Replicating The Impact of Data Revisions on the Robustness of Growth Determinants A Note on 'Determinants of Economic Growth. Will Data Tell?'

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This version: June 2011

Abstract

Ciccone and Jarocinski (2010) show that inference in Bayesian Model Averaging (BMA) can be highly sensitive to small changes in international income data. In particular they demonstrate that the importance attributed to potential growth determinants varies tremendously over different revisions of growth data. They conclude that 'agnostic' priors appear too sensible for this strand of growth empirics. In response, we show that the found instability owes much to a specific BMA set-up: First, comparing the same countries over data revisions improves robustness. Second, much of the remaining variation can be reduced by applying an evenly 'agnostic', but flexible prior. This tutorial replicates the results provided in Feldkircher and Zeugner (2012).

We start with loading the data:

`dataList` contains three vintages of PWT data: PWT 6.0, 6.1 and 6.2. We first generate an index sorting for the countries that are common to all three vintages:

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We now proceed to perfoming the BMA estimation for the three PWT vintages and various coefficient priors. We have also defined an extremely small number of iterations for the BMA MCMC-sampler: `burn=1000` (for the burn-in draws) and `iter=5000` for 'counted' draws. Increase this numbers to get a better approximation (The paper used 20 million burn-ins and 80 million subsequent iterations).

Varying Sample	g=K^2	UIP	hyper-g
Overall Max / Min Ratio	42.9688	8.0134	3.6607
PWT 6.0 vs. PWT 6.1	23.4586	10.1622	2.4817
PWT 6.0 vs. PWT 6.2	6.3580	5.2550	2.5862
PWT 6.1 vs. PWT 6.2	20.6690	4.1542	2.7457
Common Sample	g=K^2*	UIP*	hyper-g*
Overall Max / Min Ratio	18.7226	7.4440	5.1621
PWT 6.0 vs. PWT 6.1	12.1594	5.1847	3.7852
PWT 6.0 vs. PWT 6.2	4.5222	4.5747	3.4087
PWT 6.1 vs. PWT 6.2	14.1808	2.8718	2.7594

Table 1: Average PIP Max/Min ratios: for each revision pair, the figures above display the mean of the ratio maxium vs. minimum PIP per variable.

Varying Sample	g=K^2	g=N	hyper-g
PWT 6.0	0.9998	0.9888	0.9075
PWT 6.1	0.9998	0.9882	0.9252
PWT 6.2	0.9998	0.9875	0.9429
Common Sample	g=K^2*	g=N*	hyper-g*
PWT 6.0	0.9998	0.9875	0.9363
PWT 6.1	0.9998	0.9875	0.9549
PWT 6.2	0.9998	0.9875	0.9482

Table 2: Average shrinkage factors for three PWT revisions.

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PMP Distribution (PWT 6.1, common sample)
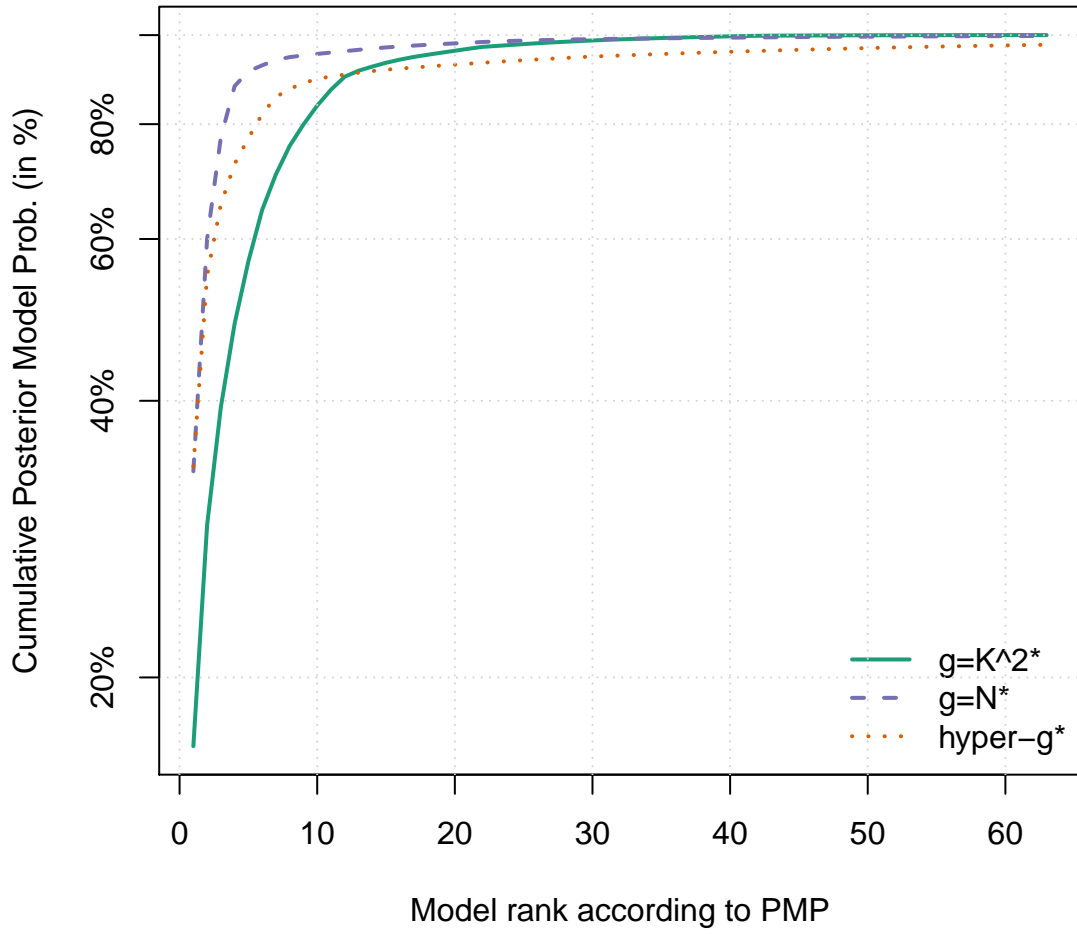
PMP Distribution (PWT 6.1, varying sample)
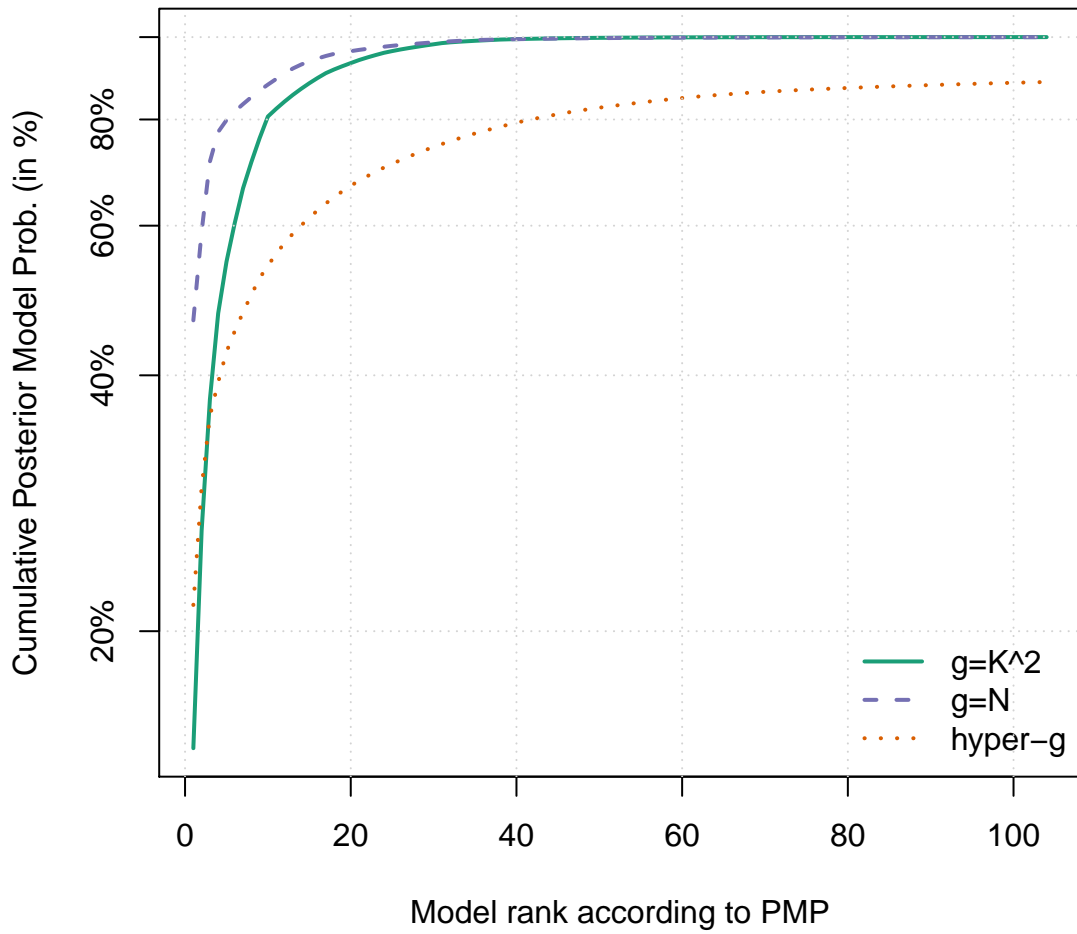
	6.0	6.1	6.2	6.0	6.1	6.2	6.0	6.1	6.2
GDP in 1960 (log)	0.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Absolute Latitude	0.03	0.00	0.00	0.00	0.00	0.02	0.14	0.12	0.13
Air Distance to Big Cities	0.00	0.33	0.00	0.00	0.24	0.00	0.19	0.32	0.32
Ethnolinguistic Fractionalization	0.16	0.32	0.32	0.00	0.05	0.00	0.41	0.57	0.27
British Colony Dummy	0.00	0.22	0.22	0.00	0.00	0.00	0.34	0.02	0.04
Fraction Buddhist	0.16	0.00	0.70	0.00	0.27	0.21	0.27	0.58	0.42
Fraction Catholic	0.00	0.00	0.00	0.00	0.12	0.00	0.40	0.24	0.62
Civil Liberties	0.00	0.00	0.00	0.00	0.00	0.00	0.81	0.09	0.16
Colony Dummy	0.04	0.00	0.00	0.00	0.00	0.00	0.32	0.28	0.49
Fraction Confucius	0.21	0.11	1.00	0.38	0.44	1.00	0.96	1.00	1.00
Population Density 1960	0.00	0.76	0.06	0.09	0.00	0.00	0.15	0.24	0.53
Population Density Coastal in 1960s	0.36	0.88	0.00	0.24	0.67	0.11	0.27	0.26	0.58
Interior Density	0.00	0.02	0.02	0.00	0.00	0.00	0.07	0.10	0.08
Population Growth Rate 1960-90	0.00	0.00	0.00	0.01	0.00	0.00	0.50	0.28	0.19
East Asian Dummy	0.94	1.00	0.07	0.96	0.66	0.13	0.83	0.16	0.35
Capitalism	0.00	0.00	0.00	0.00	0.03	0.00	0.26	0.51	0.31
English Speaking Population	0.00	0.07	0.07	0.00	0.00	0.00	0.28	0.24	0.18
European Dummy	0.00	0.00	0.68	0.01	0.00	0.05	0.27	0.35	0.17
Fertility in 1960s	0.00	0.00	0.39	0.21	0.37	0.75	0.76	0.94	0.79
Defense Spending Share	0.00	0.00	0.00	0.00	0.00	0.09	0.43	0.16	0.14
Public Education Spending Share in GDP in 1960s	0.12	0.02	0.02	0.00	0.11	0.00	0.24	0.18	0.30
Public Investment Share	0.04	0.03	0.03	0.00	0.00	0.09	0.33	0.21	0.16
Nominal Government GDP Share 1960s	0.07	0.00	0.88	0.57	0.15	0.14	1.00	0.25	0.92
Government Share of GDP in 1960s	0.04	0.01	0.01	0.06	0.06	0.04	0.35	0.89	0.16
Gov. Consumption Share 1960s	0.24	0.10	0.10	0.00	0.00	0.00	0.31	0.27	0.01
Higher Education 1960	0.23	0.00	0.00	0.13	0.00	0.00	0.49	0.13	0.09
Religion Measure	0.00	0.00	0.00	0.00	0.00	0.01	0.66	0.12	0.27
Fraction Hindus	0.14	0.00	0.00	0.06	0.00	0.07	0.72	0.31	0.62
Investment Price	0.66	0.99	0.00	0.00	0.08	0.00	0.05	0.31	0.16
Latin American Dummy	0.18	0.00	0.10	0.68	0.00	0.85	0.46	0.60	0.11
Land Area	0.00	0.02	0.02	0.00	0.00	0.00	0.33	0.18	0.27
Landlocked Country Dummy	0.00	0.15	0.05	0.00	0.02	0.00	0.52	0.05	0.39
Hydrocarbon Deposits in 1993	0.00	0.07	0.00	0.00	0.00	0.03	0.26	0.93	0.33
Life Expectancy in 1960	0.00	0.40	0.01	0.00	0.00	0.00	0.36	0.26	0.16
Fraction of Land Area Near Navigable Water	0.00	0.02	0.00	0.00	0.00	0.00	0.19	0.33	0.42
Malaria Prevalence in 1960s	0.22	0.00	0.00	0.00	0.00	0.00	0.07	0.19	0.34
Fraction GDP in Mining	0.37	0.00	0.00	0.00	0.00	0.00	0.12	0.14	0.06
Fraction Muslim	0.00	0.09	0.97	0.07	0.48	0.10	0.88	1.00	0.53
Timing of Independence	0.08	0.00	0.04	0.00	0.00	0.00	0.72	0.89	0.86
Oil Producing Country Dummy	0.18	0.07	0.07	0.07	0.00	0.12	0.24	0.22	0.20
Openess measure 1965-74	0.12	0.08	0.15	0.01	0.00	0.12	0.66	0.54	0.59
Fraction Othodox	0.00	0.00	0.00	0.00	0.00	0.00	0.55	0.54	0.24
Fraction Speaking Foreign Language	0.10	0.00	0.02	0.00	0.00	0.02	0.37	0.34	0.10
Primary Schooling in 1960	0.75	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Average Inflation 1960-90	0.00	0.00	0.04	0.00	0.03	0.02	0.53	0.04	0.06
Square of Inflation 1960-90	0.12	0.00	0.00	0.00	0.00	0.00	0.04	0.47	0.38
Political Rights	0.05	0.53	0.00	0.01	0.01	0.00	0.02	0.66	0.26
Fraction Population Less than 15	0.13	0.00	0.00	0.00	0.18	0.32	0.77	0.03	0.36
Population in 1960	0.06	0.02	0.02	0.00	0.02	0.03	0.18	0.16	0.22
Fraction Population Over 65	0.00	0.00	0.00	0.02	0.00	0.00	0.99	0.12	0.31
Primary Exports 1970	0.03	0.00	0.52	0.34	0.22	0.11	0.35	1.00	0.46
Fraction Protestants	0.00	0.00	0.00	0.00	0.00	0.07	0.30	0.20	0.62
Real Exchange Rate Distortions	0.21	0.00	0.00	0.00	0.01	0.00	0.68	0.17	0.04
Revolutions and Coups	0.00	0.05	0.05	0.00	0.01	0.00	0.40	0.28	0.57
African Dummy	0.02	0.00	0.43	1.00	0.67	1.00	0.16	0.83	1.00
Outward Orientation	0.00	0.03	0.03	0.00	0.00	0.00	0.38	0.05	0.25
Size of Economy	0.12	0.18	0.18	0.00	0.00	0.10	0.58	0.14	0.37
Socialist Dummy	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.36	0.07
Spanish Colony	0.12	0.00	0.00	0.13	0.23	0.00	0.19	0.42	0.42
Terms of Trade Growth in 1960s	0.06	0.00	0.00	0.02	0.00	0.00	0.31	0.31	0.17
Terms of Trade Ranking	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.10	0.11
Fraction of Tropical Area	0.43	1.00	0.00	0.17	0.55	0.00	0.39	0.16	0.31
Fraction Population In Tropics	0.16	0.00	0.31	0.00	0.00	0.06	0.22	0.36	0.20
Fraction Spent in War 1960-90	0.00	0.24	0.12	0.00	0.09	0.00	0.30	0.10	0.32
War Particpation 1960-90	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.13	0.49
Years Open 1950-94	0.28	0.20	0.16	0.17	0.10	0.02	0.35	0.15	0.15
Tropical Climate Zone	0.00	0.00	0.00	0.13	0.14	0.01	0.36	0.75	0.38
# Obs.	88	84	79	79	79	79	79	79	79

Table 3: Posterior Inclusion Probabilities. Left panel corresponds to data set with varying number of countries, center panel to data set with common countries over the three revisions. Right panel displays results of hyper-g BMA over common countries.