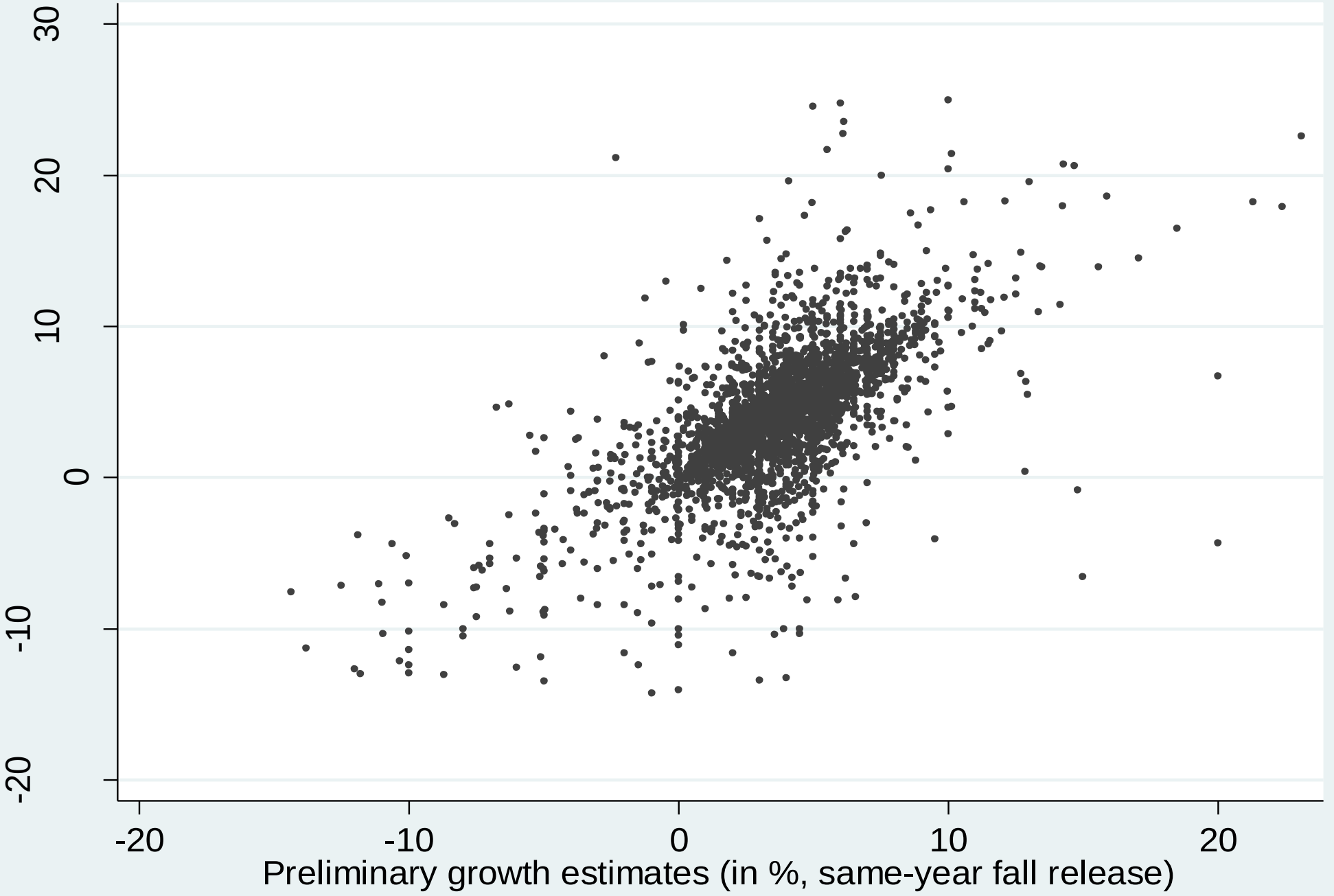
# Output Data Revision in Low-Income Countries

Florian Misch
*Centre for European Economic Research*

(with Eduardo Ley, formerly The World Bank)

Washington

January 31, 2014


30
20
10
0
-10
-20
-20
-10
0
10
20
Preliminary growth estimates (in %, same-year fall release)

# Output Data Revisions analyzed for Advanced Countries

- Orphanides and van Norden (REStat, 2002) examine reliability of output gaps in real time
- Output data revisions in EU also increasingly studied: González Cabanillas and Alessio Terzi (2012, EC WP) and Marcellino and Musso (2010, ECB WP)
- Blanchard and Leigh (AER, forthcoming) examine the relation between forecast errors and planned fiscal consolidation
- Summary by Croushore (2011), JEL

# Output Data Revisions are Relevant for Policy

- Policy makers necessarily rely on preliminary GDP figures
  - Budgetary planning & observance of fiscal rules
  - Monetary Policy
- Fiscal surveillance & analysis complicated if output data unreliable in real time
- Growth surprises and disappointments especially challenging in LICs

# Outline

- Related Literature
- Conceptual Framework and Data
- Nature and Size of Revisions
- Determinants
- Implications and Conclusions

# Little Recent Research on Output Data Revisions in LICs

- Past evaluations of Independent Evaluation Office
  - Timmermann (2008) reports revisions across all countries
  - No separate reporting for LICs

- Literature on political determinants of forecast revisions in all countries (Dreher et al., 2011, and Aldenhoff, 2007)

- Research on fiscal implications by Ley and Misch (2013) focusing on all countries

# But growing literature on measuring output in LICs

- Henderson et al. (2012) uses luminosity as a measure of 'true' economic activity to account for informal economic activity
- Hamilton and Ley (2010) argue that GDP figures in resource-rich LICs should be adjusted for depreciation of natural capital
- Devarajan (2013) presents stylized facts on 'Africa's statistical tragedy'
- Jerven (2013) suggests that that GDP figures in Africa are unreliable
- Johnson et al. (2012) examine revisions of PWT

# Definition and Drivers of Output Data Revisions

- Encompass both revisions to growth and levels
  - GDP growth: *actual – preliminary*
  - GDP levels: *(actual – preliminary) / actual*

- Encompass both forecasts, nowcasts and backcasts
  - E.g. ‘forecast errors’

- Drivers
  - New information
  - New methodology
  - Rebasing

# Data

- World Economic Outlook data on GDP
  - Time series from mid-1960s to 2012
  - All vintages from 1990 onwards
  - 175 countries

- Advantages
  - Best data source available for LICs, mostly free from political biases
  - Many vintages
  - Revisions systematic and comparable across countries

| Release of data | | Notational term | Economic content | No. of observations |
|---|---|---|---|---|
| t-1 | spring | estimates | forecast | 2,865 |
| | fall | | | 2,867 |
| t | spring | | nowcast | 3,040 |
| | fall | | | 3,042 |
| t+1 | spring | mostly historical / actual data | backcast | 2,894 |
| | fall | | | 2,896 |
| t+2 | spring | | | 2,748 |
| | fall | | | 2,749 |
| t+3 | spring | | | 2,600 |
| | fall | | | 2,602 |

# Revisions of same-year fall growth

| Country group | Percentiles | | | | | Moments | Mean abs. |
|---|---|---|---|---|---|---|---|
| | 10 | 20 | 50 | 75 | 90 | Mean | error (MAE) |
| High income: OECD | -0.93 | -0.26 | 0.41 | 1.07 | 1.89 | 0.46*** | 1.02 |
| High income: nonOECD | -2.81 | -0.92 | 0.78 | 2.36 | 6.25 | 0.90** | 3.87 |
| Upper middle income | -3.35 | -1.27 | 0.61 | 2.32 | 4.42 | 0.60*** | 2.54 |
| Lower middle income | -3.09 | -1.13 | 0.40 | 1.85 | 3.74 | 0.36** | 2.57 |
| Low income | -5.04 | -1.92 | 0.00 | 1.45 | 4.05 | -0.52** | 3.02 |
| All countries | -3.12 | -0.98 | 0.38 | 1.74 | 3.72 | 0.31*** | 2.51 |

* / ** / *** denotes significance at the 1% / 5% / 10% level

# Correlation between same-year fall and final growth

| Country group | t-1 | | t | | t+1 | | t+2 | |
|---|---|---|---|---|---|---|---|---|
| | spring | winter | spring | winter | spring | winter | spring | winter |
| High income: OECD | 0.43 | 0.51 | 0.69 | 0.84 | 0.90 | 0.92 | 0.92 | 0.94 |
| High income: nonOECD | 0.35 | 0.38 | 0.56 | 0.68 | 0.69 | 0.82 | 0.88 | 0.85 |
| Upper middle income | 0.34 | 0.42 | 0.60 | 0.73 | 0.82 | 0.85 | 0.86 | 0.88 |
| Lower middle income | 0.23 | 0.20 | 0.42 | 0.67 | 0.78 | 0.83 | 0.84 | 0.85 |
| Low income | 0.28 | 0.34 | 0.43 | 0.54 | 0.77 | 0.82 | 0.84 | 0.87 |
| All countries | 0.31 | 0.32 | 0.49 | 0.65 | 0.75 | 0.83 | 0.86 | 0.86 |

# Extent of over-optimism of same-year fall estimates (actual growth < estimated growth)

| Vintage | Country group | Overoptimism (% of instances) | | | Sign change (⊕ to ⊖) | |
|---|---|---|---|---|---|---|
| | | total | <-5% | <-10% | % | mean |
| Release in fall of t | High income: OECD | 31.66 | 0.56 | 0.00 | 2.98 | -1.74 |
| | High income: nonOECD | 37.18 | 5.45 | 1.60 | 7.69 | -5.02 |
| | Upper middle income | 38.76 | 4.21 | 0.70 | 7.44 | -4.63 |
| | Lower middle income | 41.11 | 4.99 | 1.51 | 7.32 | -6.13 |
| | Low income | 49.84 | 10.16 | 4.03 | 12.42 | -8.24 |
| | All countries | 40.27 | 5.13 | 1.58 | 7.66 | -6.07 |

| Category | Variable | Description |
|---|---|---|
| Economic | conflict | intra-/or inter-state conflict (dummy) |
| | resources | resource rents > 20% of GDP (dummy) |
| | volatile | Growth volatility (std. dev. of final growth) |
| | tphp | Turning point (dummy, based on HP filtering) |
| | disaster | Occurance of major disaster (dummy) |
| Political | imf | IMF program agreed (dummy) |
| | imf5 | IMF program in effect (at least 5 months; dummy) |
| | recession | estimated neg. growth at time of data release (dummy) |
| Technical capacity | gdds | Subscription to GDDS (dummy) |
| | sdds | Subscription to SDDS (dummy) |
| | quarterly | Quarterly GDP series (dummy) |
| | population | Log of population (in millions) |
| Other dummies | p1990 | 1990s (dummy) |
| | lic | Low-income countries (dummy) |

| VARIABLES | (1)<br>abs. revision | (2)<br>abs. revision | (3)<br>abs. revision | (4)<br>abs. revision | (5)<br>abs. revision |
|---|---|---|---|---|---|
| tphp | 0.326*** | 0.408*** | 0.415*** | 0.329*** | 0.999*** |
| volatile | 0.243*** | 0.357*** | 0.310*** | 0.186*** | 0.354*** |
| resources | -0.0139 | 0.115 | -0.0478 | -0.0487 | -0.485 |
| conflict | 0.600*** | 1.495*** | 0.780 | 0.228 | 0.976 |
| disaster | 0.527*** | 0.927*** | 0.527** | 0.286 | 0.408 |
| gdds | -0.187*** | -0.181 | -0.209* | -0.193** | -0.673** |
| sdds | -0.395*** | -0.198 | -0.470*** | -0.536*** | |
| population | -0.160*** | -0.139*** | -0.188*** | -0.173*** | -0.221 |
| imf | 0.0327 | 0.0751 | 0.131 | -0.239** | -0.352 |
| imf5 | -0.270*** | -0.117 | -0.134 | -0.403*** | -0.584** |
| recession | 0.650*** | 2.307*** | 0.699** | 0.243 | 0.512 |
| lic | 0.292*** | 0.446** | 0.318** | 0.471*** | |
| p1990 | 0.315*** | 0.372*** | 0.260** | 0.235** | 0.229 |
| Constant | 1.943*** | 1.027*** | 1.079*** | 1.018*** | 1.547*** |
| Observations | 17,816 | 3,964 | 3,964 | 3,630 | 804 |
| R-squared | 0.166 | 0.173 | 0.153 | 0.113 | 0.159 |

(1) All vintages & vintage fixed effects; (2) Forecasts; (3) Nowcasts; (4) Backcasts; (5) Nowcasts & LICs only

| VARIABLES | (1)<br>revision | (2)<br>revision | (3)<br>revision | (4)<br>revision | (5)<br>revision |
|---|---|---|---|---|---|
| tphp | -1.206*** | -0.476* | | | |
| volatile | 0.0976 | 0.00323 | -0.140* | -0.180** | -0.0349 |
| resources | -5.736*** | 0.603 | -4.670** | 0.508 | 0.407 |
| conflict | -4.884*** | -1.758** | -5.854*** | -4.016*** | -0.845 |
| disaster | -2.326** | -1.178*** | | | |
| gdds | -1.486*** | -0.557** | | | |
| sdds | -0.810 | 0.198 | | | |
| population | 1.060*** | 0.617*** | | | |
| imf | -0.0823 | 0.208 | | | |
| imf5 | -0.296 | -0.261 | | | |
| recession | -3.886*** | 2.379*** | | | |
| p1990 | -2.356*** | -1.052*** | | | |
| Constant | -0.679 | -0.129 | -0.170 | 0.432 | 0.419* |
| Observations | 804 | 736 | 1,170 | 1,240 | 1,170 |
| R-squared | 0.210 | 0.082 | 0.106 | 0.067 | 0.006 |

(1) Forecasts & LICs only; (2) Backcasts & LICs only; (3) Forecasts & LICs only;

(4) Nowcasts & LICs only; (5) t+1 Backcasts & LICs only

# Summary of Results

- In the first part, we showed that in LICs
  - Revisions are larger
  - Over-optimism is greater
  - Correlations b/w preliminary and final growth lower
  - Extreme revisions occur more often

- In the second part, discussion of the determinants
  - LIC dummy remained significant
  - Over-optimism bias in LICs disappears once vulnerability to economic shocks is controlled for

# Implications for Discussion on Data Quality

- Data quality in LICs receives much attentions (see for instance initiative by IEO)
- Data quality not measurable
- But revisions are quantifiable indicator of one dimension of data quality
- All macro variables are revised
- Construction of country-level indicators and rankings in principle feasible

# Implications for Fiscal Policy

- Do revisions matter for budgetary planning?
  - Ley and Misch (2013) show that revisions translate into fiscal policy mistakes
  - Ability to observe fiscal rules
- Do revisions result in misleading policy conclusions?
  - Cyclicality of fiscal policy
- Debt sustainability analysis based on long-run growth projections
  - Based on 5-year forecast errors, minimum deviation growth scenario could be calculated