World development indicators

Which country will develop more

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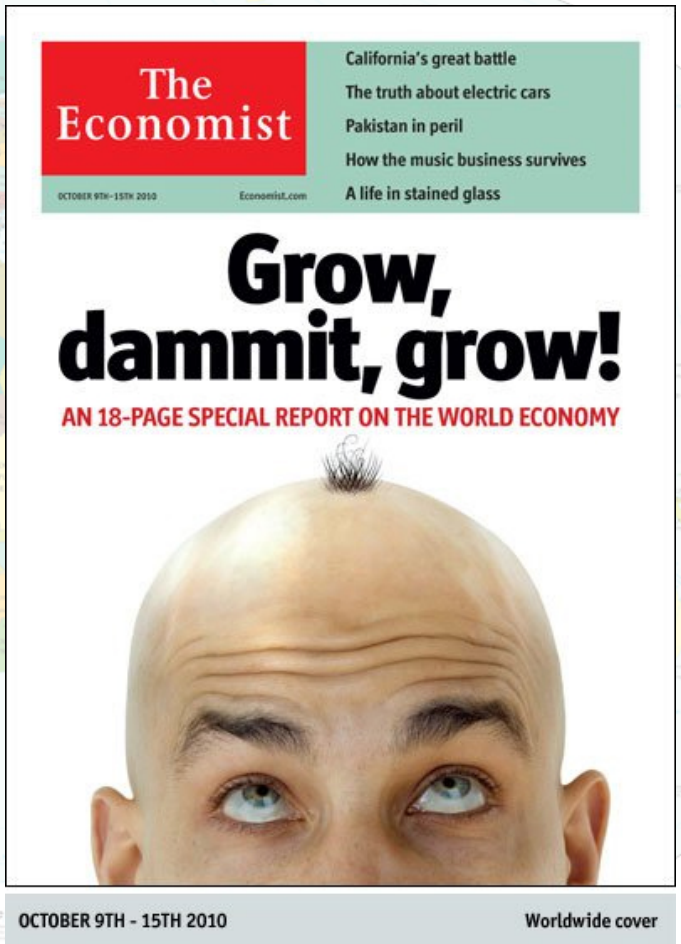
What do economists mean by growth?

Definition

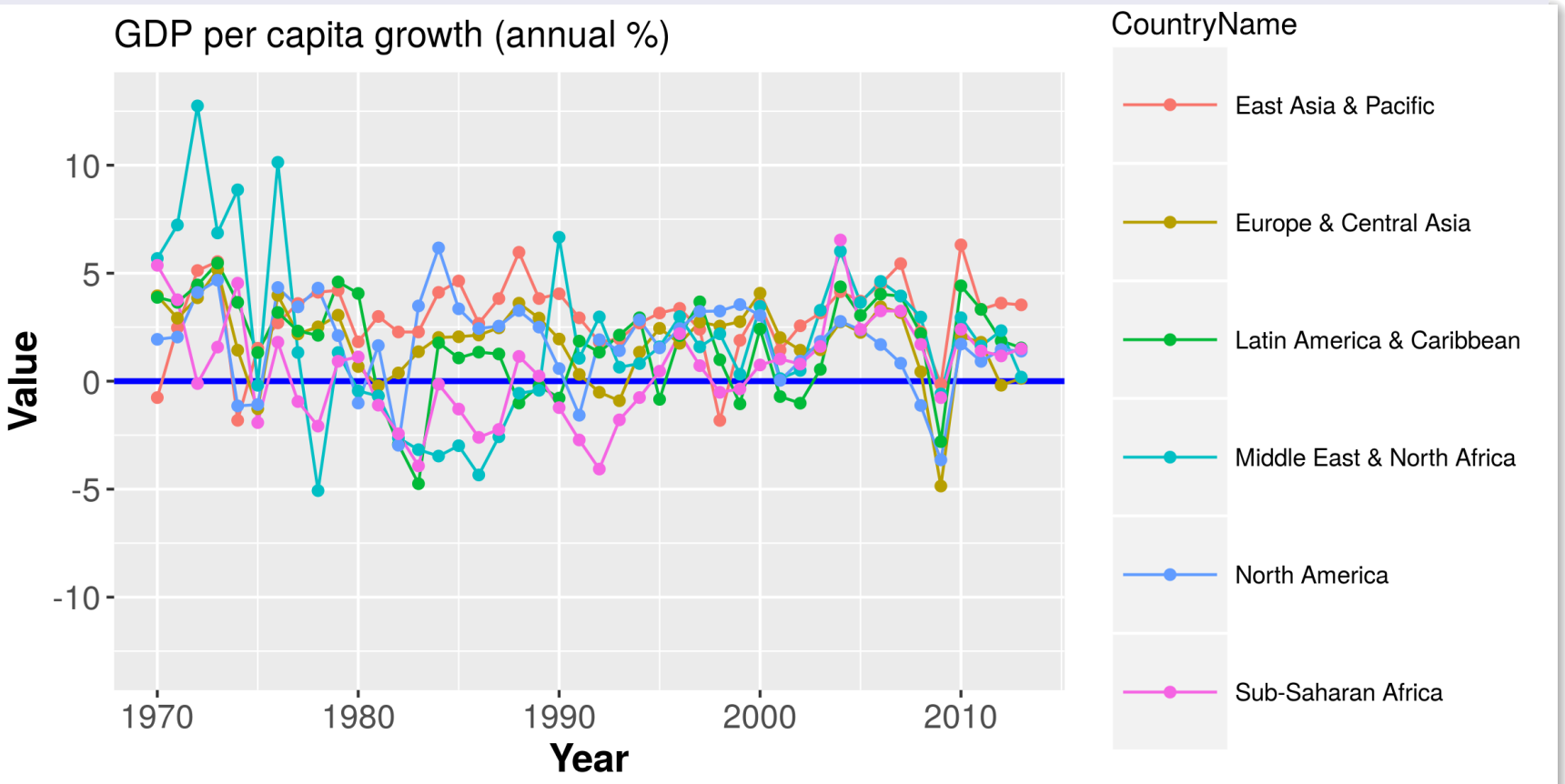
by Growth we mean the annual percentage variation of the GDP per capita in local currency. More formally,

$$Growth_t := \frac{GDP_t - GDP_{t-1}}{GDP_{t-1}} \quad (1)$$

where GDP is the Gross Domestic Product per capita



World economic growth from 1970 to 2010

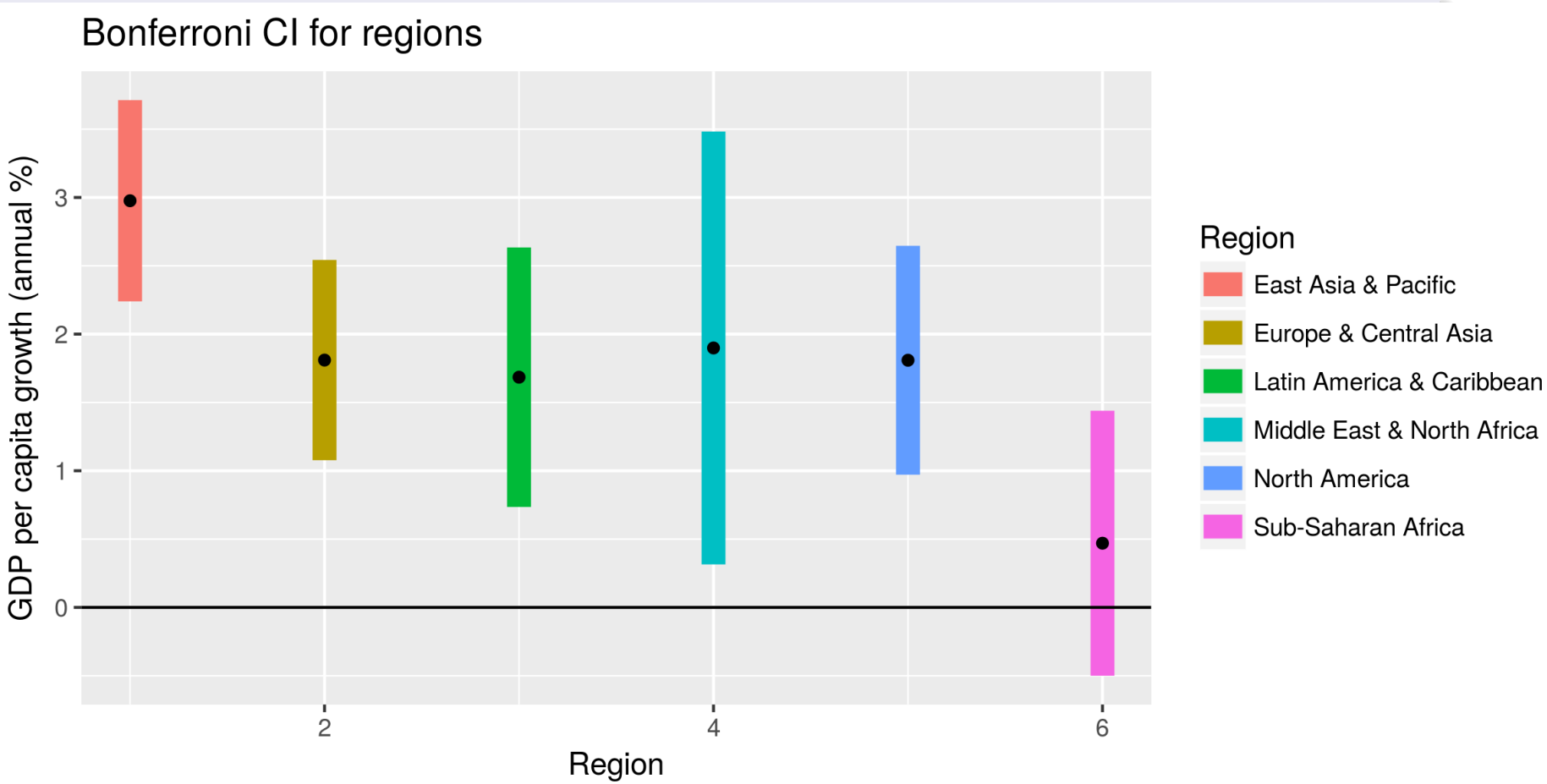


questions

- can we say that there was no growth over this time span?
- what happened in 2008/2009?

T2 test

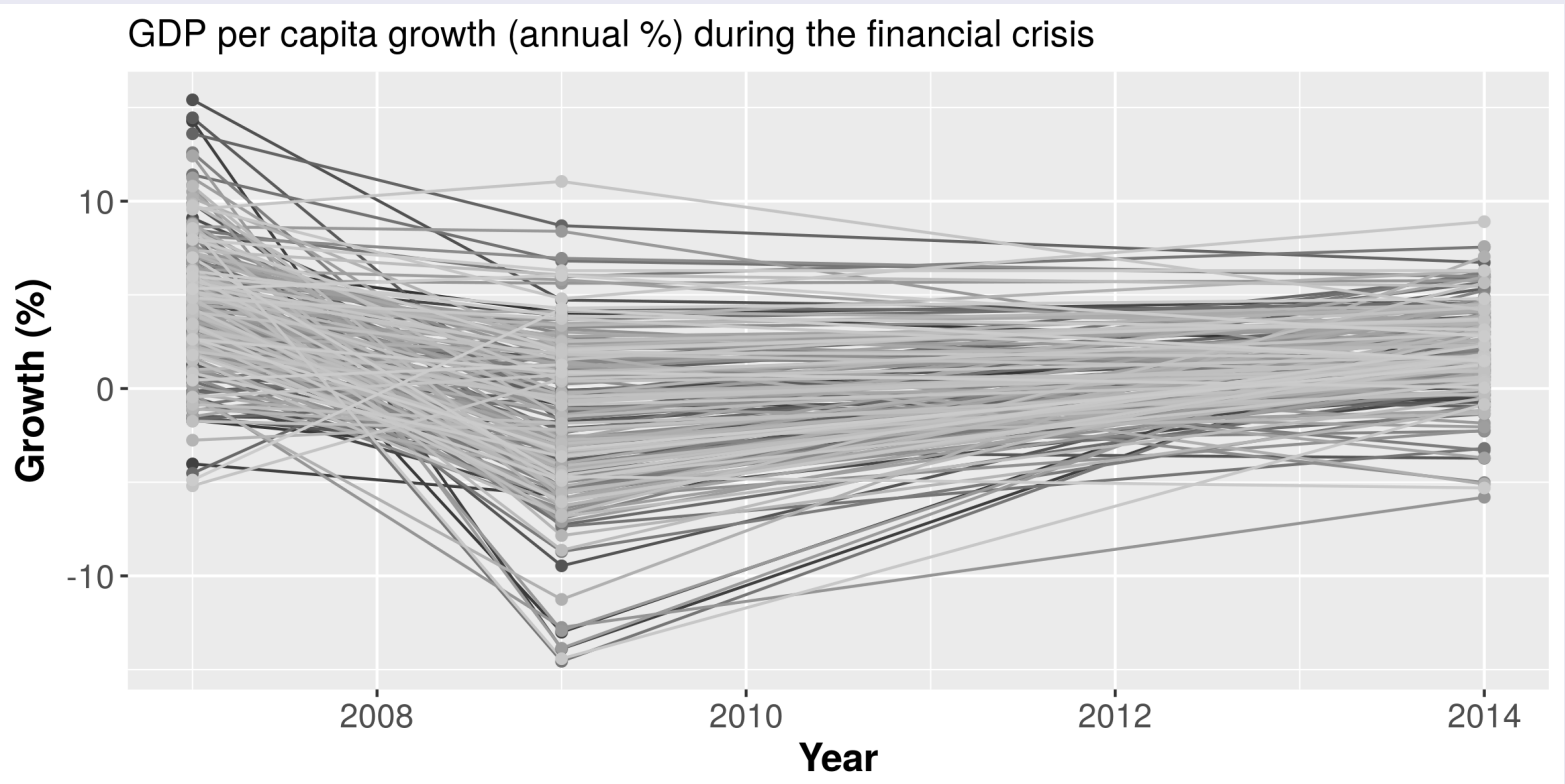
$$\begin{cases} H_0 & : \underline{\mu} = \underline{0} \implies \text{no growth over the considered time span} \\ H_A & : \underline{\mu} \neq \underline{0} \end{cases}$$



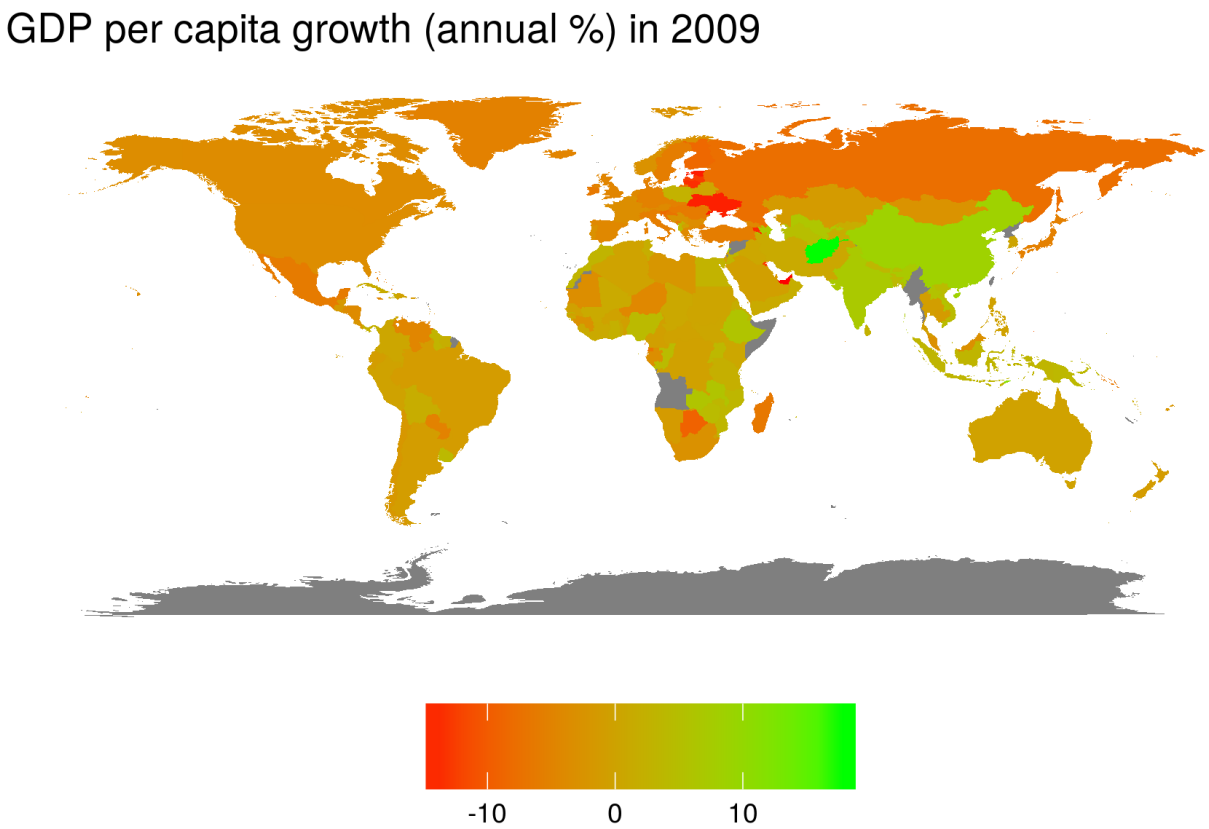
repeated measures test

$$\begin{cases} H_0 & : C\underline{\mu} = \underline{0} \implies \mu_1 - \mu_2 = 0 \quad \text{and} \quad \mu_1 - \mu_3 = 0 \\ H_A & : C\underline{\mu} \neq \underline{0} \end{cases}$$

$p.value = 0$



What affects growth?



questions

- during an economic crisis does geography play a role?
- does an economic crisis strike heavier high-income countries than low-income ones?

ANOVA two-way

during an economic crisis

Year = [2007, 2009, 2014]

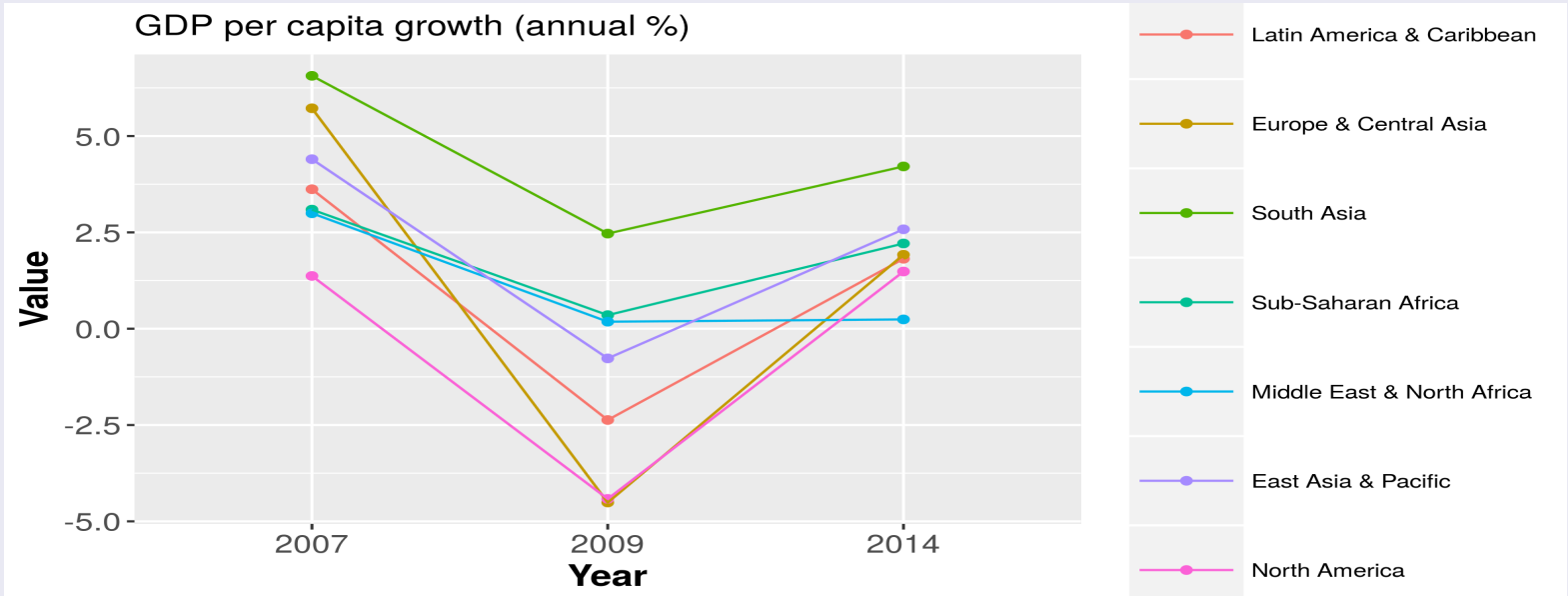
	Df	Sum Sq	Mean Sq	F value	Pr(>F)
fRegion	6	315.58	52.60	4.43	0.0002
Year	2	3362.03	1681.01	141.59	0.0000
fRegion:Year	12	894.73	74.56	6.28	0.0000
Residuals	533	6328.06	11.87		

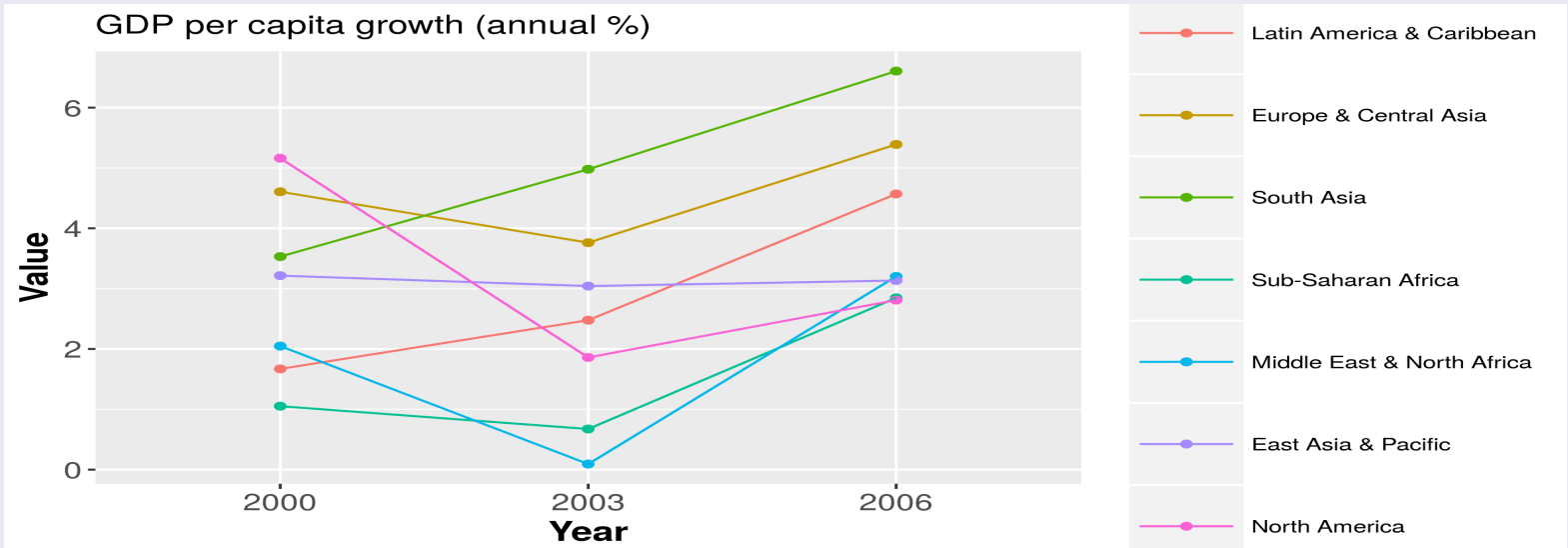
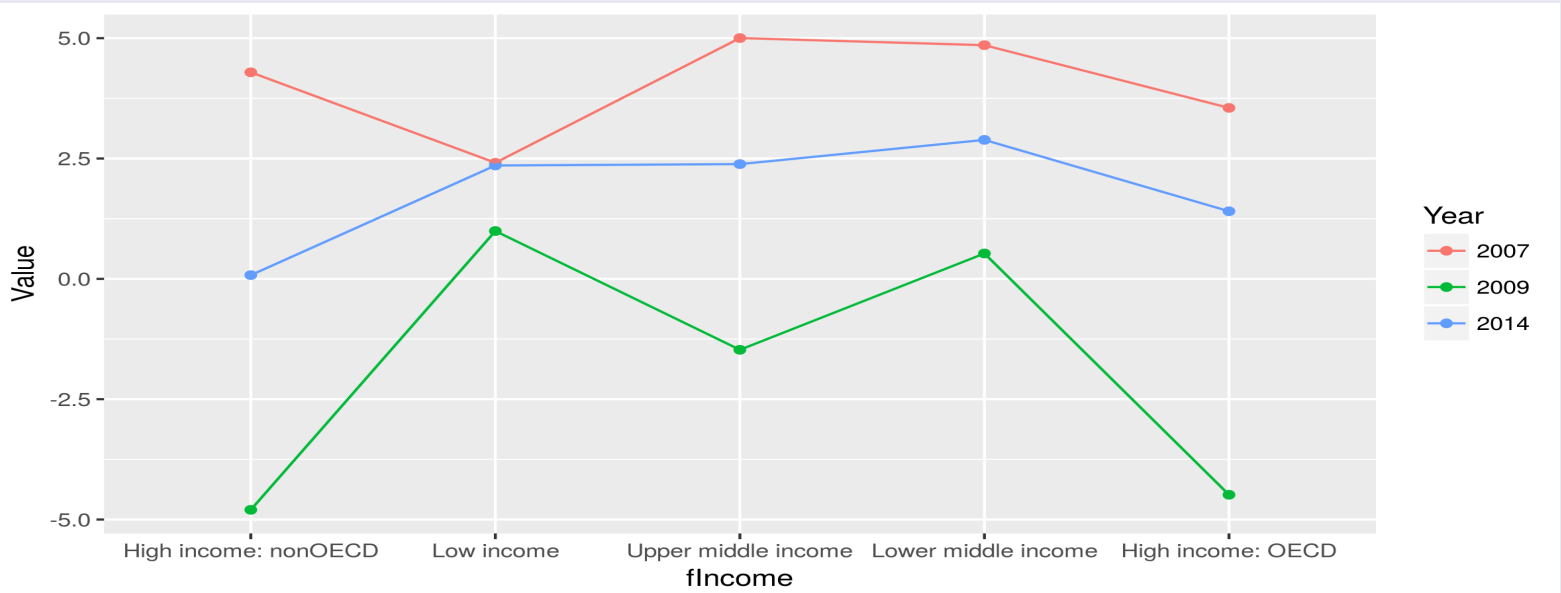
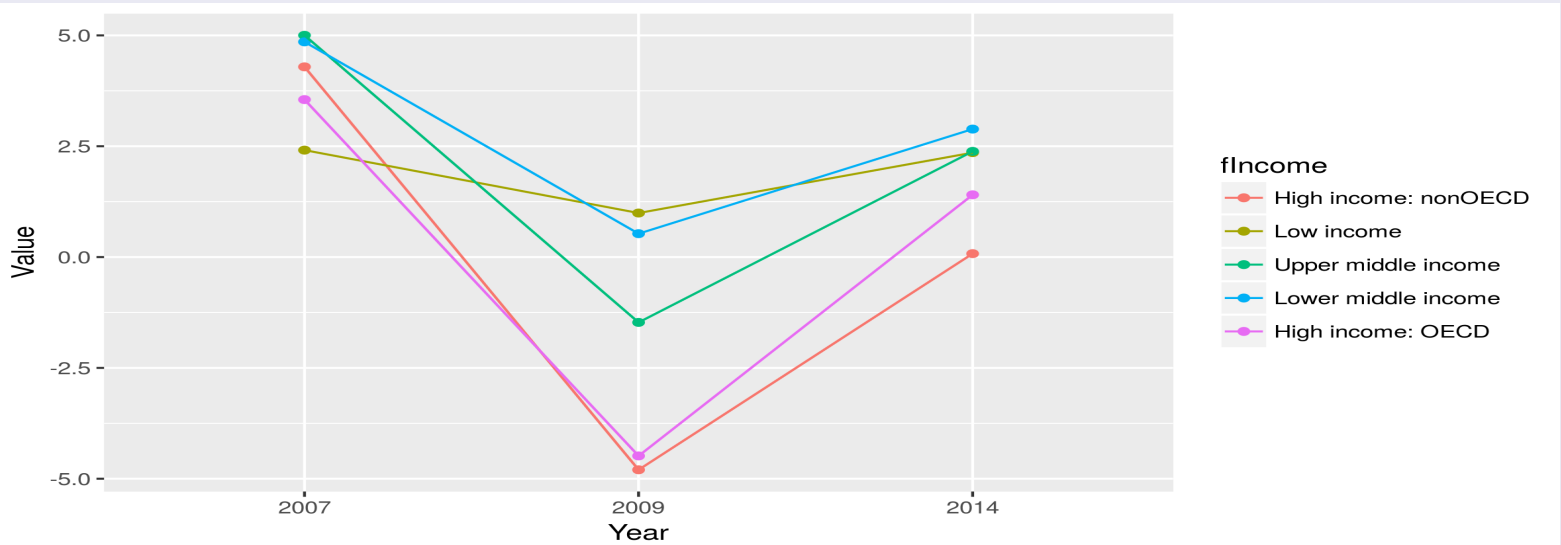
not economic turmoils

Year = [2000, 2003, 2006]

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
fRegion	6	875.35	145.89	7.37	0.0000
Year	2	317.40	158.70	8.02	0.0004
fRegion:Year	12	171.12	14.26	0.72	0.7318
Residuals	556	11001.81	19.79		

let's visualize the interaction





Does IncomeGroup affect Growth?