Do institutional changes affect business cycles? Evidence from Europe and lessons for Turkey

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May 2010

Motivation

• Business cycles are similar among developed economies, and they change over time (Helbing and Bayoumi 2003, Stock and Watson 2003, Canova, Ciccarelli and Ortega 2007, Kose et al. 2001, etc.)

• Are changes due to changes in transmission of fluctuations or variations in magnitude, frequency and type of shocks?

• Many types of structural changes over the last 20 years (changes in institutions, operational features of markets, integration,etc.).

Lots of institutional changes in Europe, e.g. Maastricht Treaty, the ECB creation, the introduction of the Euro. Special events:

- Exogenous and politically driven.

- Monetary in nature, comparable to establishment of the FED, the breaking of the Gold Standard, etc. Not the standard monetary shocks.

- Likely to change medium-long run features of economies. Do they affect cyclical fluctuations? But if they do:

- Common practice of separating business cycles and longer-term fluctuations probably incorrect.

- Does it mean that national idiosyncrasies matter less?

Questions

1) Have national and European business cycles changed? **Yes.**

- A common European cycle emerges since 1990s. Earlier for EMU countries than for non-EMU countries.

- National cycle characteristics remain. Their synchronicity has increased.

2) Are there clear-cut changes coinciding Maastricht Treaty, ECB creation or Euro introduction? **No.**

3) Did the events have different relative impact? **Somewhat.**

Conclusions: changed we detect more related to a general convergence process within the EU than to institutional changes.

Methodology

Panel TVC-VAR (Canova and Ciccarelli, 2004, JoE; 2009, IER; Canova, Ciccarelli and Ortega, 2007, JME).

$$y_{it} = D_{it}(L)Y_{t-1} + F_{it}(L)W_{t-1} + e_{it}$$

$i = 1, ..., 10$ countries, y_{it} is a 5×1 vector, W_t are the exogenous variables.

(1) Parameter specific to each variable-country.

(2) Parameters time-varying.

(3) Account for lagged interdependencies.

- Unrestricted classical estimation impossible: each equation has $k = NGp + Mq = 56$ time varying coefficients, and $r = 10 \times 5 = 50$ equations.

- Even with fixed coefficients, T smaller than $k \times r$. Parsimonious representation:

$$
\begin{aligned}
Y_t &= X_t \delta_t + E_t \qquad E_t \sim N\left(0, \Omega\right) \\
\delta_t &= \Xi_1 \lambda_t + \Xi_2 \alpha_t + \Xi_3 \rho_t + \Xi_4 \psi_t = \Xi \theta_t + u_t \qquad u_t \sim N\left(0, \Omega \otimes V\right)
\end{aligned}
$$

$Y_t = \left(y'_{1t}, \ldots y'_{10t}\right)'$, $\theta_t = [\lambda'_t, \alpha'_t, \rho'_t, \psi'_t]'$.

Idea: shrink δ_t, (2800×1) into θ_t $(16$ or $17 \times 1)$; Ξ_j are matrices with elements equal to zero or one.

- λ_t captures movements in the coefficients vector δ_t common to all countries and variables (a 1×1, or 2×1 vector if EMU vs. non-EMU).

- α_t is the country specific component (a 10×1vector).

- ρ_t is the variable specific component (5×1vector).

- ψ_t is the exogenous variable component (1×1 vector).

- u_t captures unmodelled features of the coefficients vector.

Observable Index model

$$Y_t = \mathscr{Z}_{1t}\lambda_t + \mathscr{Z}_{2t}\alpha_t + \mathscr{Z}_{3t}\rho_t + \mathscr{Z}_{4t}\psi_t + v_t = \mathscr{Z}_t\theta_t + v_t$$

$$\mathscr{Z}_{1t} = X_t\Xi_1, \mathscr{Z}_{2t} = X_t\Xi_2, \mathscr{Z}_{3t} = X_t\Xi_3, \mathscr{Z}_{4t} = X_t\Xi_4, v_t = E_t + X_t u_t$$

- Regressors of the model are averages of lags of the VAR variables. Dynamically span lagged interdependencies between variables and countries.

- $\lambda_t, \alpha_t, \rho_t, \psi_t$ are the factor loadings. Time varying.

- Observable business cycle (common, country, variable) indicators easy to construct e.g. $\mathcal{Z}_{1t|t}\lambda_{t|t}$ coincident indicator of the common cycle.

- Can also construct a leading indicator, e.g. $\mathcal{Z}_{1t|t-1}\lambda_{t|t-1}$.

- Indicators emphasize low frequency movements, since average of VAR variables. Good for medium term forecasting.

- Analysis feasible with small T and small N and when degrees of freedom in Panel VAR small. We estimate loadings θ_t not VAR coefficients.

Estimation

$$Y_t = X_t \delta_t + E_t \qquad E_t \sim N\left(0, \Omega\right)$$

$$\delta_t = \Xi \theta_t + u_t \qquad u_t \sim N(0, \Omega \otimes V)$$

$$\theta_t = \theta_{t-1} + \eta_t \qquad \eta_t \sim N\left(0, B_t\right)$$

- Use Bayesian methods.

- E_t, u_t, η_t uncorrelated.

- $V = \sigma^2 I_k$. $\sigma^2 = 0$ (exact decomposition of δ_t).

- $B_t = \gamma_1 B_{t-1} + \gamma_2 B_0$, with $B_0 = diag\left(B_{01}, B_{02}, B_{03}, B_{04}\right)$

- Prior densities for $\left(\Omega, B_0, \theta_0\right)$ proper but loose.

Data

- 1970Q1-2007Q3. Demeaned and standardized growth rates of SA data.

- 7 EMU (Germany, France, Italy, Spain, Belgium, Netherlands and Finland) and 3 non-EMU (UK, Sweden, Denmark) countries.

- Endogenous variables: real GDP, total employment index, industrial production index, real private consumption expenditure and real gross fixed capital formation (from OECD database).

- Exogenous variables: oil prices (IMF), non-energy commodity prices and total world trade volume (OECD), US GDP and US 3-month interest rate.

- Implementation of the Maastricht Treaty (1-11-1993) and ECB creation (1-6-1998), Euro changeover (1-1-2002).

- VAR: 1 lag for all endogenous and exogenous.

Strategy for the analysis

- Examine the dynamics of indicators. Are there breaks? When do they occur?

- Conduct a forecasting exercise around the time of the institutional changes. Can we predict cycles well?

- Examine the dynamics of shocks around the same time. Do responses change before and after the events?

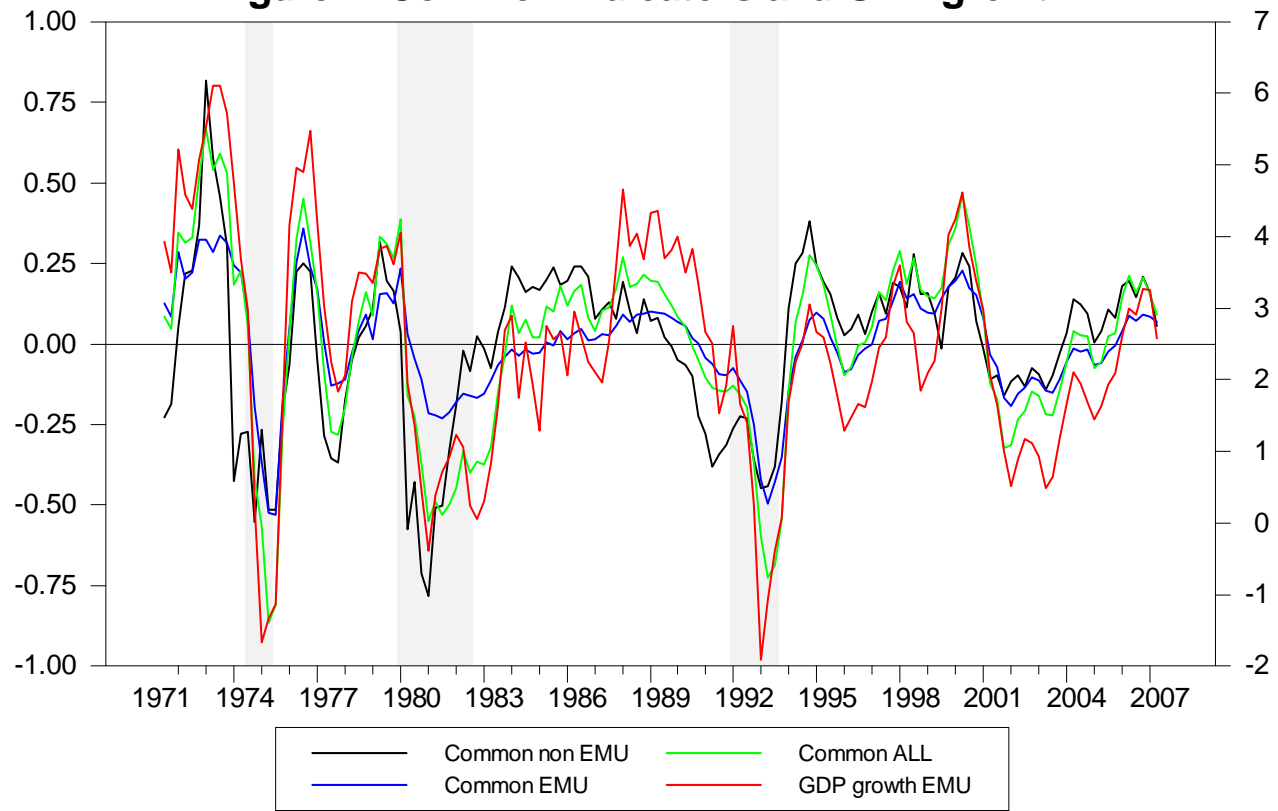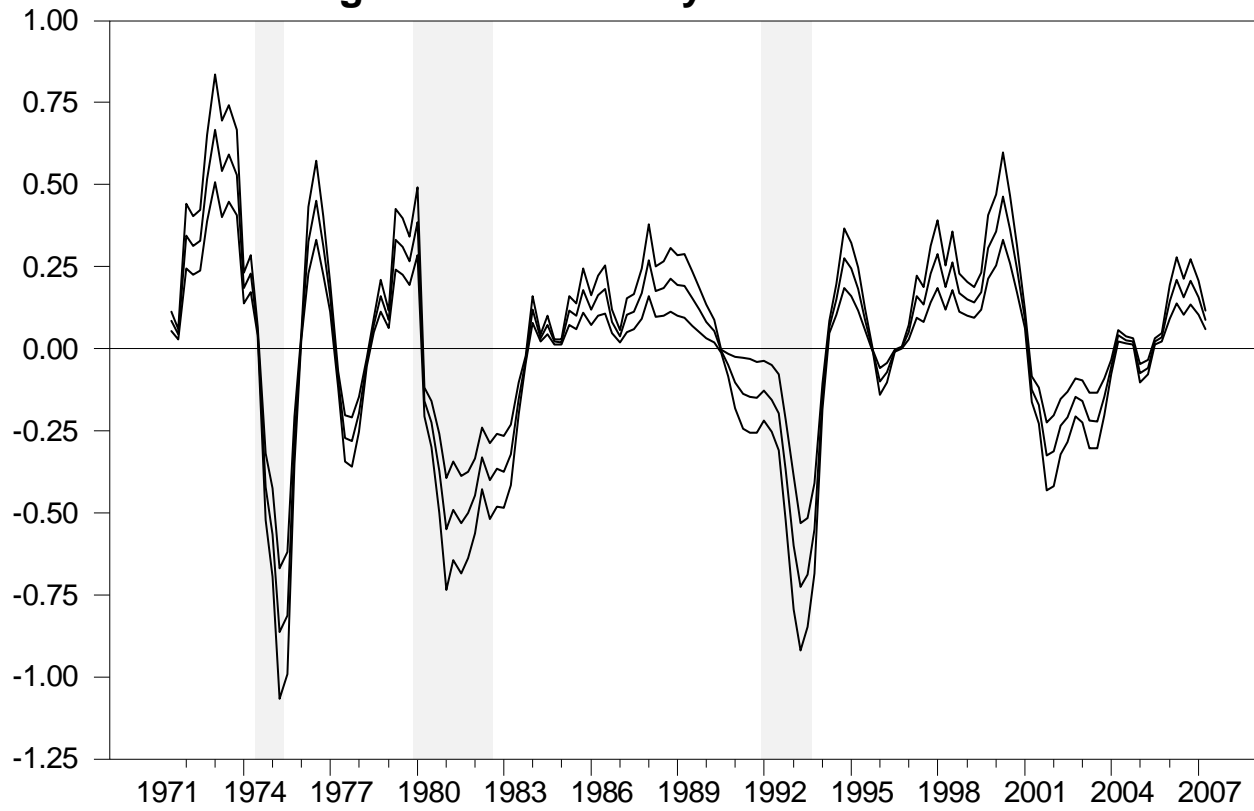**Figure 1. Common indicators and GDP growth**

Common non EMU		Common ALL
Common EMU		GDP growth EMU

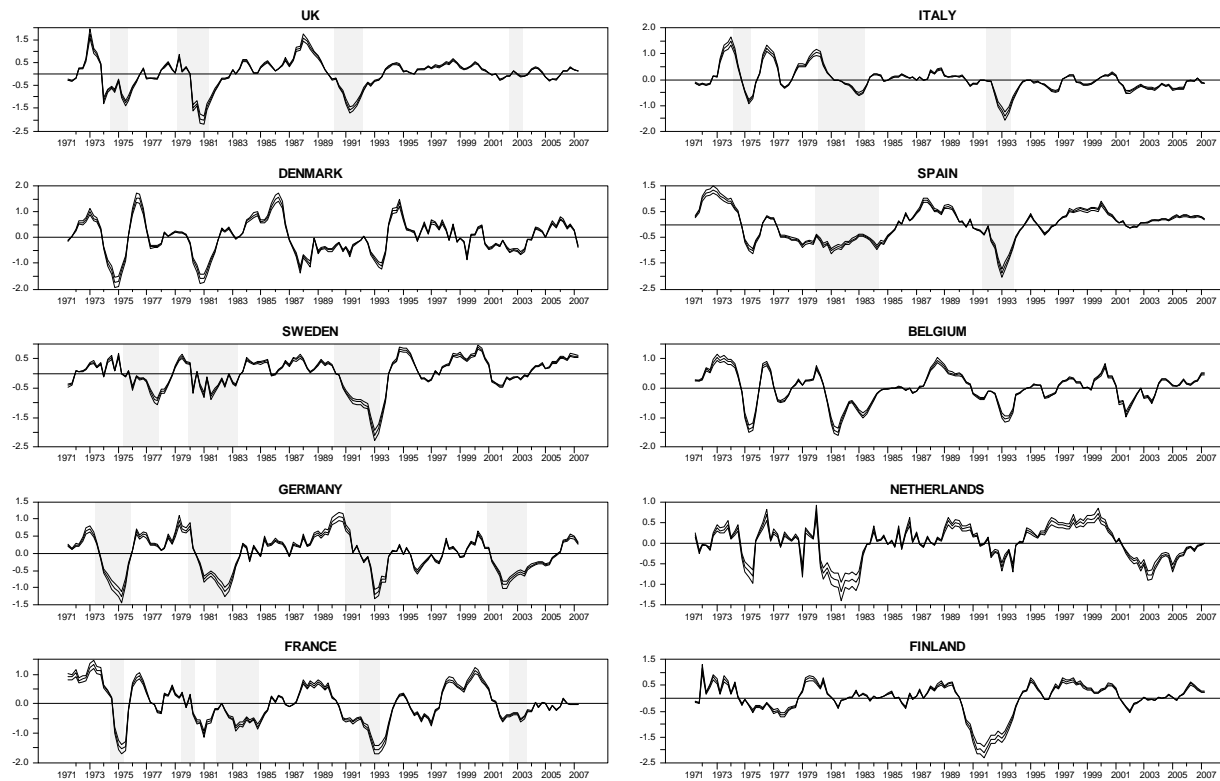**Figure 2. Common cyclical indicator**

# Figure 3. Country cyclical indicators

Results 1

- Common indicator: very volatile, hardly identifiable as a cycle, up to late 1980. Later more clear, less volatile (Great moderation?), more persistent.

- Since 1980s, the common European cycle showed 4 clear expansions and 3 recessions: 2 strong ones (1981-84, 1991-94) and a much softer one (2001-03). Shaded areas show CEPR dating.

- EU cycles smoother than country-specific cycles, less volatile.

- National cycles fall at official recession dates (48% coincidence with ECRI, 68% $\pm 2q$). Reduced volatility in 90s, like the EU cycle.

Results 2

- Common and national cycles coexist. National cycles show significant idiosyncratic features.

- Contemporaneous correlation of national with the common cycle high and increasing. after Post-Maastricht (for DE, IT, ES, FI, SE) and post-ECB (for UK, NL).

- Decreasing volatility and higher correlation observed post-Maastricht and less so post-ECB.

- EMU and non-EMU cycles similar. Highly correlated with Eurozone GDP but less volatile. Largest contemporaneous correlation in most recent periods.

Changes in volatility, persistence and synchronization due to institutional changes? Small-sample problem, many events make identification of changes difficult

- Look at 90%CI of GDP growth unconditional forecasts.

- Out-of-sample forecasting performance pretty good in all samples (due TVC structure and interdependencies).

- Institutional changes do not imply a clear change in forecasting EMU GDP.

- Non-EMU (DK, SE, UK) are better forecasted with info up to 1998Q3 than with info up to 1993Q4.
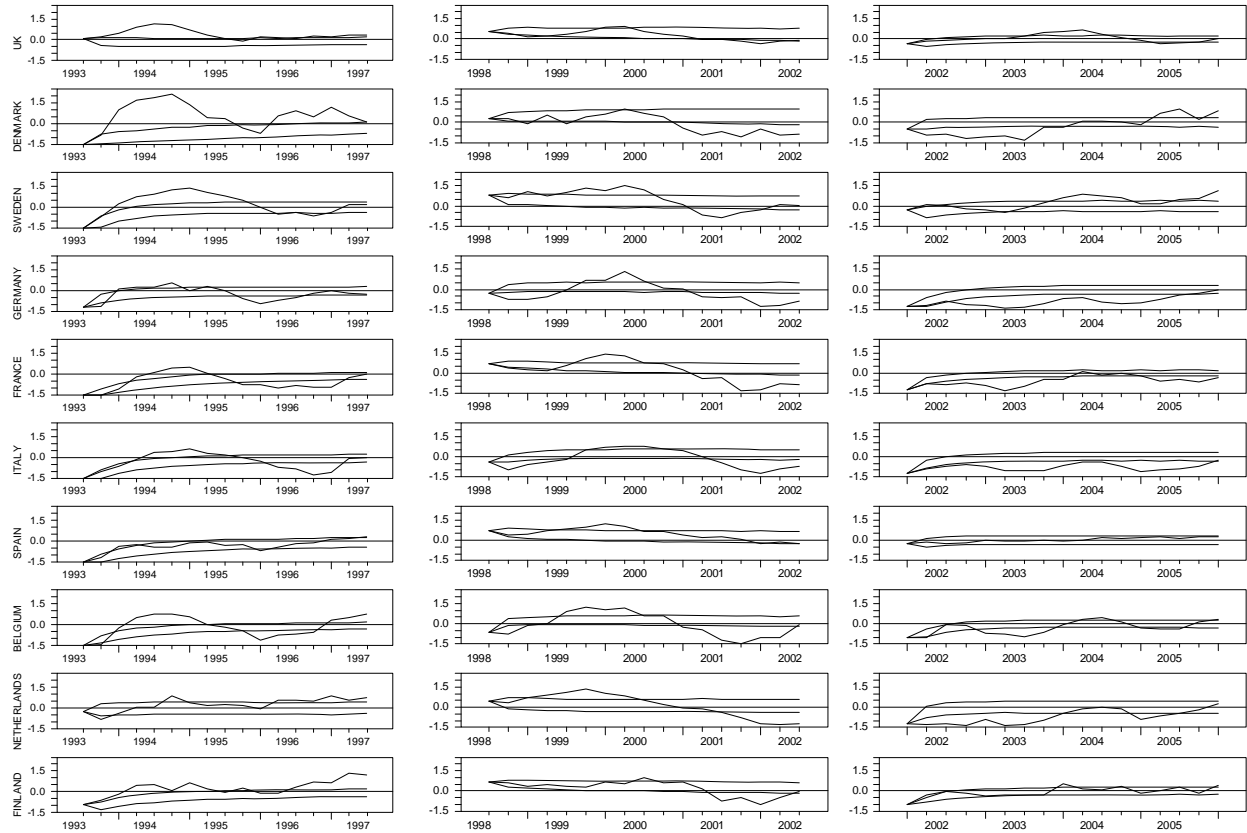
Conditional forecast 1: shock US rates, 1 period impulse

- Responses very similar across panels: dollar appreciates, European countries more competitive and grow more; responses smooth and persistent.

- Until Maastricht, all countries respond substantially (non-EMU more than EMU).

- Until ECB creation, reduction of responses. Reduction even larger after Euro introduction (but especially non-EMU countries). Temporary?
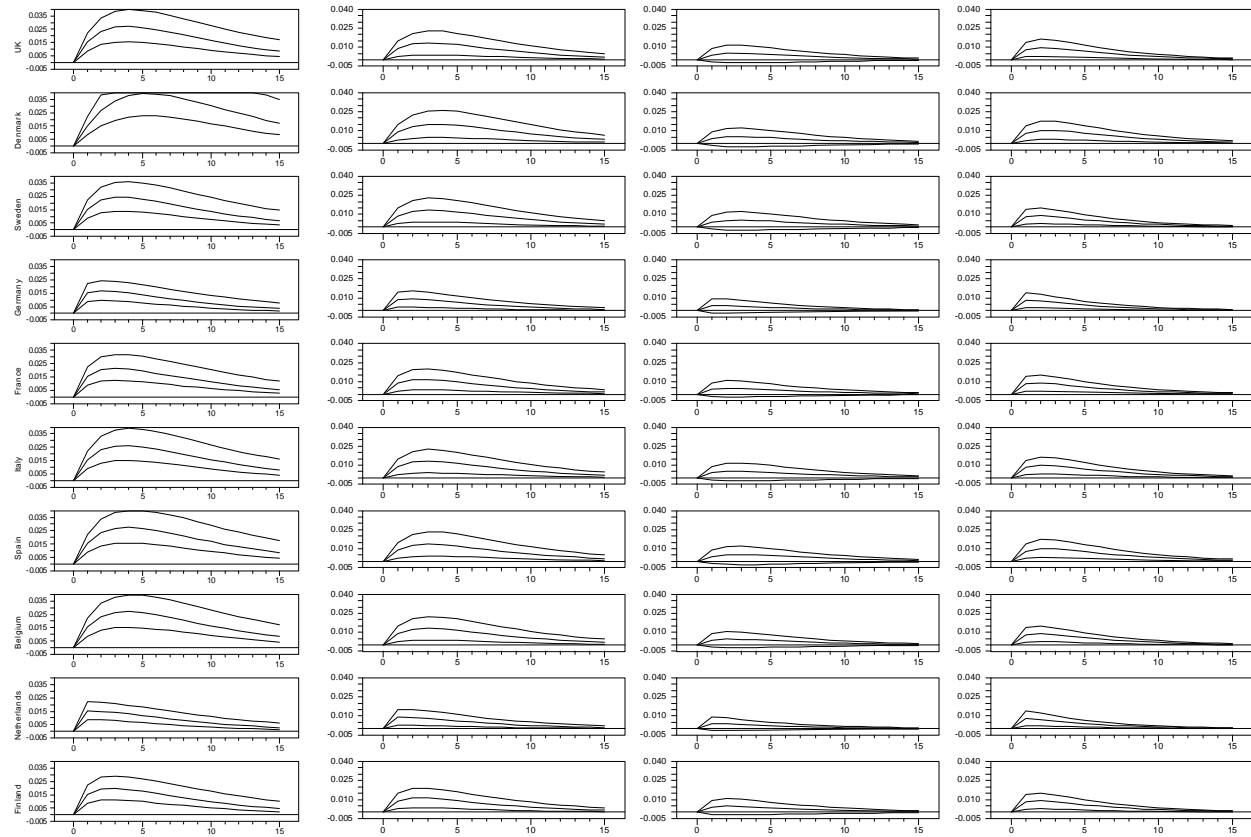
Conditional forecast 2: 1 period of higher growth in Germany

Some changes in the transmission of this shock:

- no spillovers pre-Maastricht not even among EMU;

- spillovers afterwards (pre-BCE): FR, IT, BE rise as in GE, a bit less so ES, NL; no spillovers for non-EMU and FI.

- German reunification data may dominate pre-Maastricht data.

- Responses consistent with the idea domestic that monetary policies and exchange rates used to protect against external European shocks.

- With info until 2002Q1, same transmission but smaller spillovers. Idiosyncrasies seem to matter more in the last years.
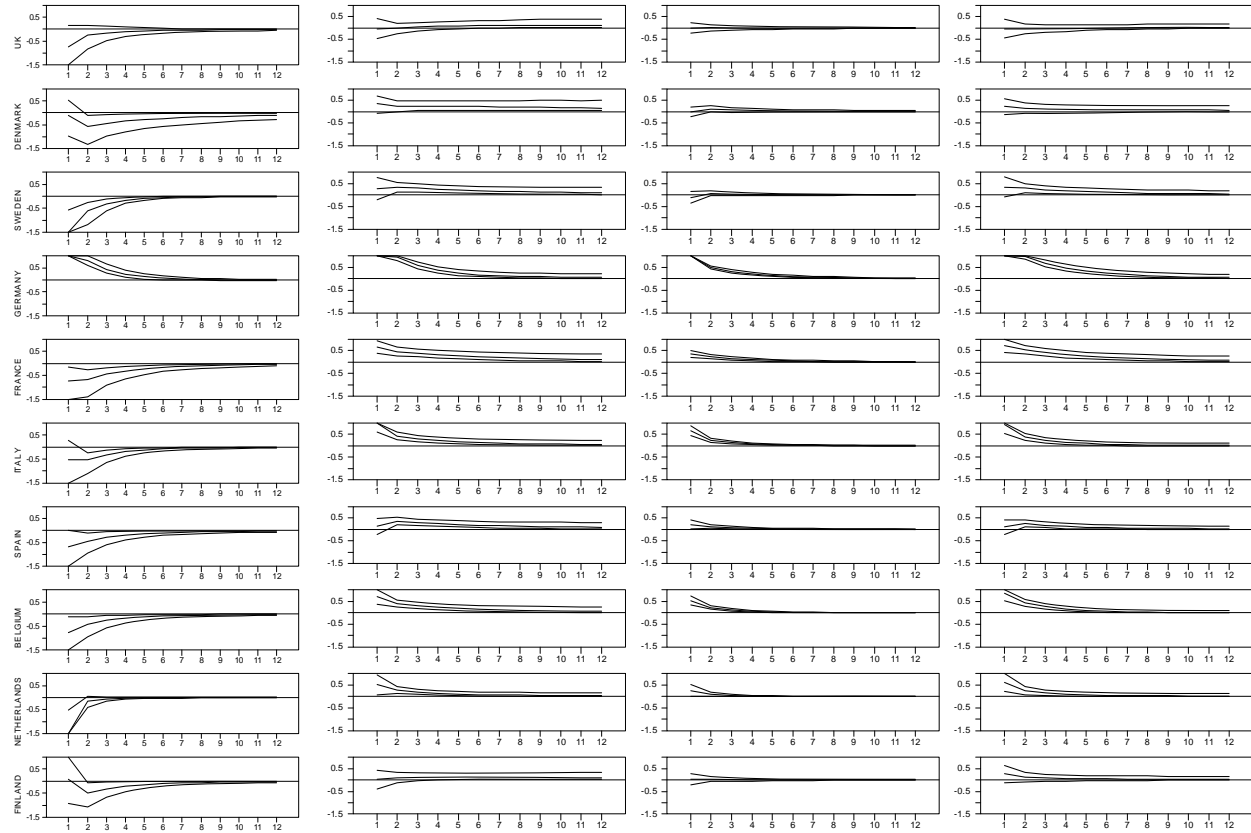
Conclusions

- Clear convergence process in EU: respond more to European shocks and less to non-European ones. The process has happened somewhat faster among EMU countries.

- European cycles evident since 1990. Domestic cycles more synchronized and correlated with European cycle since then.

- Neither the start, nor the acceleration of this process can be clearly linked to political events of interest.

Lessons for Turkey

- Most of the "gains" in terms of business cycle synchronization likely to occur in the transition period.

- Likely to become more dependent on EU shocks than rest-of-the-world shocks.

- Trade, monetary or financial interdependences?