION OF EUROZONE AGGREGATED MONEY/INFLATION

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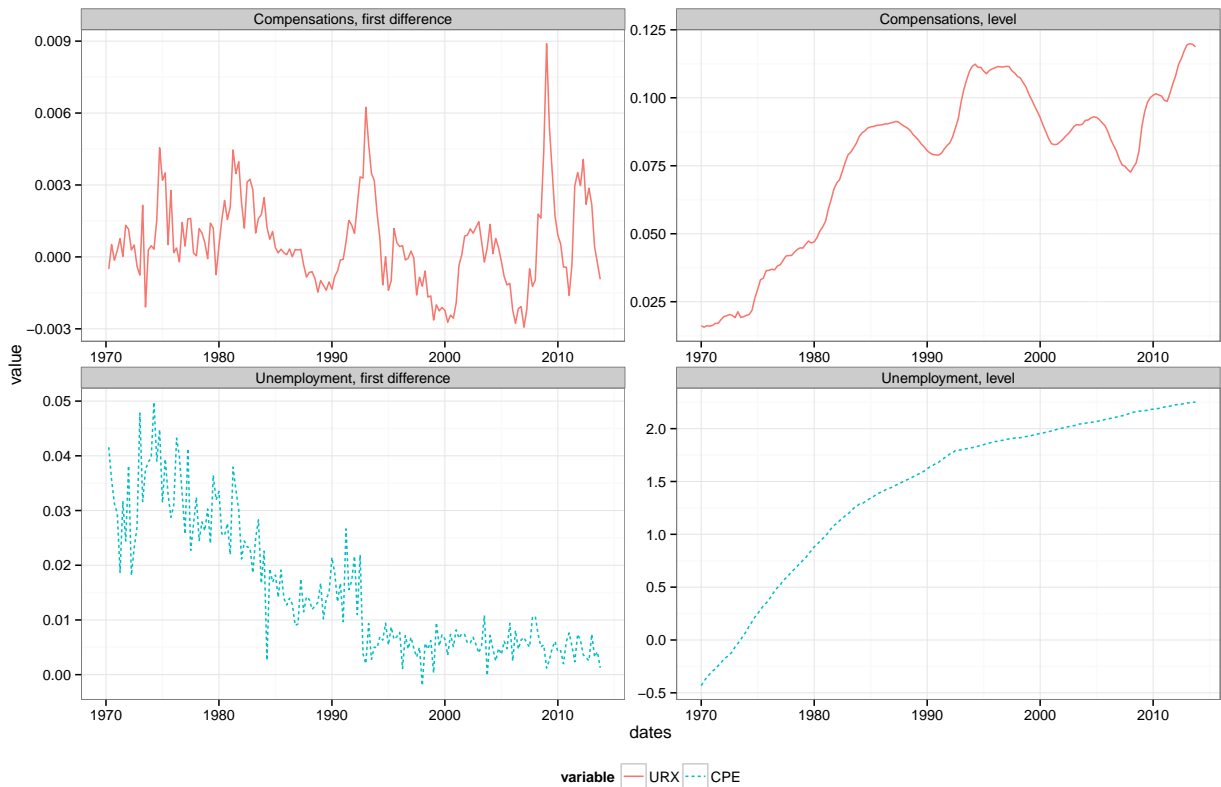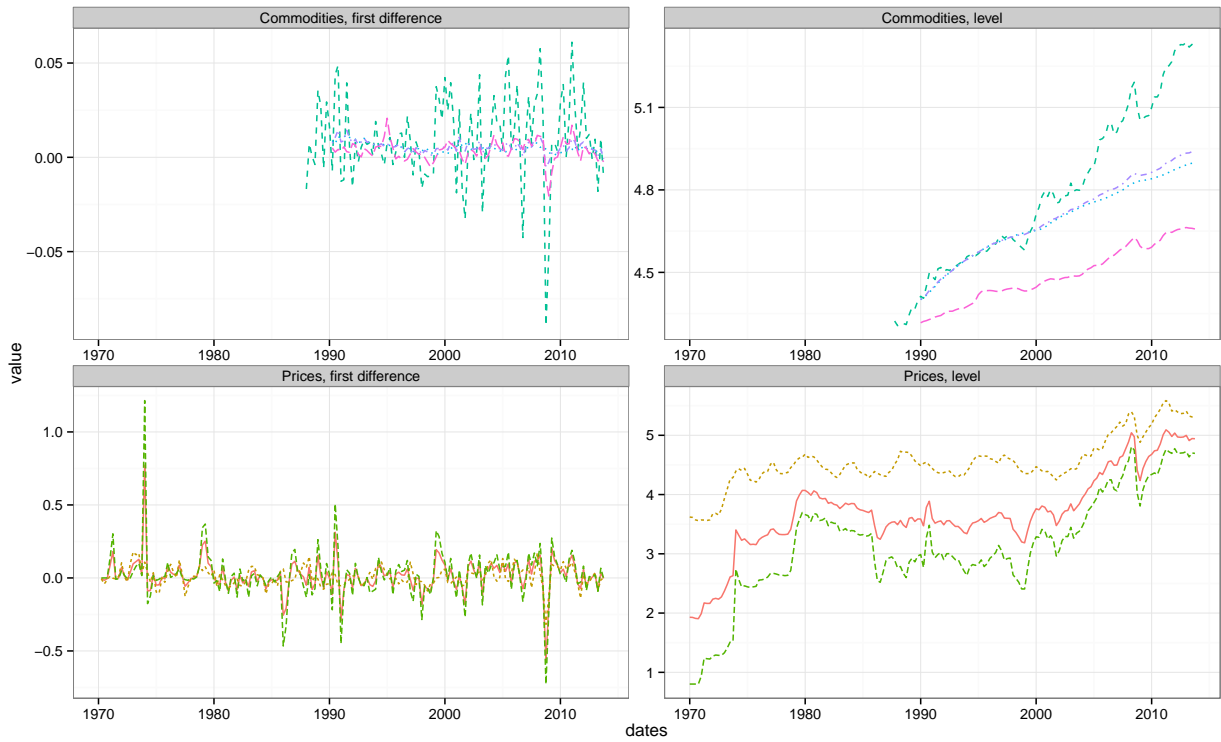
```
##  [1] "COMPR"   "PCOMU"   "POILU"   "HEG"     "HEXSA"   "HICPSA"  "HICP"
##  [8] "EEN"     "EXR"     "STN"     "LTN"     "URX"     "YER"     "XTR"
## [15] "MTR"     "CPE"     "YWRX"    "LHO"     "LFI"     "M1"      "M3"
## [22] "ESI"     "LIB"     "PPI"     "DJES"    "dates"
```
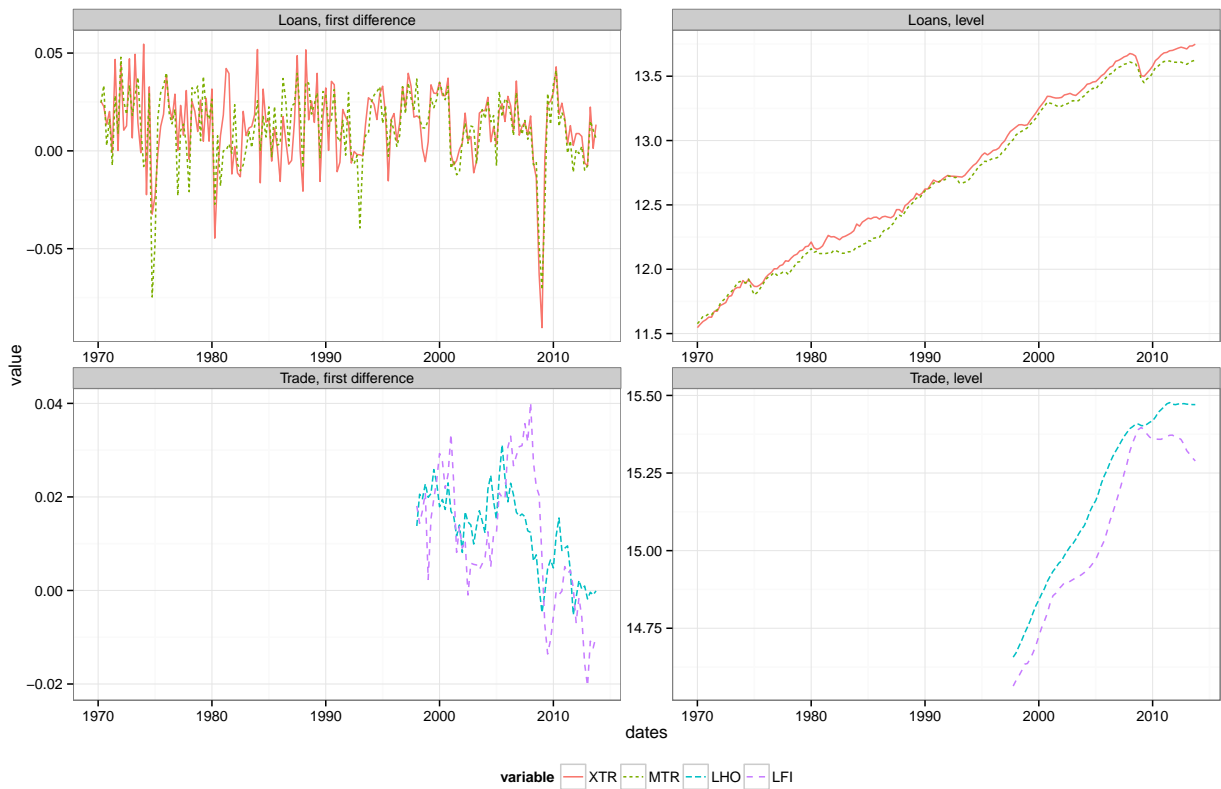
In this document we estimate models for money demand and inflation on aggregated Eurozone data following Bårdsen et al. (2005)

1. Visualisation of the data
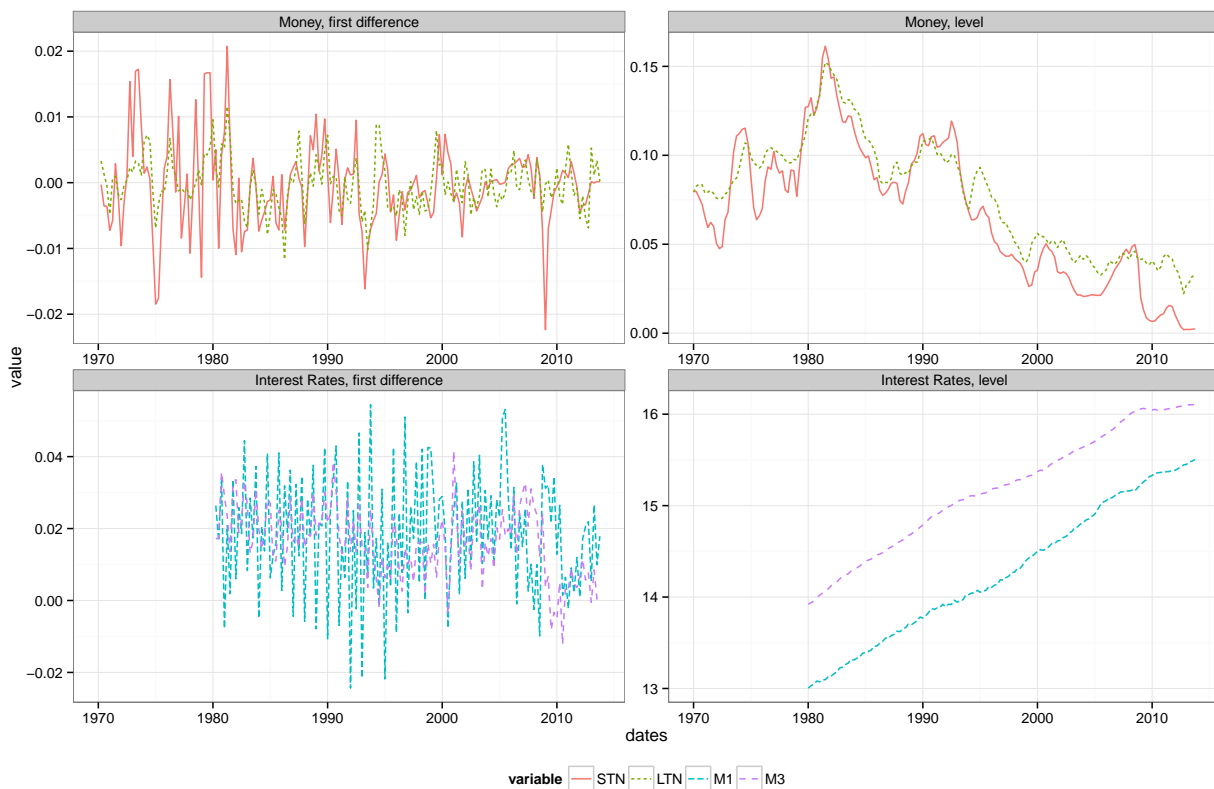
Strong seasonal effect in M1, M3 seems better behaved.

2. Money demand function

Bårdsen et al. (2005) estimates a money demand function on AWM data from 1980:4 to 1997:2. The equation is based on a model from Coenen and Vega (2001) and it includes lagged and contemporanous variables as well as an error correction term. It has the form:

$$\Delta(\widehat{m-p})_t = \alpha_0 + \alpha_1 \Delta\Delta y_t + \alpha_2 \frac{\Delta RS_t + \Delta RS_{t-1}}{2} + \alpha_3 \Delta RL_{t-1}$$
$$+ \alpha_4 \frac{\Delta pan_t + \Delta pan_{t-1}}{2} + \alpha_5 emc_{t-2},$$
$$ecm_t = (m-p)_t + \beta_1 y_t + \beta_2 \Delta pan_t + \beta_3 (RL - RS)_t.$$

The it is a co-intergration relation taken form references in (Bårdsen et al., 2005, p. 152). RL and RS are the short and long rates from the AWM, y_t the log of real GDP, and Δpan is the annualized change in the GDP deflator.

Let's try to estimate some variation of it. We do not include an ECM term for starters, and the GDP deflator isn't in the data yet.

```
##
## Call:
## lm(formula = dmp ~ L1_dmp + ddy + LD0_STN + LD1_STN + LD2_STN +
##     LD0_LTN + LD1_LTN + LD2_LTN, data = cbind(awm, LD))
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.021360 -0.006772 -0.001146  0.005768  0.024458
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.005526   0.002586   2.137 0.035517 *
## L1_dmp       0.347456   0.099563   3.490 0.000773 ***
## ddy          0.222234   0.196361   1.132 0.260954
## LD0_STN     -0.818803   0.358442  -2.284 0.024874 *
## LD1_STN      0.732357   0.402077   1.821 0.072101 .
## LD2_STN      0.105485   0.393424   0.268 0.789264
## LD0_LTN     -0.188801   0.271217  -0.696 0.488272
## LD1_LTN      0.334666   0.303381   1.103 0.273124
## LD2_LTN      0.404098   0.252506   1.600 0.113276
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.008809 on 84 degrees of freedom
##   (83 observations deleted due to missingness)
## Multiple R-squared:  0.2465, Adjusted R-squared:  0.1747
## F-statistic: 3.435 on 8 and 84 DF,  p-value: 0.00182
## Call:
## lassovar(dat = var1, lags = 4)
##
## Model estimated equation by equation
## Selection criterion: BIC
## Estimator: Lasso
## Deterministics: intercept.
## Dimensions: T = 91  N = 4
##
## Total number of variables selected:20 (31.25% of candidates)
##
##  Model summary statistics:
##                 Lambda non-zero    resid var
## dmp         0.0004031671      10 4.880706e-05
## LD0_HICPSA  0.0005798616       3 9.937317e-06
```

```
## LD0_STN      0.0005322228        2 6.832299e-06
## LD0_LTN      0.0003189406        5 1.125708e-05
##
## Deterministics not included in the non-zero count.
##                      [,1]         [,2]         [,3]         [,4]
##                0.002327635 -0.0007433861 0.003219391  5.438899e-05
## 1L_dmp         0.055006039  0.0000000000 0.000000000  0.000000e+00
## 1L_LD0_HICPSA -0.141505112  0.2452826138 0.000000000  2.714080e-01
## 1L_LD0_STN     0.000000000  0.0000000000 0.240385061  2.510174e-01
## 1L_LD0_LTN     0.444229932  0.0000000000 0.000000000  3.663671e-01
## 2L_dmp         0.082117048  0.0000000000 0.000000000  0.000000e+00
## 2L_LD0_HICPSA  0.000000000  0.0000000000 0.000000000  0.000000e+00
## 2L_LD0_STN     0.000000000  0.0000000000 0.000000000 -1.811055e-01
## 2L_LD0_LTN     0.181701749  0.0000000000 0.000000000  0.000000e+00
## 3L_dmp         0.000000000  0.0000000000 0.000000000  0.000000e+00
## 3L_LD0_HICPSA -0.295219256  0.0000000000 0.000000000  0.000000e+00
## 3L_LD0_STN     0.000000000  0.0000000000 0.155102212  0.000000e+00
## 3L_LD0_LTN     0.174285594  0.0000000000 0.000000000  0.000000e+00
## 4L_dmp         0.450750917  0.0000000000 0.000000000  0.000000e+00
## 4L_LD0_HICPSA  0.000000000 -0.0523451587 0.000000000  0.000000e+00
## 4L_LD0_STN     0.250079448  0.0000000000 0.000000000 -1.632384e-01
## 4L_LD0_LTN     0.308291408 -0.0803711365 0.000000000  0.000000e+00
```

Some models in levels:

```
##
## Call:
## lm(formula = mp ~ YER + STN + LTN, data = awm)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.11779 -0.03585 -0.00800  0.03598  0.15127
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -25.0117     1.8767 -13.327  < 2e-16 ***
## YER           2.5007     0.1291  19.364  < 2e-16 ***
## STN          -1.8992     0.6127  -3.100  0.00257 **
## LTN           4.3620     1.0428   4.183 6.56e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.06377 on 92 degrees of freedom
##   (80 observations deleted due to missingness)
## Multiple R-squared:  0.9441,Adjusted R-squared:  0.9423
## F-statistic: 517.8 on 3 and 92 DF,  p-value: < 2.2e-16
##                 [,1]
##           1.3388037179
## 1L_dat    0.8765929977
## STN       0.0000000000
## LTN       0.0000000000
## YER       0.0003278016
## LD0_HICPSA 0.0000000000
##                  [,1]         [,2]         [,3]         [,4]
##             -1.1960265  0.042599060  0.18303063  0.76113369
## 1L_mp        0.9257880 -0.003811509  0.00000000  0.00000000
## 1L_STN       0.0000000  0.945491666  0.04670236 -0.10497598
## 1L_LTN       0.0000000  0.005022450  0.85051184 -0.06335923
## 1L_YER       0.1407295  0.000000000 -0.01241340  0.94748692
```

```
## 1L_LD0_HICPSA  0.0000000  0.504065809  0.43919307  0.33430108
##                            [,5]
##                 0.0008704405
## 1L_mp           0.0000000000
## 1L_STN          0.0000000000
## 1L_LTN         -0.0246811771
## 1L_YER          0.0000000000
## 1L_LD0_HICPSA   0.3564794659
```

Totally different from the relation in JAE/Baardsen, but then again the modes are totally difference as well.

3. Inflation models

as.matrix(cbind(awm$M3[nona], HPM3$cycle))
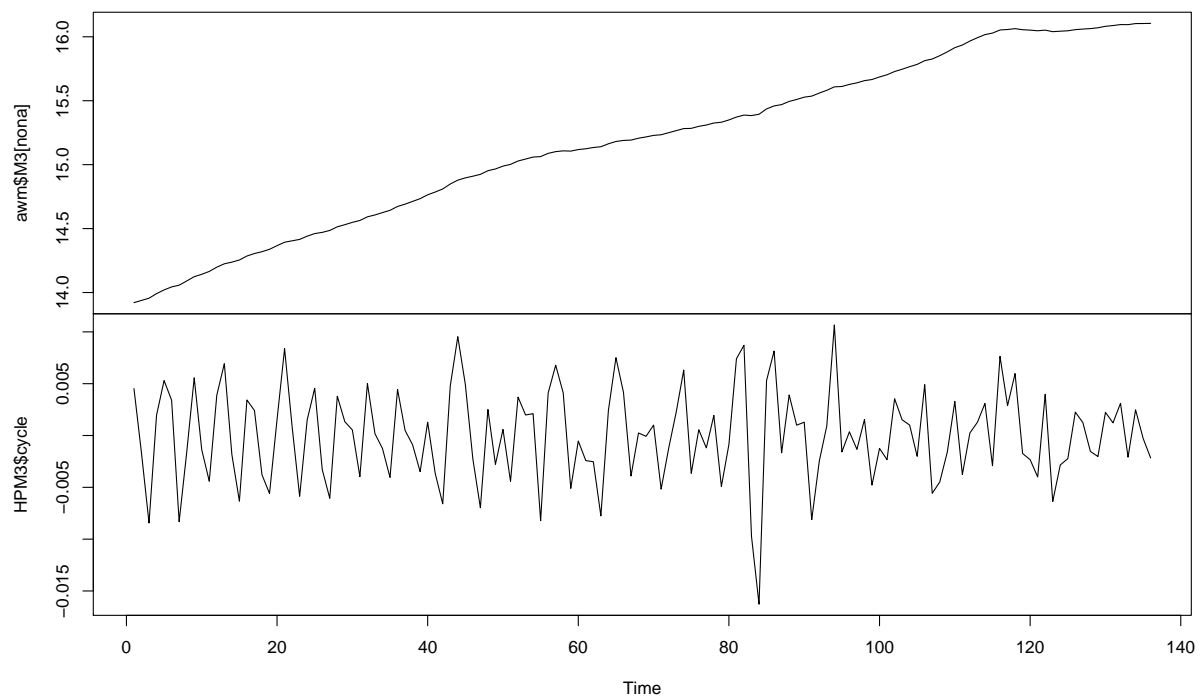
References

Bårdsen, G., Ø. Eitrheim, E. S. Jansen, and R. Nymoen (2005). *The econometrics of macroeconomic modelling*. Oxford University Press Oxford.

Coenen, G. and J.-L. Vega (2001). The demand for m3 in the euro area. *Journal of Applied Econometrics 16*(6), 727–748.