

Comparing total hours worked from monthly LFS and QNA

– the major change to continuous data collection in Norway revisited, through seasonal – and break adjustment

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Total hours worked in a months (preliminary unofficial LFS estimation)

$$\hat{T}_m = F_m \times \sum_i W_i \times t_i, \text{ where}$$

t_i = number of hours worked during the ref. week for interviewee i

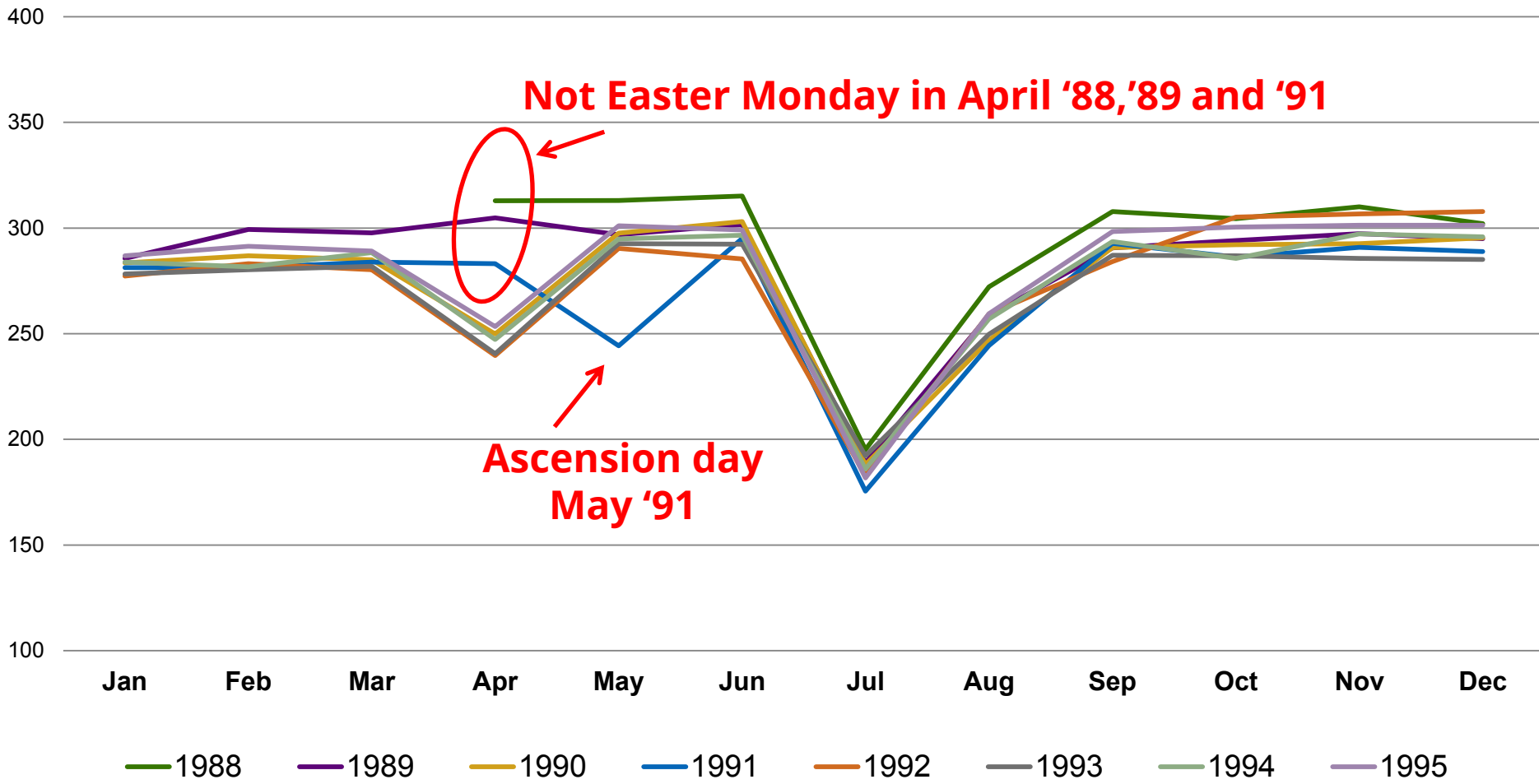
W_i = **monthly weighting factor** for interviewee i in month m

F_m = a factor to transform reference week average to a “monthly” sum

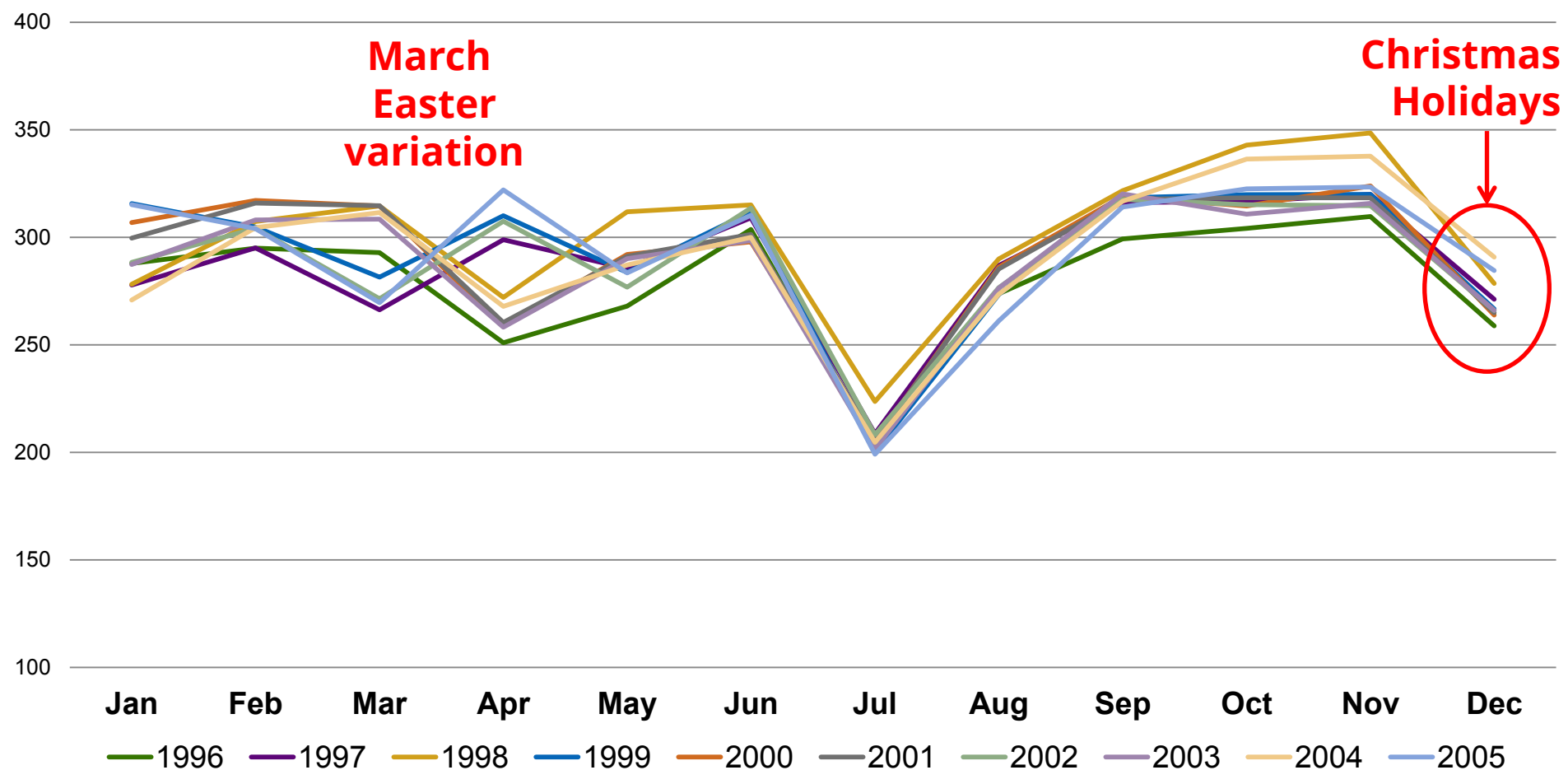
In this preliminary study we use:

$F_m = 13/3 = 4.333$ for months in quarters with **13** reference weeks
 $F_m = 14/3 = 4.667$ for months in quarters with **14** reference weeks

LFS: Total hours worked per normalized months (no. of ref. weeks in Q /3) Resident persons aged 16-74 in Norway (Million work hours) 1988-1995 (one ref. week a month)



LFS: Total hours worked per normalized months (no. of ref.weeks in Q /3) Resident persons aged 16-74 in Norway (Million work hours) 1996-2005 (continuous data collection)



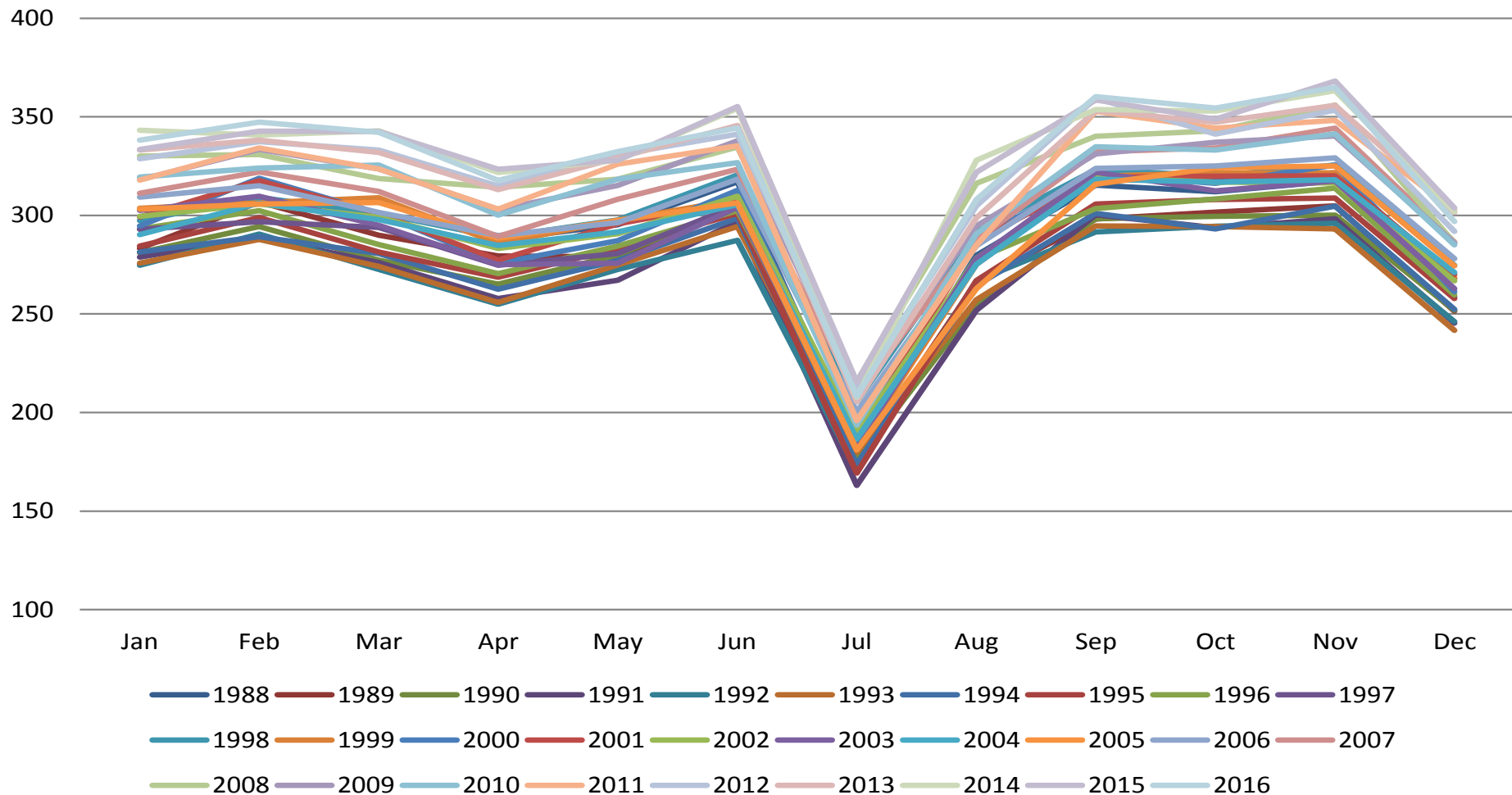
Regression Model

ARIMA Model: (0 1 1)(0 1 1) , no log transformation

Variables		Parameter Estimate	Standard Error	t-value
SO1996.4	(Seasonal Outlier)	-35,4	3,5	-10,0
SO1996.12	(Seasonal Outlier)	-28,4	4,2	-6,8
SO2006.7	(Seasonal Outlier)	-18,2	3,3	-5,6
TL1992.10-1992.12	(14-week quarter)	18,2	3,4	5,4
TL1998.10-1998.12	(14-week quarter)	24,5	3,4	7,2
TL2004.10-2004.12	(14-week quarter)	21,3	3,4	6,3
TL2009.10-2009.12	(14-week quarter)	18,3	3,4	5,4
TL2015.10-2015.12	(14-week quarter)	21,4	3,5	6,1
User-defined				
March_easter	(after '96)*	-41,1	1,4	-29,7
Spring_free	(after '96 and occasional breaks)*	-9,4	0,5	-20,0
Red_days_in_Dec	(after '96)*	-11,6	0,8	-14,0
Christmas week jobdays	(after '96)*	-4,1	0,6	-6,8

* Deseasonalized with monthly means after '96

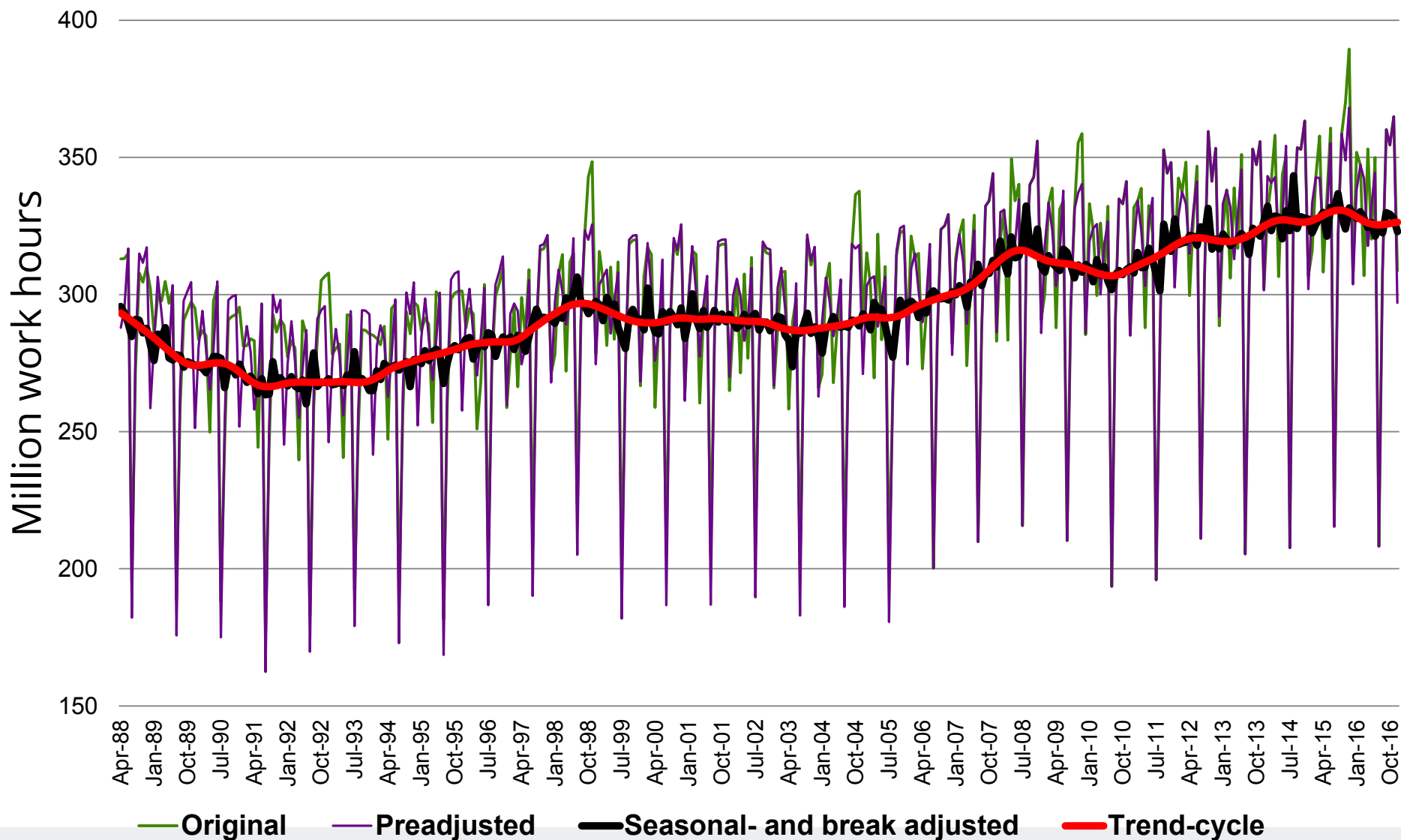
LFS: Total hours worked per months in Norway, prior adjusted 1988-2016 (In Million work hours)



Quality indicators for the seasonal adjustment

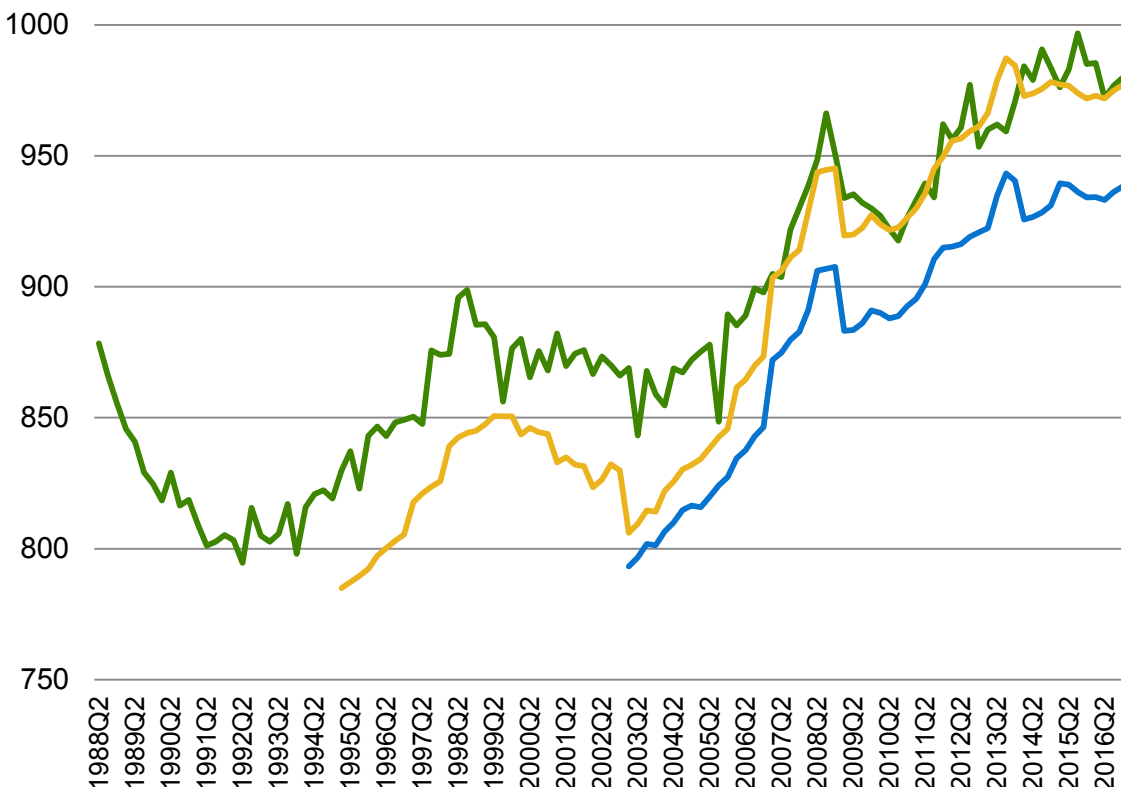
The relative contribution of the irregular component to the stationary portion of the variance (from Table F 2.F)	M2 = 0.07
The amount of moving seasonality present relative to the amount of stable seasonality (from Table F 2.I)	M7 = 0.06
Same as 8, calculated for recent years only.	M10 = 0.16
Same as 9, calculated for recent years only.	M11 = 0.15
A weighted average of M1 - M11	Q = 0.63

Total hours worked in the NLFS (Preliminary unofficial figures)



Quarterly total hours worked, seasonally adjusted.

Figures from NLFS and National Accounts (QNA) up months to Quarters in LFS



— LFS: Total hours worked seasonal and break adjusted

— QNA: Total hours worked, seasonally adjusted

— QNA: Total hours worked, seasonally adjusted (hours worked estimate for non-resident employees subtracted)

- Different populations
- Expected lower LFS level (or QNA higher)
- Non-resident workers in QNA
- Age limit in LFS
- Similar development, except 2004-2008

• **short-term immigrants registered as wage earners more than doubled from 2004 to 2008**

Measuring problems in the NLFS and register

- LFS based **contractual working hours** are systematically longer, and vary more, than the register based, used in (Q)NA
- **Proxy interviews** gives overestimation of contractual working hours
- Our employee **register** used to only cover jobs with minimum 4 hours per week
- The A Scheme register, reporting duty: 1000kr and up
- Remaining non-response bias? Too many employed?

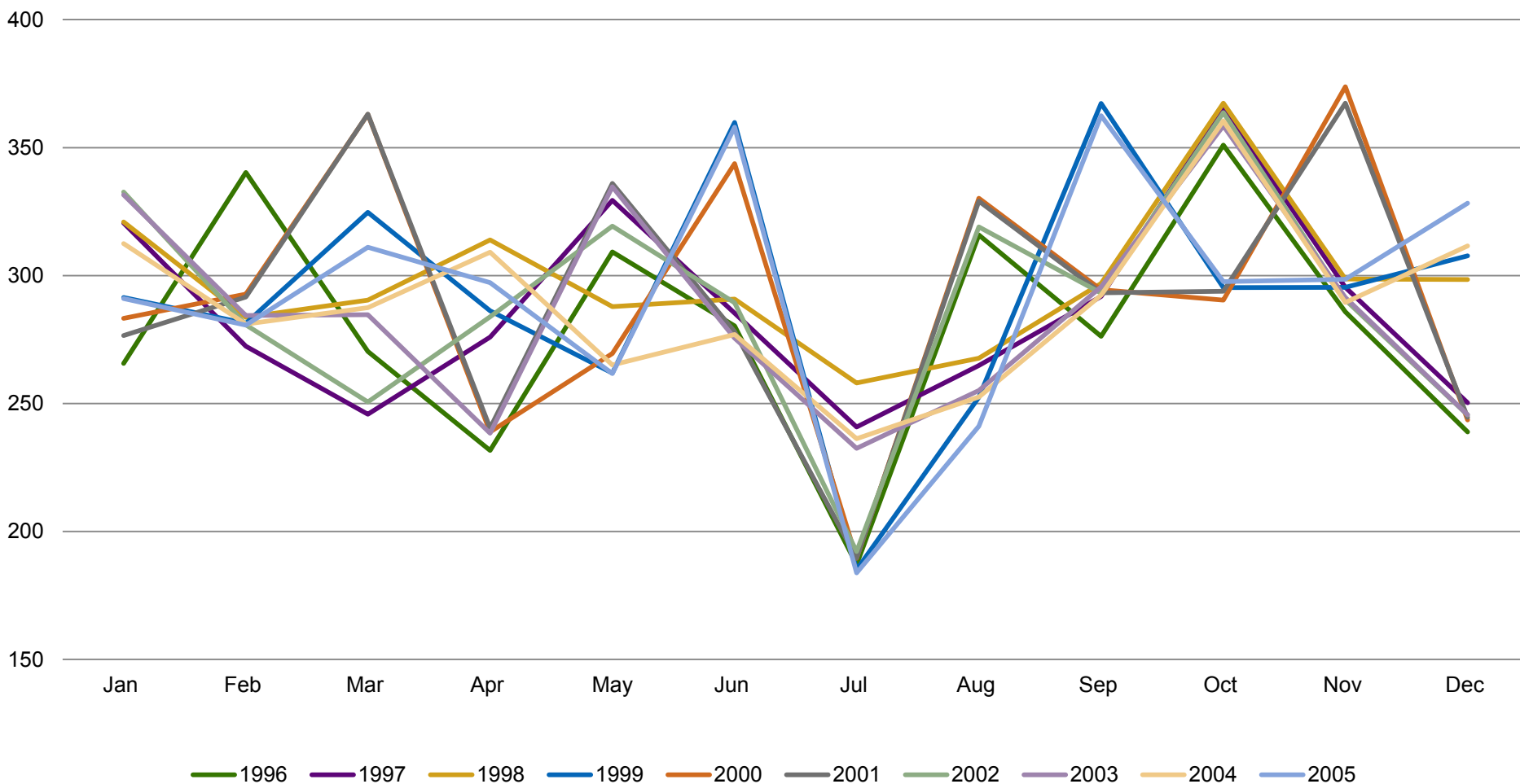
Conclusion

- Further investigation working hours needed
- Seasonal outlier functionality in X-13ARIMA-SEATS helps (also in JD+ with nice graphics)
- User defined preadjustment variables important for LFS
- Further work on LFS-reference months and refinement of user defined variables

LFS: Total hours worked per LFS-reference months

Resident persons aged 16-74 in Norway. 1996-2005

(Million work hours)



User defined preadjustment variables

$$March_easter = \begin{cases} 1 & \text{in March} \\ -1 & \text{in April} \\ 0 & \text{Other months} \end{cases} \quad \text{IF Good Friday in March in LFS}$$

$March_easter = 0$ for all ref. months in years with Good Friday in April, and before 1996

Spring free: the number of the following common days off on **weekdays** (Monday – Friday) in the ref. month: **Easter Monday**, May 1st (**Labour day**), May 17th (our **constitution day**), **Whit Monday** and **Ascension Day** .

All variables deseasonalized based on monthly averages after 1996

User defined preadjustment variables (continued)

Red_days_in_dec: the number of common days off that falls on weekdays (Monday – Friday) in December

Christmas_week_jobdays: the number of normal working days in the week between Christmas and New Year's Eve in the reference month

All variables **deseasonalized** based on monthly averages after 1996

LFS: Total hours worked per normalized months (no. of ref.weeks in Q /3) Resident persons aged 15-74 in Norway (Million work hours) 2005-2016

