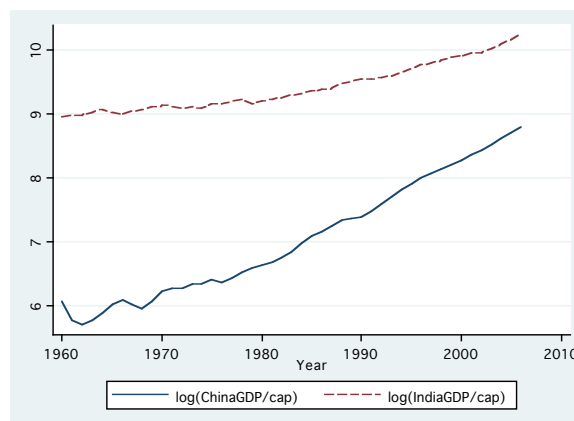
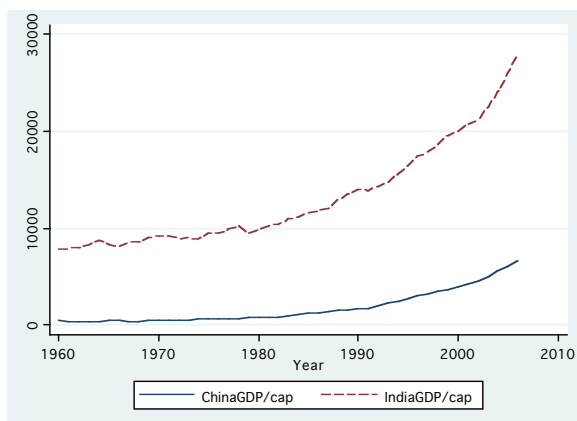


Time series (2)

3. Estimating a time trend

GDP per capita in 2000 US\$, 1960-2006



source: <http://devdata.worldbank.org/dataonline/>

3.1 Linear trend

```
. reg chinagdp year
```

Source	SS	df	MS
Model	106888159	1	106888159
Residual	28570284.4	45	634895.209
Total	135458443	46	2944748.76

Number of obs = 47
F(1, 45) = 168.36
Prob > F = 0.0000
R-squared = 0.7891
Adj R-squared = 0.7844
Root MSE = 796.8

chinagdp	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
year	111.175	8.568271	12.98	0.000	93.91757 128.4323
_cons	-218679.3	16991.28	-12.87	0.000	-252901.5 -184457.1

```
. reg indiagdp year
```

(t-stat in parentheses)

$$\widehat{indiagdp} = -696845.2 + 358.03 \text{ year}$$

(-15.2) (15.5)

3.2 Estimate a growth rate with the regression of $\ln(y)$ on t

```
. g lchinagdp=ln(chinagdp)
```

```
. reg lchinagdp year
```

Source	SS	df	MS
Model	38.968173	1	38.968173
Residual	1.1066636	45	.024592586
Total	40.0748393	46	.871192159

Number of obs = 47
F(1, 45) = 1584.55
Prob > F = 0.0000
R-squared = 0.9724
Adj R-squared = 0.9718
Root MSE = .15682

lchinagdp	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
year	.067127	.0016863	39.81	0.000	.0637305 .0705234
_cons	-126.0574	3.344084	-37.70	0.000	-132.7927 -119.3221

```
. g lindiagdppc=log(indiagdppc)
. reg lindiagdppc year
```

Source	SS	df	MS
Model	5.75678667	1	5.75678667
Residual	.435026632	45	.009667258
Total	6.1918133	46	.134604637

```
Number of obs =      47
F( 1, 45) = 595.49
Prob > F      = 0.0000
R-squared     = 0.9297
Adj R-squared = 0.9282
Root MSE     = .09832
```

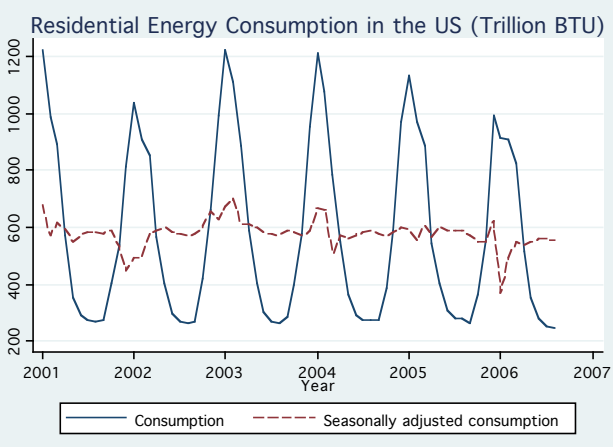
lindiagdppc	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
year	.0258007	.0010573	24.40	0.000	.0236713 .0279302
_cons	-41.75061	2.096654	-19.91	0.000	-45.97348 -37.52773

3.3. Seasonality

	year	month	cons time
1.	2001	1	1225.016
2.	2001	2	985.609
3.	2001	3	891.438
4.	2001	4	574.492
5.	2001	5	355.583
6.	2001	6	290.759
7.	2001	7	276.641
8.	2001	8	270.324
9.	2001	9	273.712
10.	2001	10	403.192
11.	2001	11	536.788
12.	2001	12	816.055
13.	2002	1	1038.648
14.	2002	2	909.404

```
. tab month, gen(month)
. reg cons time month1-month12, nocons
```

Source	SS	df	MS
Model	29370688.7	13	2259283.75
Residual	159820.319	55	2905.82397
Total	29530509	68	434272.191



Source: Energy Information Administration
November 2006 Monthly Energy Review

```
Number of obs =      68
F( 13, 55) = 777.50
Prob > F      = 0.0000
R-squared     = 0.9946
Adj R-squared = 0.9933
Root MSE     = 53.906
```

cons	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
time	-.4993901	.3348244	-1.49	0.142	-1.170393 .1716131
month1	1140.733	24.33186	46.88	0.000	1091.971 1189.495
month2	1009.691	24.47656	41.25	0.000	960.6394 1058.744
month3	871.6912	24.62497	35.40	0.000	822.3417 921.0408
month4	574.5008	24.77701	23.19	0.000	524.8465 624.155
month5	399.4392	24.93262	16.02	0.000	349.4731 449.4052
month6	313.4942	25.09174	12.49	0.000	263.2092 363.7792
month7	288.8859	25.25429	11.44	0.000	238.2752 339.4967
month8	284.7268	25.42021	11.20	0.000	233.7836 335.6701
month9	289.6065	26.51886	10.92	0.000	236.4615 342.7515
month10	410.6397	26.6601	15.40	0.000	357.2116 464.0677
month11	602.2259	26.80478	22.47	0.000	548.5079 655.9438
month12	963.4642	26.95285	35.75	0.000	909.4495 1017.479

Computing a seasonally adjusted series

```
gen average=(_b[month1]+_b[month2]+_b[month3]+_b[month4]+_b[month5]+_b[month6]+
             _b[month7]+_b[month8]+_b[month9]+_b[month10]+_b[month11]+_b[month12])/12
gen seasonadj=0
replace seasonadj=cons + average-_b[month1] if month==1
- - - - -
replace seasonadj= cons + average-_b[month12] if month==12
twoway line cons seasonadj time
```

4. Distributed lag model

```
. sort year
. g pe1=pe[_n-1]
(1 missing value generated)
. g pe2=pe[_n-2]
(2 missing values generated)
```

```
. list year gfr pe pe1 pe2
```

	year	gfr	pe	pe1	pe2
1.	1913	124.7	0	.	.
2.	1914	126.6	0	0	.
3.	1915	125	0	0	0
4.	1916	123.4	0	0	0
5.	1917	121	19.27	0	0
6.	1918	119.8	23.94	19.27	0
7.	1919	111.2	20.07	23.94	19.27
8.	1920	117.9	15.33	20.07	23.94
9.	1921	119.8	34.32	15.33	20.07
10.	1922	111.2	36.65	34.32	15.33

```
. reg gfr pe pe1 pe2 ww2 pill
```

Source	SS	df	MS
Model	12959.7886	5	2591.95772
Residual	13032.6443	64	203.635067
Total	25992.4329	69	376.701926

```
Number of obs =      70
F( 5, 64) =      12.73
Prob > F      =      0.0000
R-squared     =      0.4986
Adj R-squared =      0.4594
Root MSE     =      14.27
```

gfr	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
pe	.0726718	.1255331	0.58	0.565	-.1781094 .323453
pe1	-.0057796	.1556629	-0.04	0.970	-.316752 .3051929
pe2	.0338268	.1262574	0.27	0.790	-.2184013 .286055
ww2	-22.1265	10.73197	-2.06	0.043	-43.56608 -.6869196
pill	-31.30499	3.981559	-7.86	0.000	-39.25907 -23.35091
_cons	95.8705	3.281957	29.21	0.000	89.31403 102.427

Long term effect = $\beta_{pe} + \beta_{pe_1} + \beta_{pe_2}$

```
. lincom pe+pe1+pe2
```

```
( 1) pe + pe1 + pe2 = 0
```

gfr	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
(1)	.1007191	.0298027	3.38	0.001	.0411814 .1602568

