

Modeling Euro Area Industrial New Orders

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I. Motivation

- Eurostat **discontinued** industrial new order series in mid-2012
- **Although, industrial new orders historically a relevant indicator for many users and uses!**
- **ECB fills the emerged data gaps at euro area level**

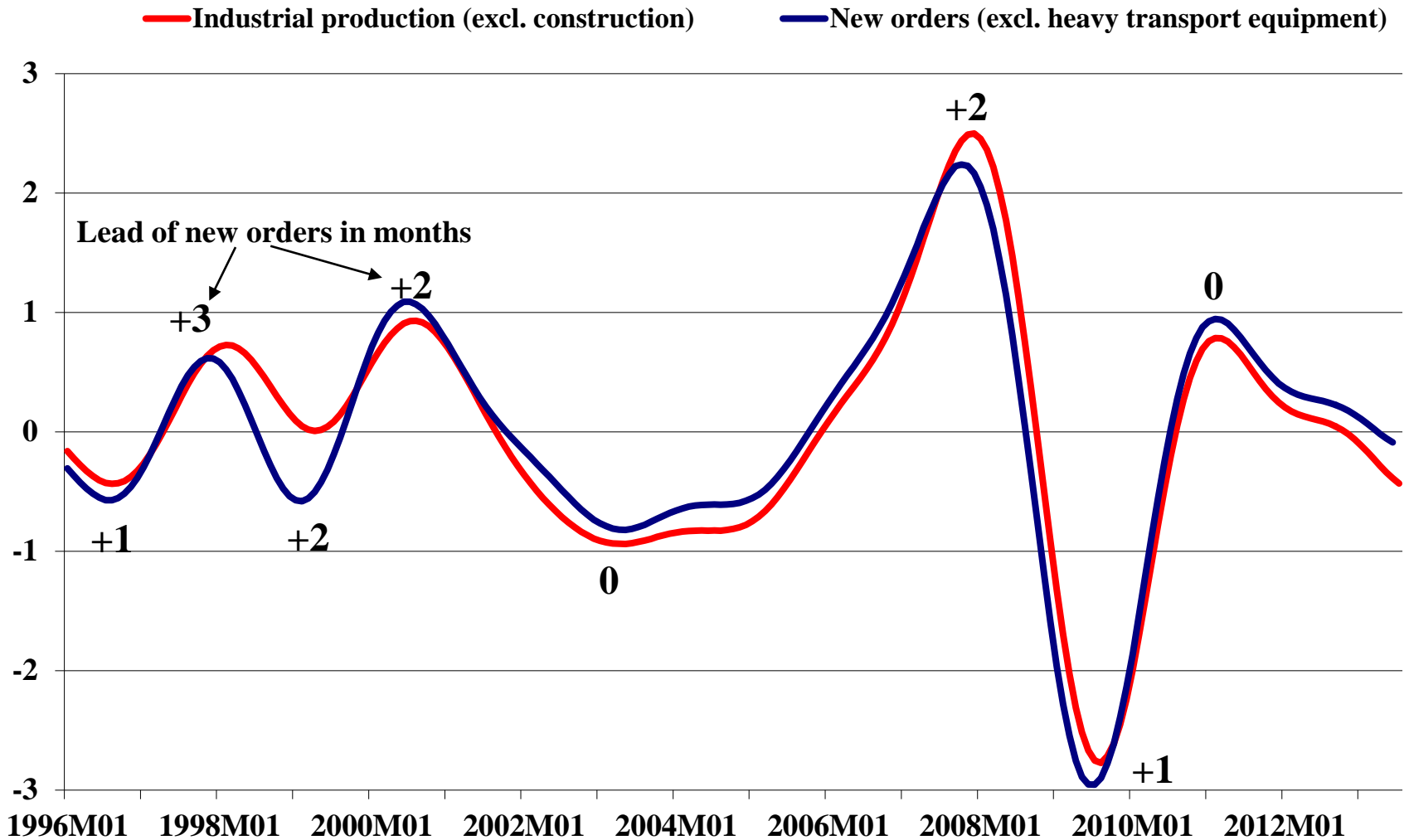
I. Motivation (cont'd)

Target: Fill gap for euro area industrial new orders
(m-o-m % changes from seasonally adjusted data)

- For countries that continue the data collection: set-up of regular **data transmission** from NSIs to the ECB
- For countries that discontinue the data collection: **model-based proxy** for new orders
- Regular production at monthly frequency

I. Motivation (cont'd)

(cyclical component, standardised percentage deviation from trend)



Sources: Eurostat and ECB calculations using a one-sided band pass filter.

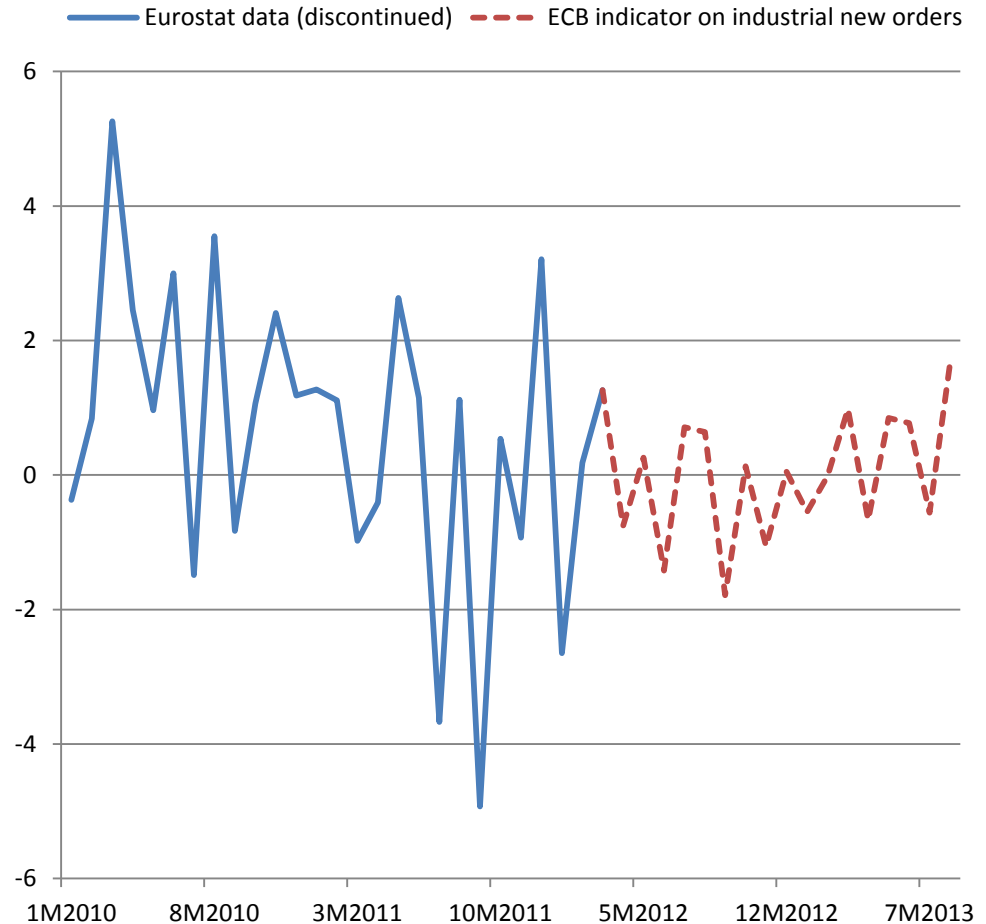
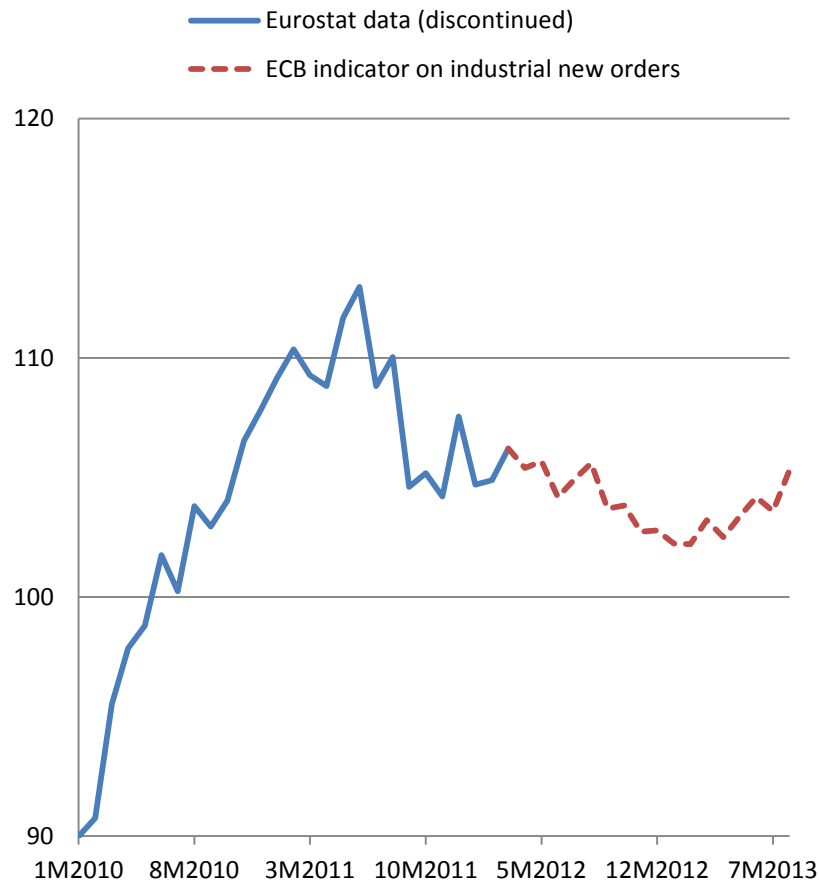
2. ECB indicator on euro area new orders

- Euro area aggregates, if > **60% country coverage**
- **Published monthly** (timeliness around $t+55$), e.g. in **Monthly Bulletin, Statistical Data Warehouse**
- **Country weights**: Eurostat's weighting scheme for industrial turnover for base year 2010 = 100
- **Working-day and seasonal adjustment** performed by NSIs, otherwise by ECB

2. ECB indicator on euro area new orders (cont'd)

(index, 2010=100; seasonally and working day adjusted)

(month-on-month percentage changes)

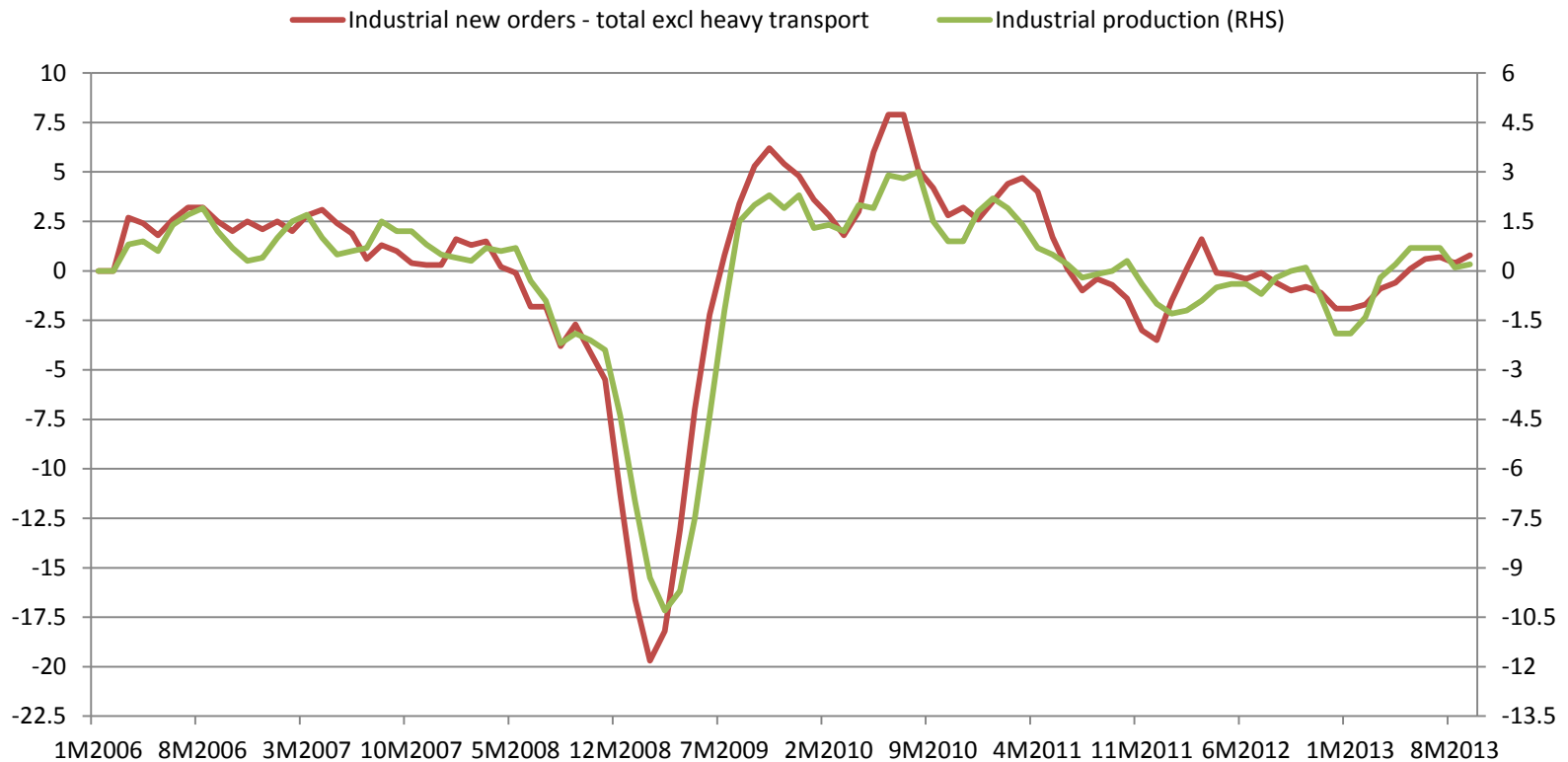


“ECB Experimental statistics based on national data”

2. ECB indicator on euro area new orders (cont'd)

Numerous breakdowns:

- Total excluding heavy transport equipment (NACE Rev2 Division 30; e.g. ships, aircraft, railway)**
(3 month-on-3 month percentage changes; seasonally and working day adjusted)

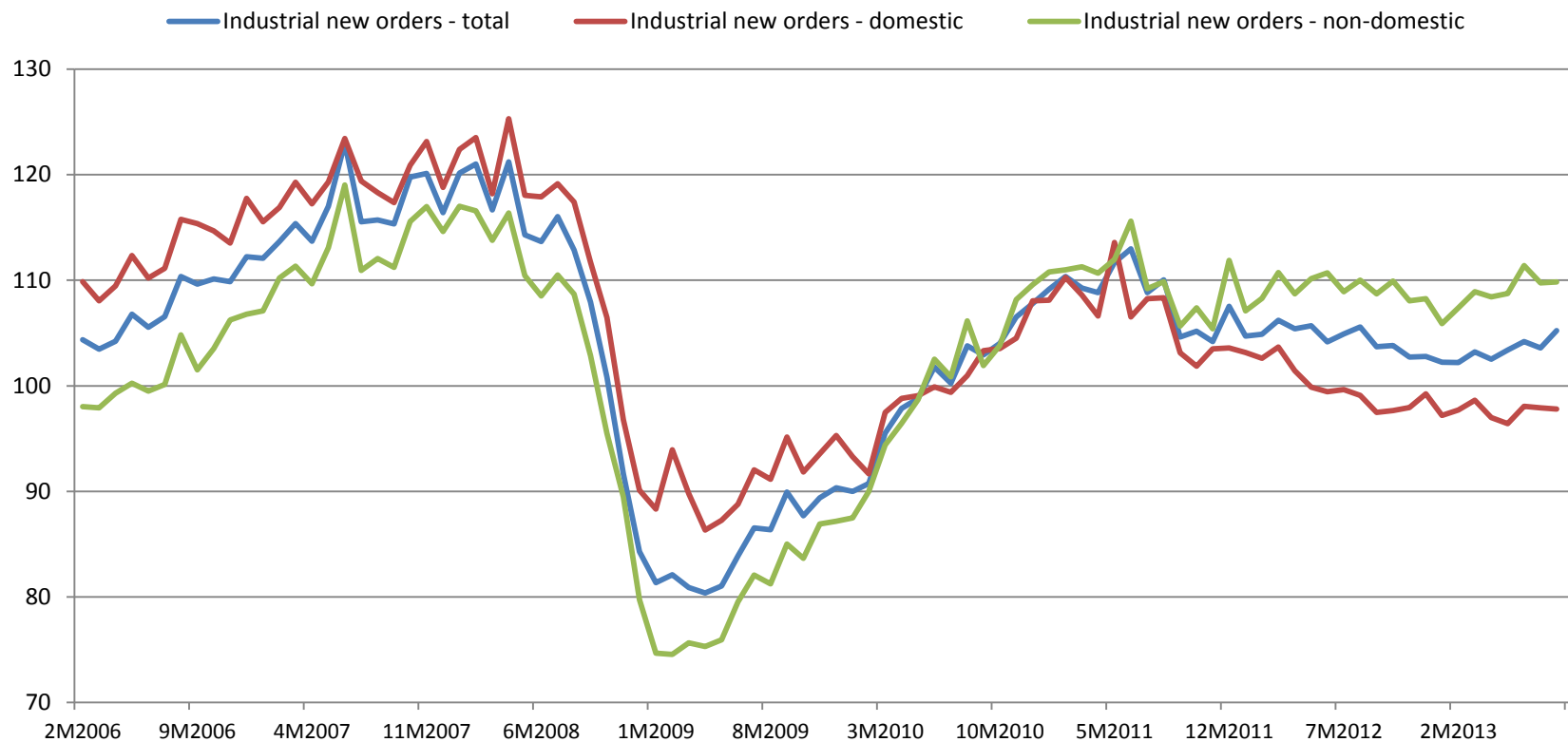


2. ECB indicator on euro area new orders (cont'd)

Numerous breakdowns:

- **By origin of order**
 - **Domestic and non-domestic**

(index 2010=100; seasonally and working day adjusted)

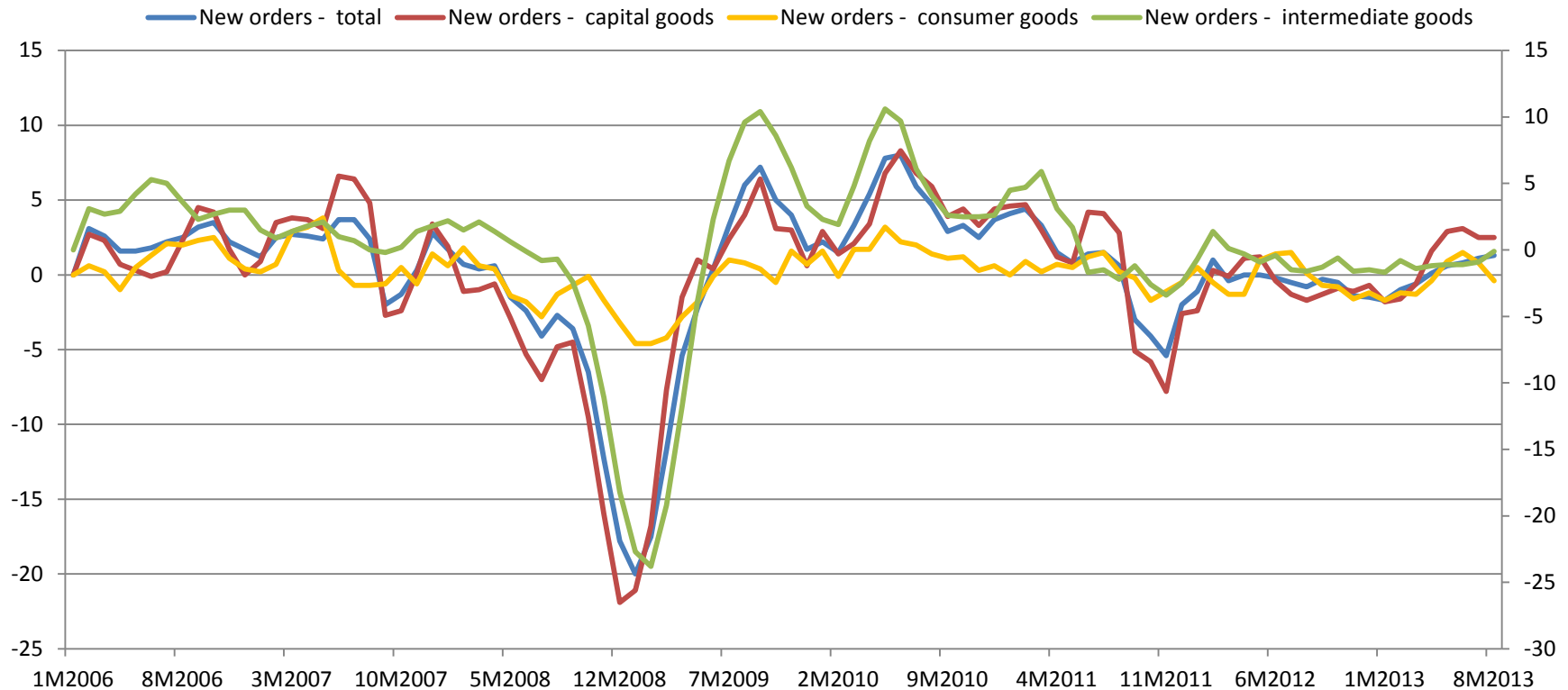


2. ECB indicator on euro area new orders (cont'd)

Numerous breakdowns:

- **By “Main Industrial Groupings”**
 - **Capital Goods, Consumer Goods, Intermediate Goods,**

(3 month-on-3 month percentage changes; seasonally and working day adjusted)



3. Model

- **Lack of theoretical/empirical underpinning for the modelling exercise → **agnostic** approach**
- **Drawing from a **variety of data sources** (both, surveys and hard statistics)**
- **Ensure robustness at country level and across new order subgroupings**

3. Model (cont'd)

- **DG ECFIN's survey in manufacturing**
 - “Do you consider your overall order books to be (*above normal – normal - below normal*)?”
 - Stock concept
- **Purchasing Managers' Survey in manufacturing**
 - “Level of total orders this month compared with one month ago?” (*higher – same - lower*)
 - Flow concept
- **Eurostat data on industrial turnover**
 - Quantitative monthly data from all Member States; indices (2010=100); seasonally adjusted
 - Δ Order books = new orders – sales – ~~cancelled orders~~

3. Model (cont'd)

New orders model:

$$\begin{aligned} NO_t \text{ m-o-m growth} &= \beta_0 + \beta_1 (\Delta_3 ECFIN_t) + \beta_2 (\Delta\Delta_3 ECFIN_t) + \beta_3 (PMI_t \text{ residuals}) + \beta_4 (\Delta PMI_t \text{ residuals}) \\ &+ \beta_5 (TO_t \text{ m-o-m growth}) + \beta_6 (TO_{t-1} \text{ m-o-m growth}) + \beta_7 (NO_{t-1} / TO_{t-1}) \\ &+ \beta_8 (NO_{t-1} \text{ m-o-m growth}) + \beta_9 (NO_{t-2} \text{ m-o-m growth}) + \varepsilon_t \end{aligned}$$

...where the variables are represented by monthly series:

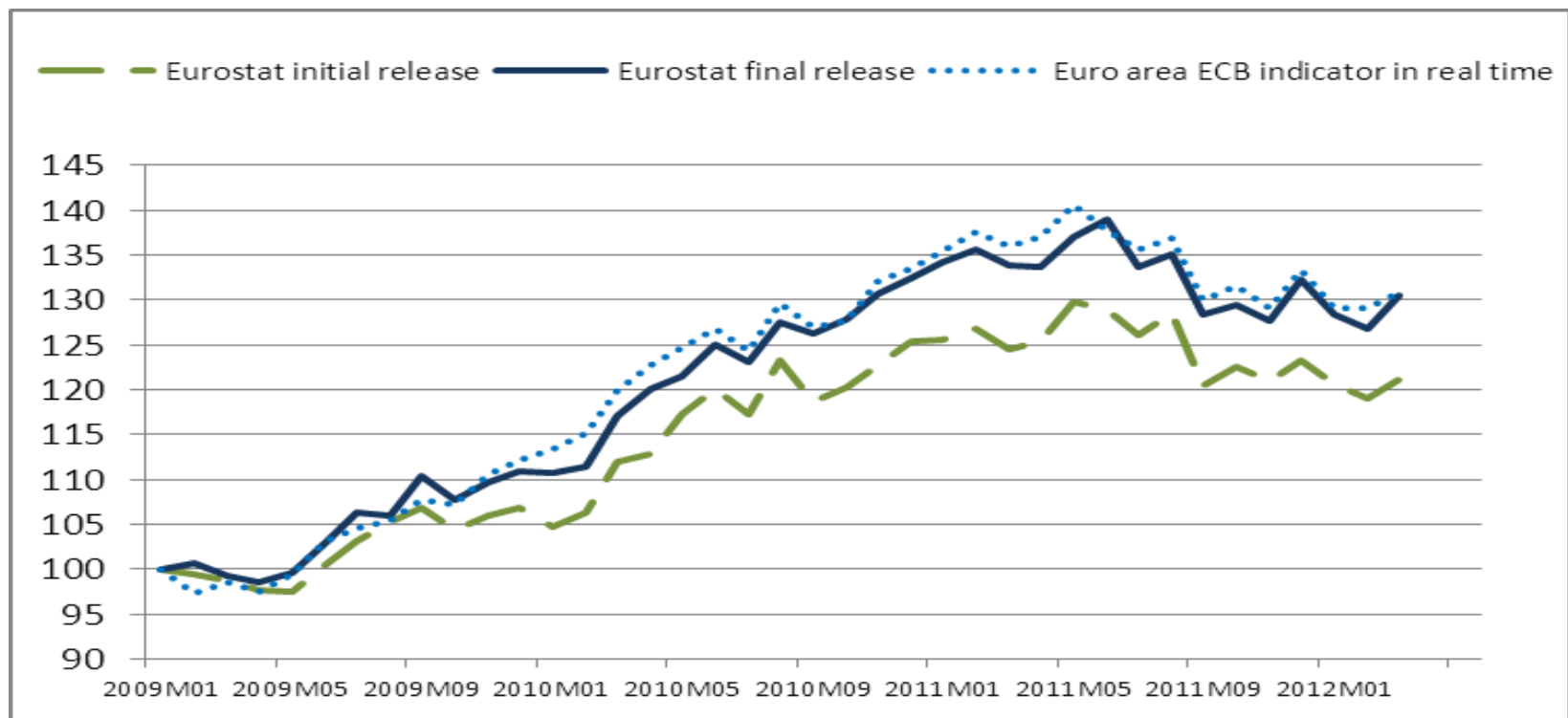
- **NO** – Total manufacturing working to order
- **ECFIN** – Total order book levels
- **PMI** – Purchasing manager index surveys in manufacturing
- **TO** – Total turnover index – manufacturing

4. Results

- All three cohorts of variables matter for explaining euro area m-o-m new order growth
- Economically sound coefficients and healthy residual behaviour
- Tailored restriction sets stemming from free estimations
 - *Insignificants at 0*
 - *The sum of turnover variables cannot exceed 1*
- Restrictions jointly tested by the *Wald* test for statistical viability
- **Total new orders:** 50% of m-o-m growth explained
- **Other subgroupings:** 30% for MIG Capital Goods to 70% for MIG Intermediate Goods m-o-m growth explained
- **Index level:** model explains 98% of variation in new orders
- **Out-of-sample forecast** (est. over 5-years to dynamically forecast 10-years): explains 97% of variation

4. Real-time forecasts

- **Real-time exercise based on limited data availability**
- **Model re-estimated once up to Jan. 2009 for all countries that have discontinued the collection of new orders, using historical data vintages instead of final releases**
- **Generate 1-period ahead forecasts for Feb.2009-Mar.2012**
- **Forecasts aggregated with real-time hard data of continuing countries**
- **ECB indicator clearly closer to final data than Eurostat initial release**



5. Conclusions

- Model proves **robust** across countries, new order subgroupings, frequencies as well as *out-of-sample*
 - Formal checks show that the **ECB indicator leads industrial production** but not *vice versa*
 - **Important for cross-checking production data**, especially during times with heightened uncertainty
 - **ECB indicator provides invaluable information on the origin of demand**
- ➔ **All in all, ECB indicator relevant for conjunctural analysis of the euro area economy**

6. Publication

- **ECB Occasional Paper Series (No 149, June 2013)**
 - “Introducing the ECB Indicator on Euro Area Industrial New Orders”
 - <http://www.ecb.europa.eu/pub/pdf/scpops/ecbocp149.pdf>
- **ECB Monthly Bulletin**
 - July 2013 edition; **Box 9** (pages 65-68):
“Introducing the ECB Indicator on Euro Area Industrial New Orders”
<http://www.ecb.europa.eu/pub/pdf/mobu/mb201307en.pdf>
 - Statistical Annex, Page S52, Table 5.2.4, col 1-2:
- **ECB Statistics Pocket Book**
 - Page S52, Table 3.3
<http://www.ecb.europa.eu/pub/pdf/stapobo/spb201308en.pdf>
- **ECB Statistical Data Warehouse (SDW)**
 - <http://sdw.ecb.europa.eu/browse.do?node=2120800>
- **HAVER Economics:** EUDATA database; code: S025OCNO@EUDATA

Thanks a lot for your attention!

Questions?

Reserve slides

New orders national statistics country coverage

Discontinued: DK, FR, IE, CY, LU, MT, SI, LT, LV and the UK

Continued:

- *Euro area:* BE, DE, GR, EE, ES, IT, **NL** (will stop as of Jan-2014), AT, PT, SK and FI

- *Non-euro area:* BG, CZ, HU, PL, RO and SE

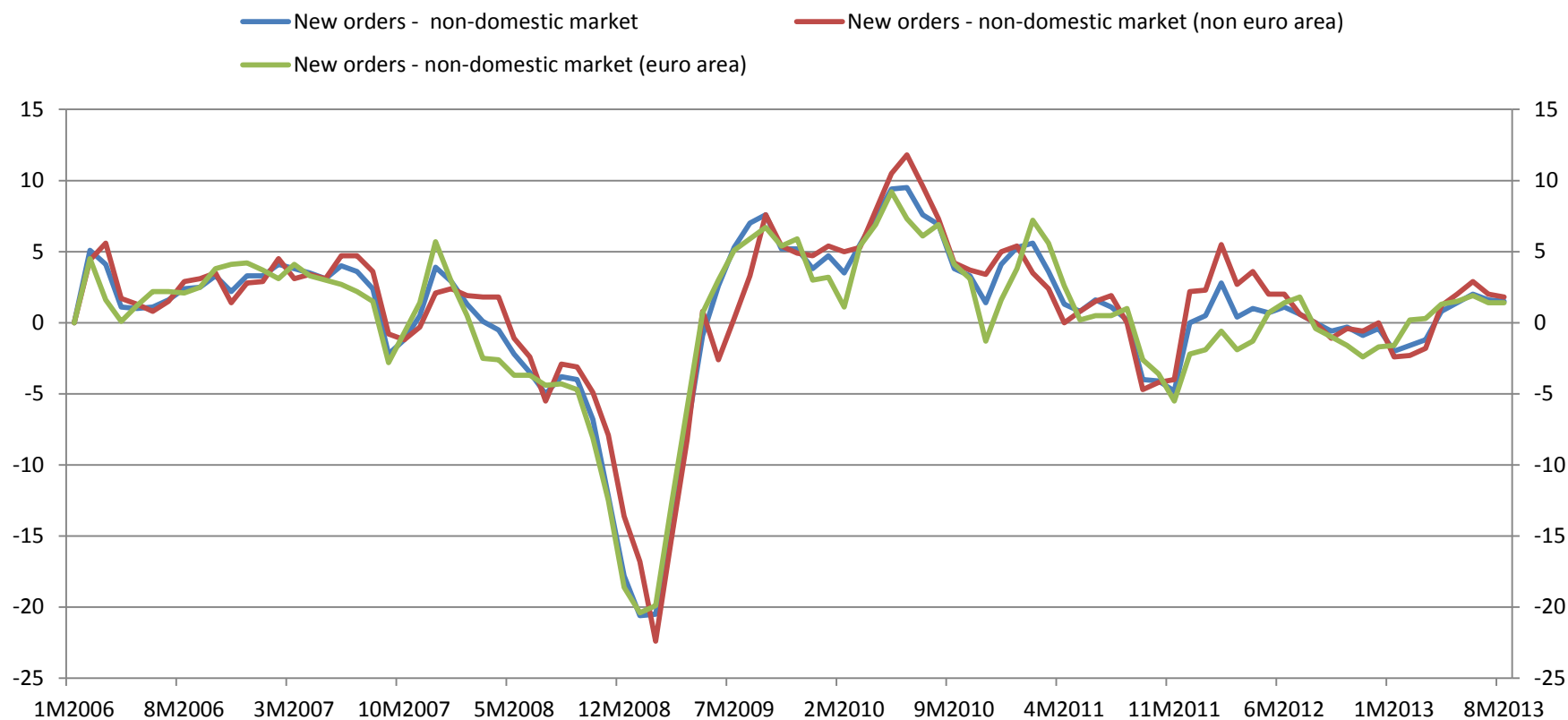
Euro area coverage rate of above 80% (2012), around 70% (2013) and about 65% from 2014 onwards.

2. ECB indicator on euro area new orders (cont'd)

Numerous breakdowns:

- **By origin of order**
 - **Non-domestic and split into euro area and non-euro area**

(3 month-on-3 month percentage changes; seasonally and working day adjusted)

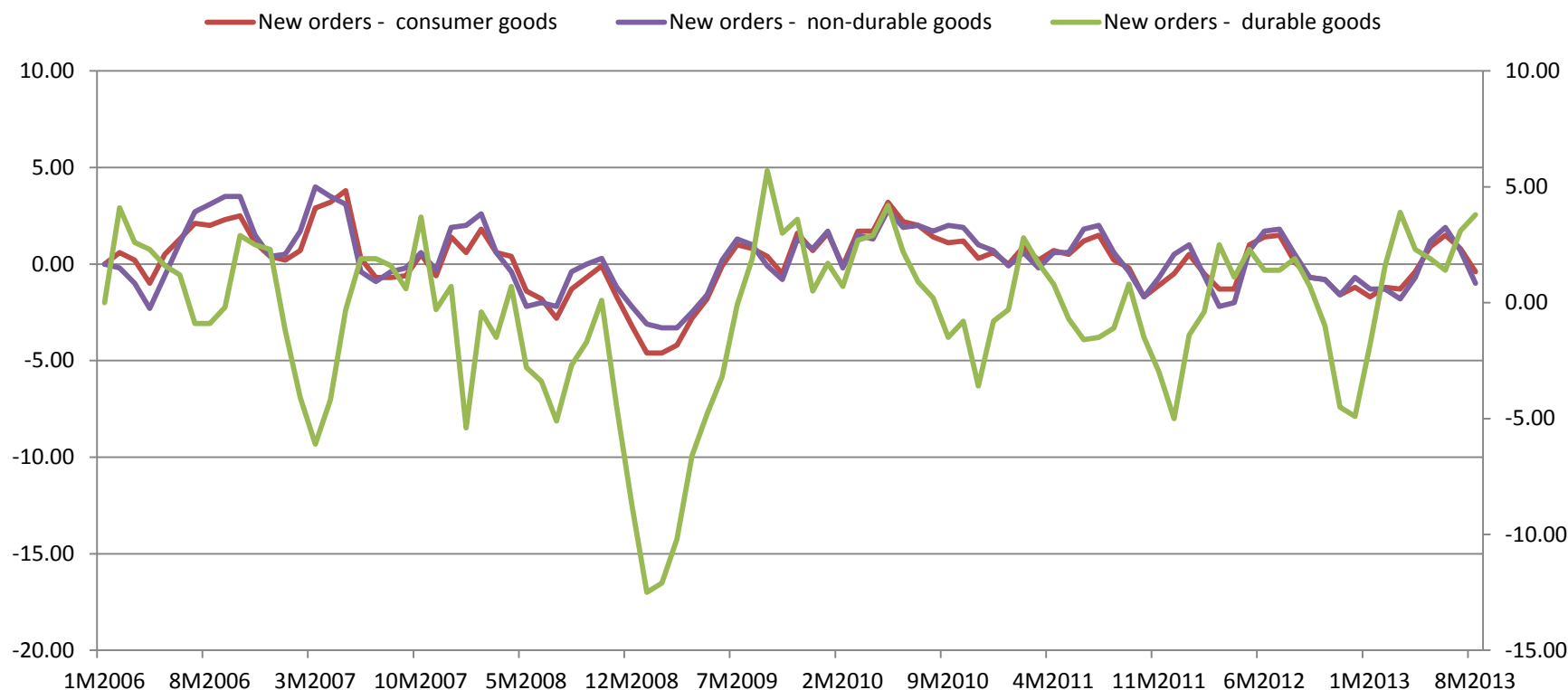


2. ECB indicator on euro area new orders (cont'd)

Numerous breakdowns:

- **By “Main Industrial Groupings”**
 - **Consumer Goods: Durable and non-durable**

(3 month-on-3 month percentage changes; seasonally and working day adjusted)

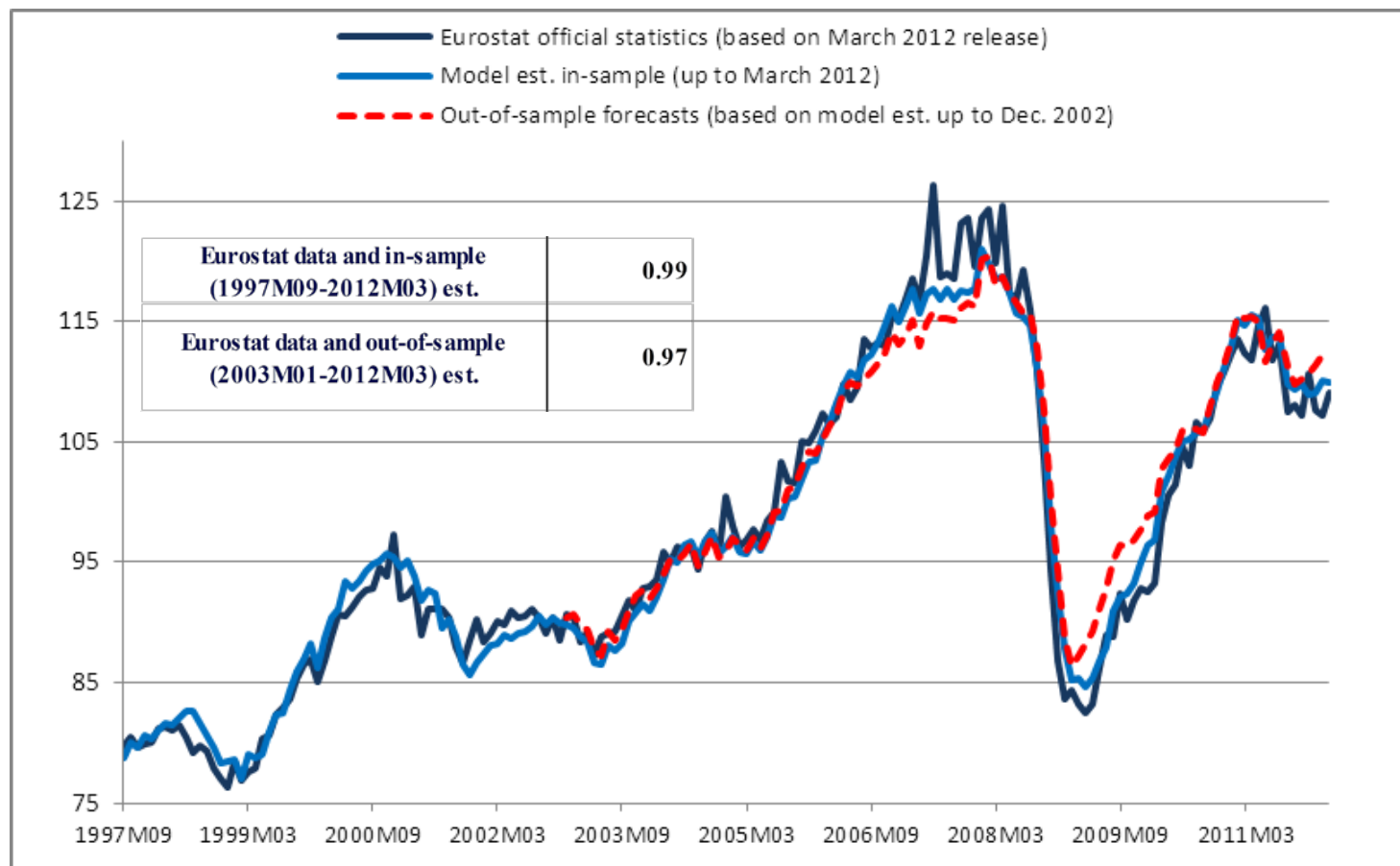


3. Model (cont'd)

- **DG ECFIN's survey in manufacturing**
 - **Headline survey indicator**
 - **Available for all countries**
 - **In levels and delta**
- **PMI surveys in manufacturing**
 - **Auxiliary survey indicator**
 - **Data gap (available only for DE, IE, GR, ES, FR, IT, NL,AT)**
 - **In residual levels and delta**
 - $PMI_t = \beta_0 + \beta_1(\Delta_3 ECFIN_t) + \varepsilon_t \rightarrow$ extract residuals
 - $\Delta PMI_t = \beta_0 + \beta_1(\Delta\Delta_3 ECFIN_t) + \varepsilon_t \rightarrow$ extract residuals
 - **Capitalise on any extra information available on the top on ECFIN surveys**

4. Out-of-sample forecasts

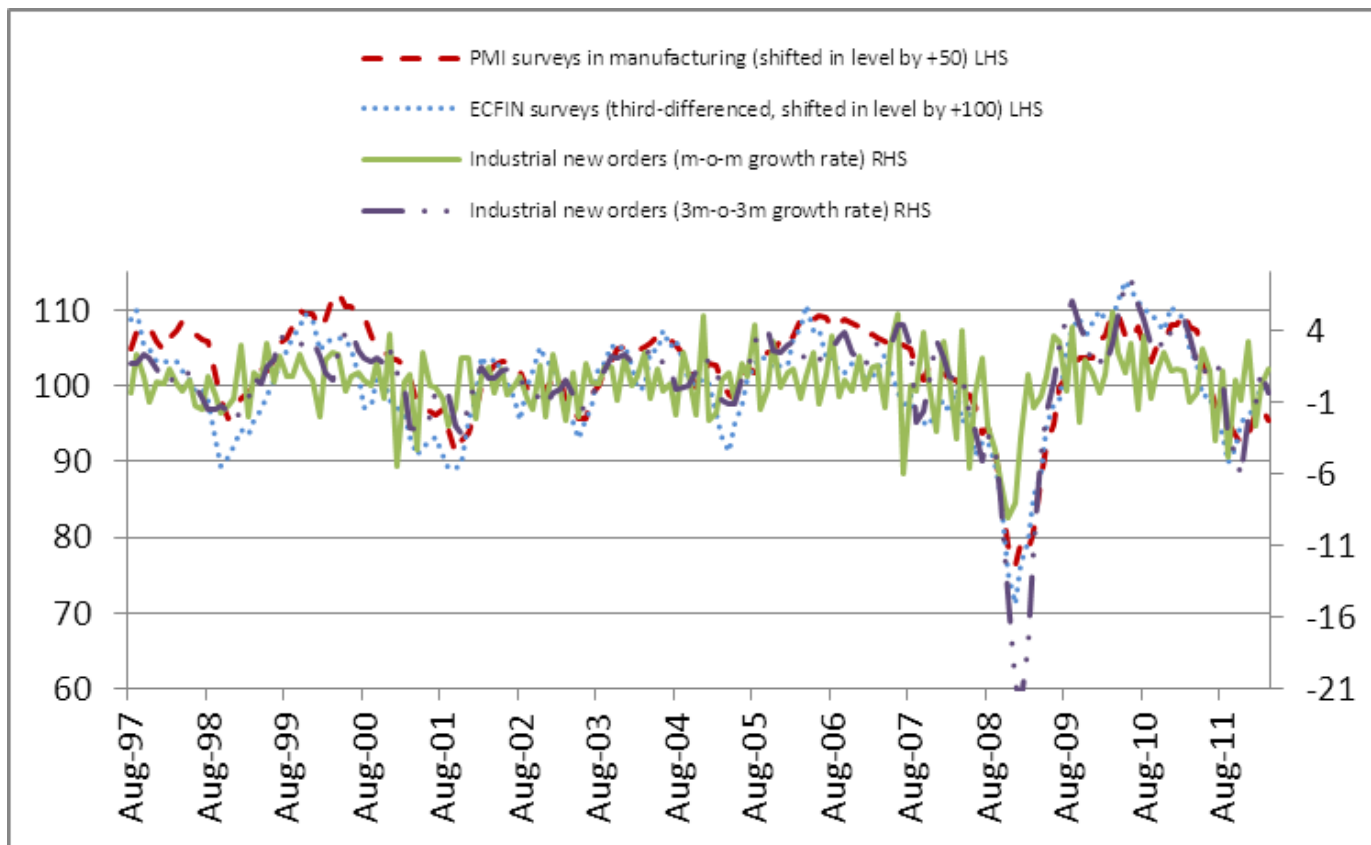
- 5-year estimates (1997-2002) to dynamically forecast 10 years (2003-2012)
- Dynamic forecast uses previously est. values of lagged dependent variable



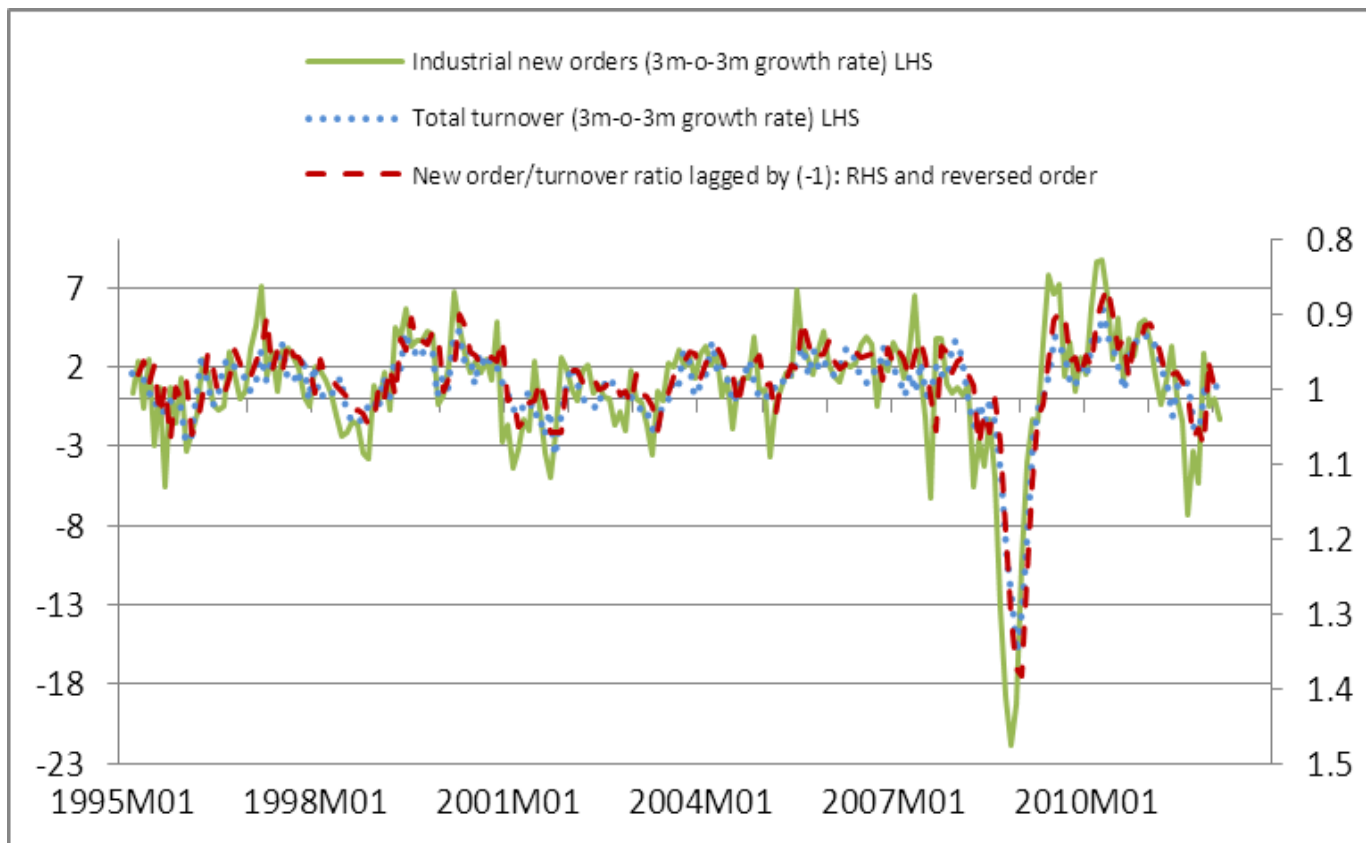
Overview of determinants

Variable	Macroeconomic determinant
Surveys	
$\Delta_3 ECFIN$	Three-month change in managers' assessment of the current level of orders books
$\Delta\Delta_3 ECFIN$	Three-month change in managers' assessment of the current level of orders books (1st difference)
<i>PMI</i> residuals	Manufacturing PMI new orders index
ΔPMI residuals	Manufacturing PMI new orders index (1st difference)
Hard data	
<i>TO</i> m-o-m growth	Industrial turnover index in manufacturing (corresponds to market sales of goods or services)
<i>TO</i> _{t-1} m-o-m growth	Industrial turnover index in manufacturing (1 period lagged)
<i>NO</i> _{t-1} / <i>TO</i> _{t-1}	New orders to industrial turnover ratio (1 period lagged)
Variables that improve dynamics	
<i>NO</i> _{t-1} m-o-m growth	Lagged dependent variable (by 1 period)
<i>NO</i> _{t-2} m-o-m growth	Lagged dependent variable (by 2 periods)

Surveys



Hard data



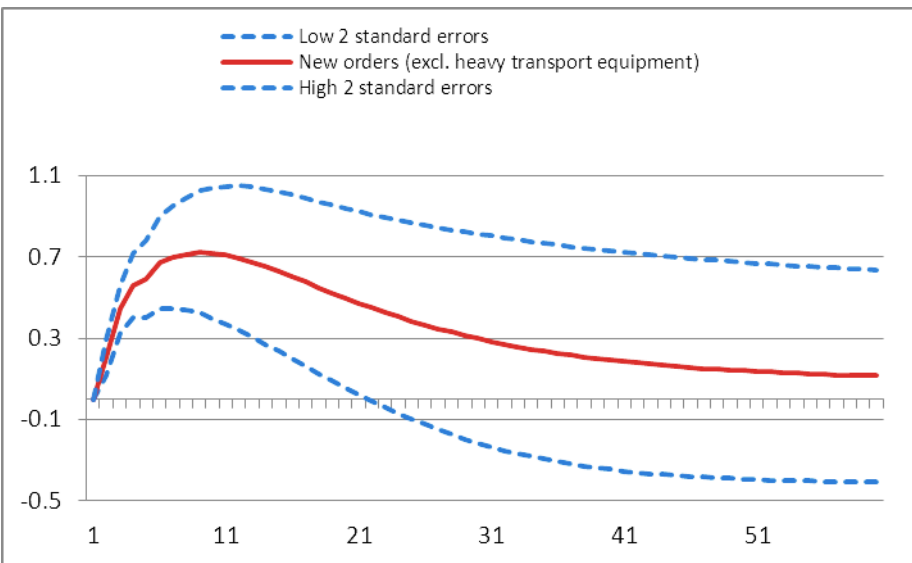
New order breakdowns results available

<i>euro area</i>
New orders breakdown
Industrial new orders
Industrial new orders (excl. heavy transport equipment)
Main industrial groupings (MIG)
Industrial new orders - capital goods
Industrial new orders - intermediate goods
Industrial new orders - consumer goods
Industrial new orders - consumer durable goods
Industrial new orders - consumer non-durable goods
By origin of demand
Industrial new orders - domestic
Industrial new orders - non-domestic
Industrial new orders - non-domestic (euro area)
Industrial new orders - non-domestic (non-euro area)
<i>EU non-euro area</i>
New orders breakdown
Industrial new orders
Industrial new orders (excl. heavy transport equipment)
By origin of demand
Industrial new orders - domestic
Industrial new orders - non-domestic

New orders as leading series: impulse responses

- Based on **BVARs** consisting from new orders (excl. heavy transport) and industrial production (excl. constr.)
- Unexpected temporary shock in orders followed by significant delayed adjustment in production (but orders do not react to shock in production)

Log level



Log change

