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Net Appendix on robustness to

The transition in the growth rate

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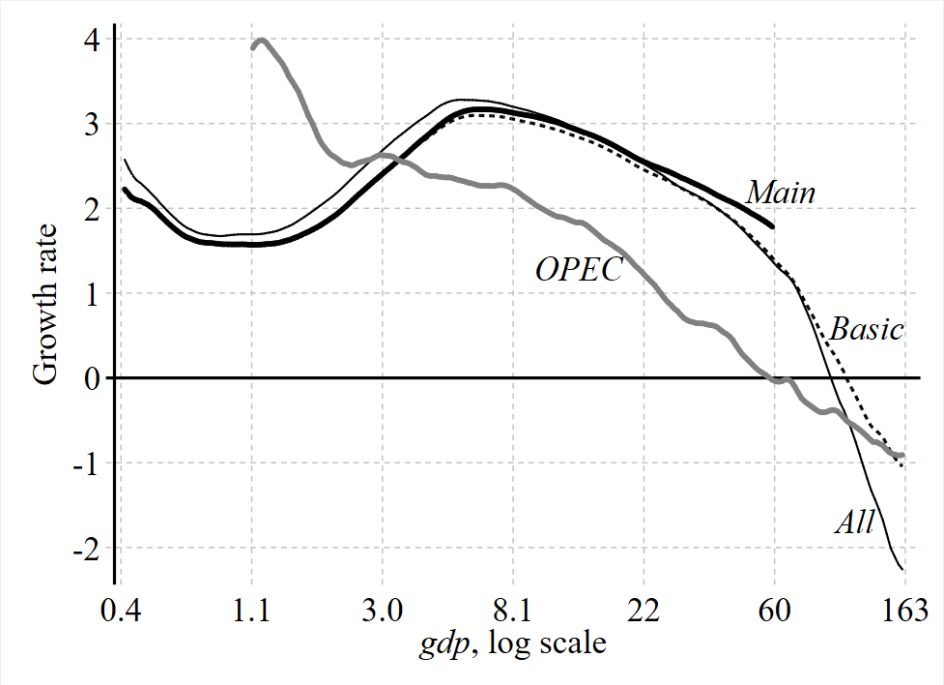
The main paper discusses the results – notably section 5 on robustness. Table 1 of the main paper surveys the data used. All data are from the *cgdppc*-series from the Maddison project in the 2018 version. A *standard kernel* uses Epanechnikov's formula with degree zero and bandwidth 0.35. The horizontal axis is in logs to *gdp* (GDP per capita) in 2011 US $ prices.

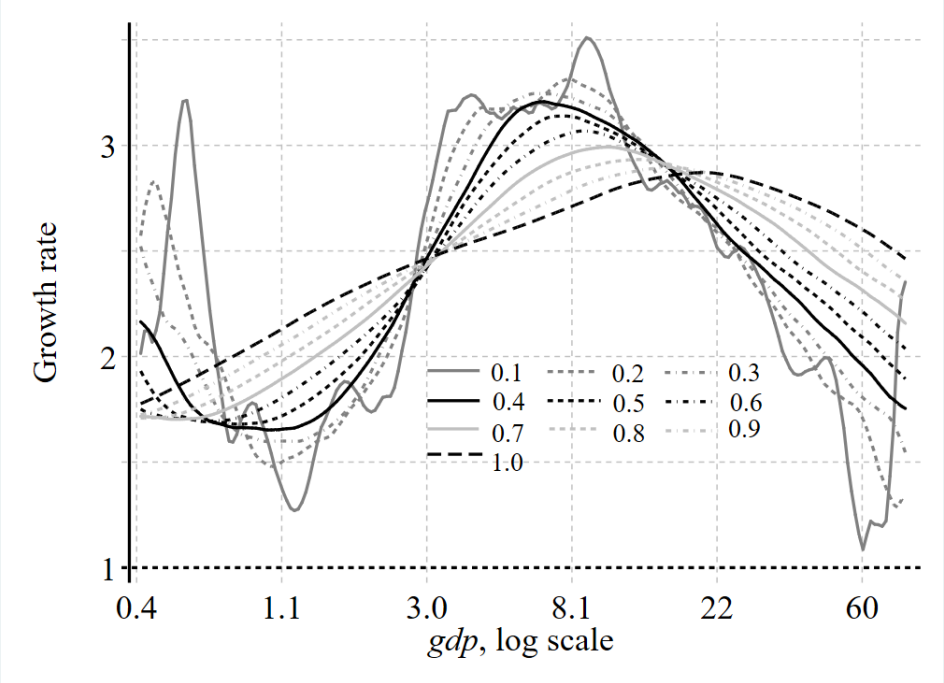
Figures and Tables

Figure A1. Transition paths for *All, Basic, Main and OPEC* samples



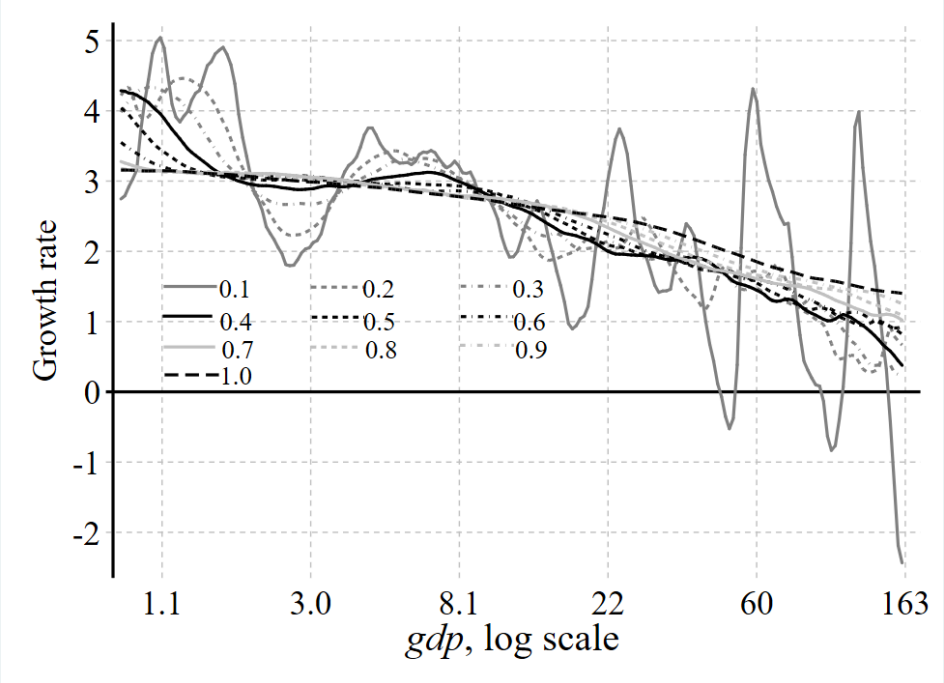
Note: Standard kernels. Samples in Table 1. Kernel for *Main* and *OPEC* sample is Figure 3a and 3b.

Figure A2. Transition paths for *Main* sample with bandwidths from 0.1 to 1.0



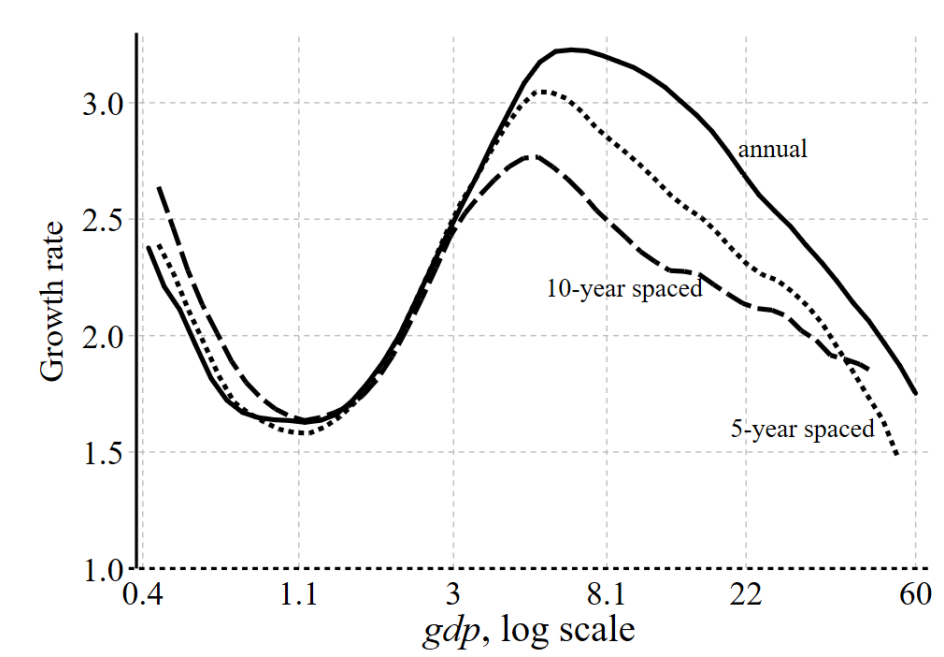
Note: See Figure 3a in main paper.

Figure A3. Transition paths for *OPEC* sample with bandwidths from 0.1 to 1.0



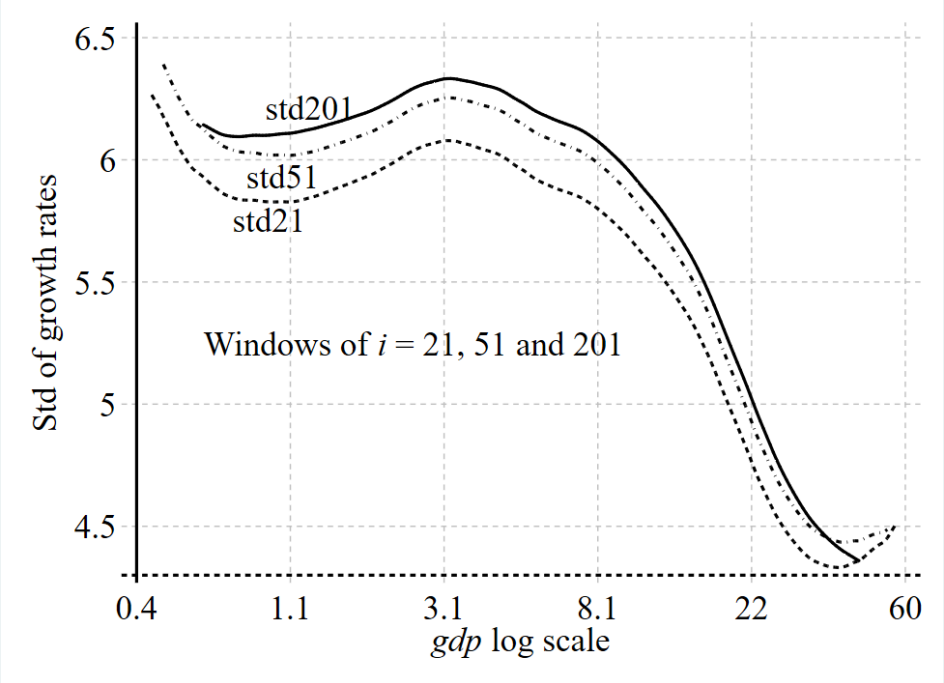
Note: See Figure 3b.

Figure A4. Transition path for averages of different time-intervals



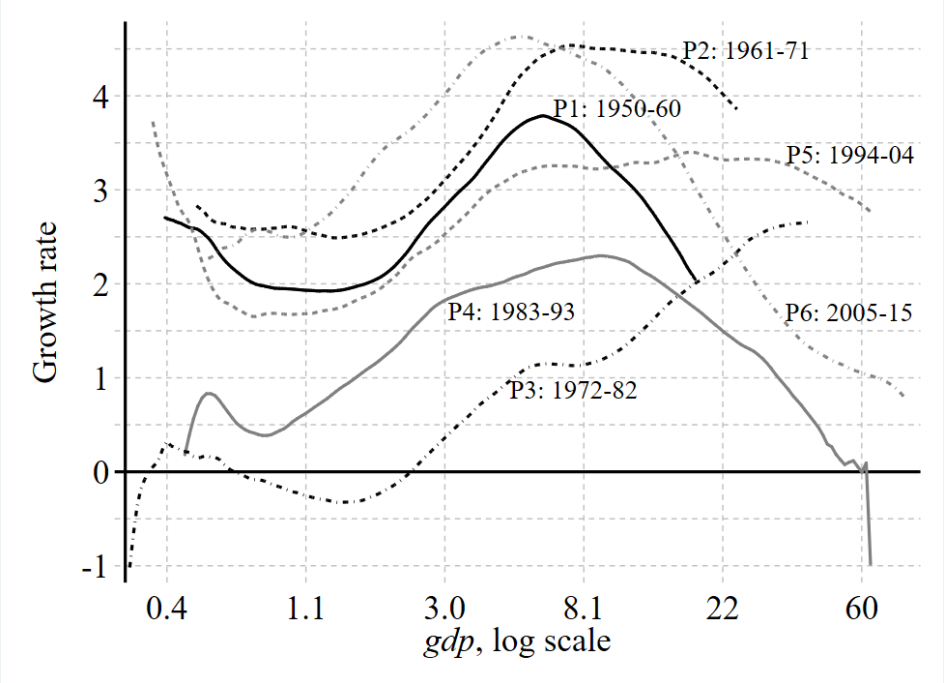
Note: Standard kernels, *Main* sample, restricted income range. Annual (*N*=9250), 5-year spaced (*N*=1837), and 10-year spaced (*N*=842) growth rates (in percent).

Figure A5. Kernels in standard deviations for three moving windows



Note: See Figure 4. *Main* sample and standard kernels.

Figure A6. Transition paths for six decades



Note: *Main* sample, broken into the six intervals mentioned. A dozen isolated observations deleted.

Figure A7. Transition paths for six country groups, *Basic* sample

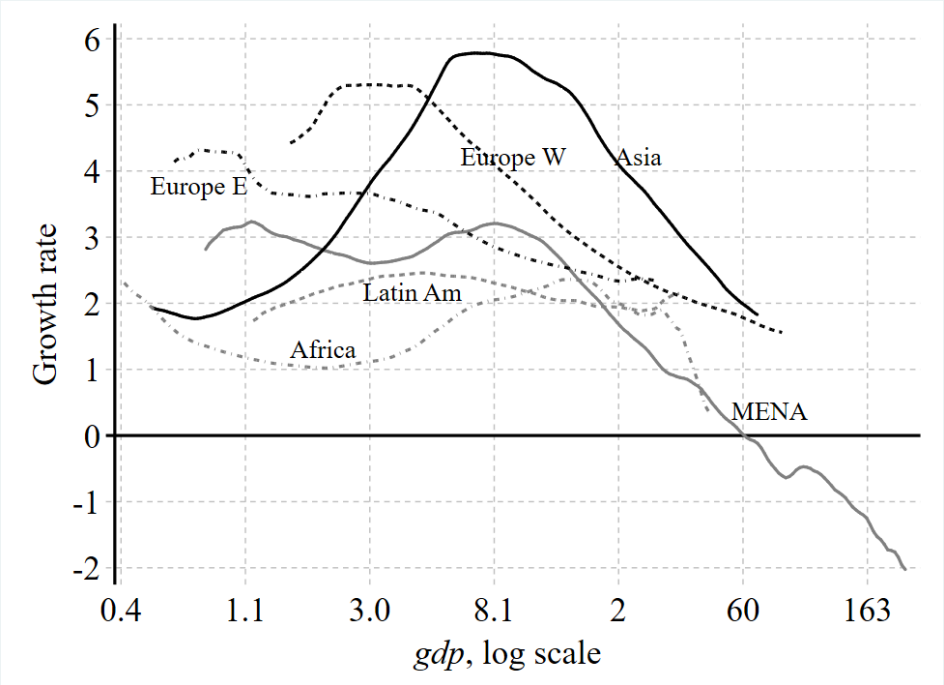
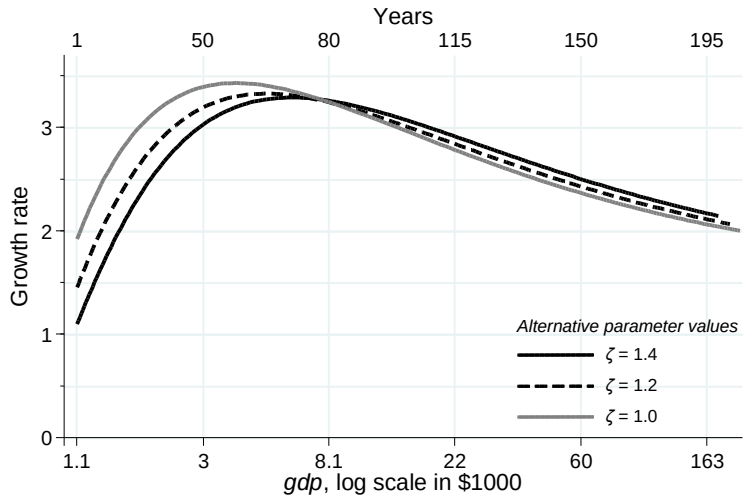


Table A1. Members of groups. Close to the World Bank classification

Africa SS part 1	Africa SS part 2	Asia	Europe West	Europe East	Latin America	MENA
Angola	Liberia	Afghanistan	Australia	Albania	Argentina	Algeria
Benin	Madagascar	Bangladesh	Austria	Armenia	Barbados	Bahrain
Botswana	Malawi	Cambodia	Belgium	Azerbaijan	Bolivia	Egypt
Burkina Faso	Mali	China	Canada	Belarus	Brazil	Iran
Burundi	Mauritania	Hong Kong	Cyprus	Bosnia &	Chile	Iraq
Cabo Verde	Mauritius	India	Denmark	Bulgaria	Colombia	Jordan
Cameroon	Mozambique	Indonesia	Finland	Croatia	Costa Rica	Kuwait
CAR	Namibia	Japan	France	Czech R	Cuba	Lebanon
Chad	Niger	Korea N	Germany	Czechoslovakia	Dominica	Libya
Comoros	Nigeria	Korea S	Greece	Estonia	Dominican R	Morocco
Congo, Br	Rwanda	Laos	Iceland	Georgia	Ecuador	Oman
Congo, Kin	Sao Tome	Malaysia	Ireland	Hungary	El Salvador	Palestine
Côte d'Ivoire	Senegal	Myanmar	Israel	Kazakhstan	Guatemala	Qatar
Djibouti	Seychelles	Nepal	Italy	Kyrgyzstan	Haiti	Saudi Arabia
Equatorial Guinea	Sierra Leone	Pakistan	Luxembourg	Latvia	Honduras	Syria
Ethiopia	South Africa	Philippines	Malta	Lithuania	Jamaica	Tunisia
Gabon	Sudan	Singapore	Netherlands	Macedonia	Mexico	Turkey
Gambia	Swaziland	Sri Lanka	New Zealand	Moldova	Nicaragua	UAR
Ghana	Tanzania	Taiwan	Norway	Mongolia	Panama	Yemen
Guinea	Togo	Thailand	Portugal	Montenegro	Paraguay	
Guinea-Bissau	Uganda	Vietnam	Spain	Poland	Peru	
Kenya	Zambia		Sweden	Romania	Puerto Rico	
Lesotho	Zimbabwe		Switzerland	Russia	Saint Lucia	
Continued next col.			UK	Serbia	Trinidad	
			USA	Slovakia	Uruguay	
			OBS from next	Slovenia	Venezuela	
			USSR	Tajikistan		
			Uzbekistan	Turkmenistan		
			Yugoslavia	Ukraine		

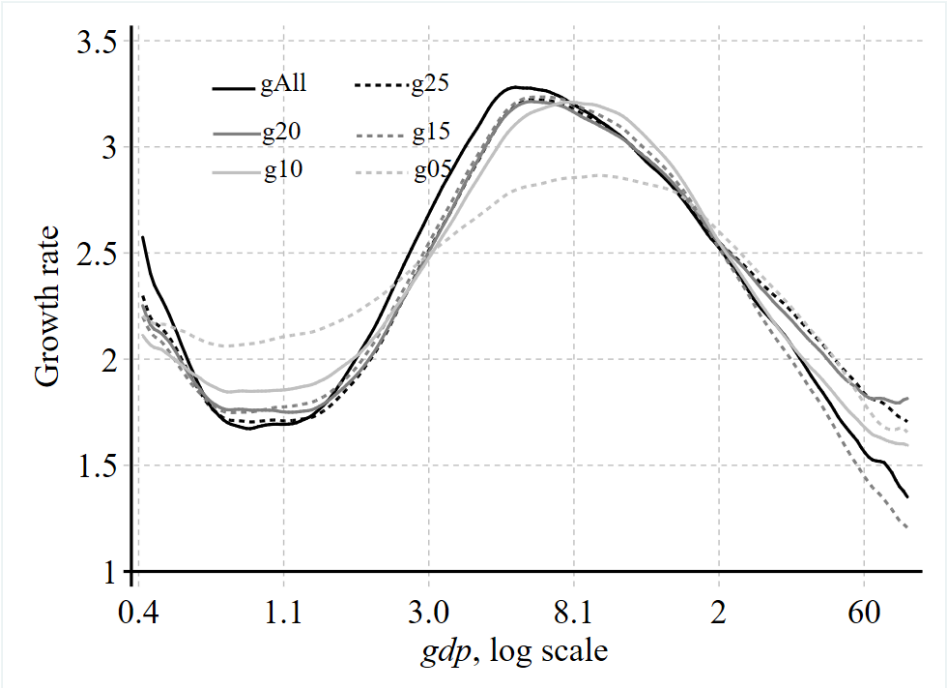
Note: Europe West include the four overseas western countries and Israel. Europe East include all countries that changed out of socialism around 1990. Latin America also contains the Caribbean. MENA include Turkey and Iran. Djibouti, the Seychelles and Mauritius are classified as African. The names are shortest version. R is Republic.

Figure A8. Simulated growth-income paths for alternative externalities



Note: See Figure 5.

Figure A9. Kernels for *All* and the five truncations in Table A2



Note: All six curves use the same horizontal axis. So the thin observations below y = 6 ($400 and above y = 11.3 ($81,000) are deleted.

Figure A9 shows that the kernels for the samples All, g-25, g-20 and g-15 are almost the same. In the g-10 sample the peak moves a little, while the kernel becomes significantly flatter in the g-5 sample, where no less than 1/3 of the all sample is deleted.

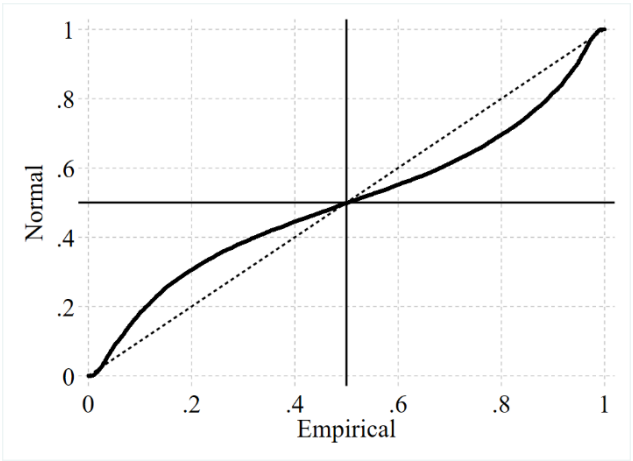
Table A2. Five truncations of outliers

Sample	Deleted	N	Deleted	In %	Mean	StD	Min	Max
All	None	10,333	0	0	2.510	8.167	-62.942	133.628
Out-25	Mean ± 25	10,159	174	1.7	2.476	6.248	-22.484	27.502
Out-20	Mean ± 20	10,042	291	2.8	2.481	5.803	-17.358	22.508
Out-15	Mean ± 15	9,750	583	5.6	2.482	5.082	-12.381	17.502
Out-10	Mean ± 10	9,108	1,225	11.9	2.498	4.155	- 7.742	12.500
Out-05	Mean±5	6,926	3,407	33.0	2.477	2.519	-2.490	7.508

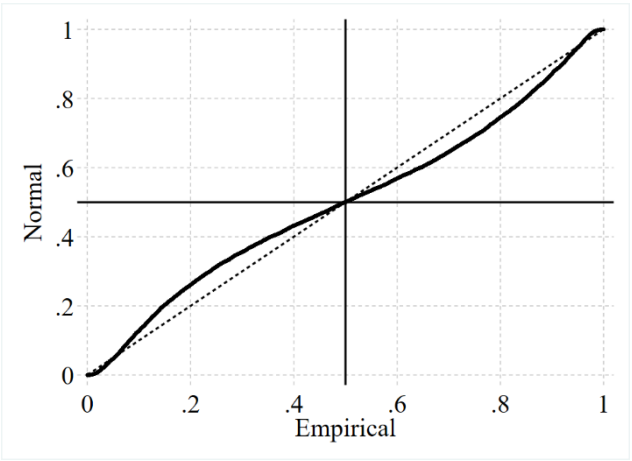
The growth rate is an aggregate, so it should be approximately normally distributed. Figure A10.a shows that too many observations are extreme. Once we delete extremes, the distribution becomes more normal, but already in the out-10 sample too few large observations appear. Regressions are robust to the distribution, so we only delete outliers above ±25.

Figure A10. Probit diagrams of *All* and three truncations

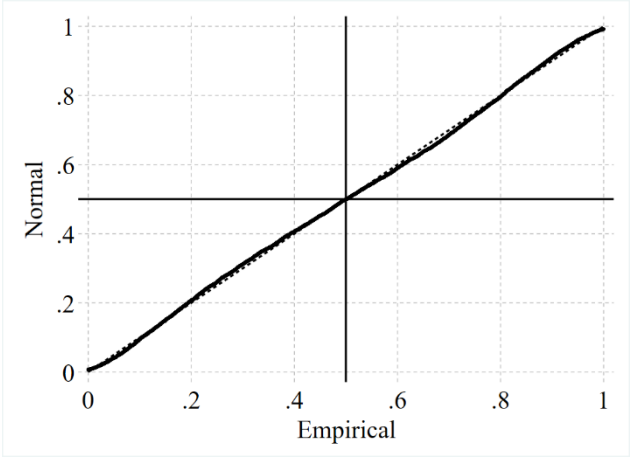
a. All observations



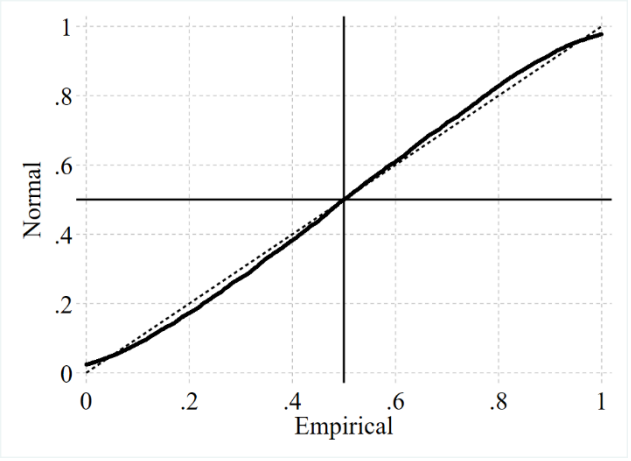
b. The out-25 sample



c. The out-10 sample

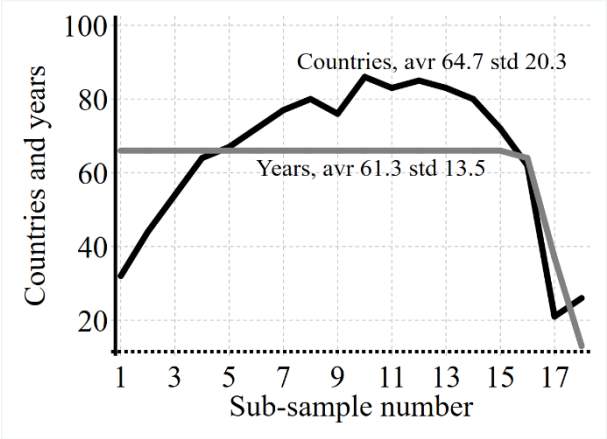


d. The out-5 sample



Finally, we analyze the amount of scrambling done by stacking and sorting the data. A simple way is to analyze the number of countries and years that are contained in the average kernel. This is done on the *Main* sample that contains N = 9,289, and as the kernel is 0.35 of a range of 6.3 ln points it is the range is almost exactly 1/18 of the range. Thus, in average it contains 516 observations. In fact the kernels have less observations at the thin ends and more in the fat middle. However, if we have used the average and divided the string of all 9,289 observations into 18 sub-strings with 516 observations in each, and then we have counted the number of countries and years in each sub-string. Figure A11 shown the outcome of this exercise.

Figure A11. The number of countries and years in the average kernel



Note: Explained in text. Calculated for Main sample.

There is no less than 64 countries (of the 153 possible) and 61 (of the 66 years possible) present in the average kernel.

Table 3. The scrambling tests done for string of all N = 6,965

Comparing yj and y_{j+n}	y_{j+1}	y_{j+2}	y_{j+3}	y_{j+4}	y_{j+5}	Sum
Same country	309	319	312	315	306	-
Next year	157	173	172	119	140	-
Both same	34	26	25	14	6	105
Both in %	0.49	0.37	0.36	0.20	0.09	1.51

An alternative way to study the scrambling is to ask if the strings does not contain many sequences that are also sequences in the original data, i.e., if $y_j = y_{it}$, then it should be rare that

$y_{j+1} = y_{it+1}$, or $y_{j+1} = y_{it+2}$, or … $y_{j+1} = y_{it+5}$ Table 4 count the frequencies of such sequences. They are actually rare.

Hence, both tests show that the scrambling is rather good. Consequently, the simultaneity bias in the kernel regression must be very small.