The secret of the interact term
交互项的秘密

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Introduction

Table 1: Summary Statistics for Crime Measures

Variables: Crime Rates	Region	2011-2013	2014-2016	2017-2018	All Year
Number of total criminal cases per thou. workers	East	0.081	0.713	0.774	0.492
		(0.183)	(0.338)	(0.282)	(0.420)
	Middle	0.039	0.586	0.773	0.428
		(0.093)	(0.221)	(0.255)	(0.366)
	West	0.046	0.598	0.304	0.418
		(0.111)	(0.304)	(0.343)	(0.391)
Number of criminal cases related to public security and the safety of individuals and property per thou. workers	East	0.064	0.532	0.572	0.366
		(0.148)	(0.260)	(0.210)	(0.316)
	Middle	0.030	0.442	0.583	0.323
		(0.073)	(0.170)	(0.198)	(0.278)
	West	0.032	0.436	0.516	0.304
		(0.073)	(0.226)	(0.261)	(0.289)
Number of criminal cases related to drugs, prostitution and gambling per thou. workers	East	0.009	0.111	0.094	0.069
		(0.026)	(0.112)	(0.074)	(0.092)
	Middle	0.004	0.069	0.080	0.047
		(0.013)	(0.058)	(0.061)	(0.058)
	West	0.007	0.097	0.100	0.064
		(0.023)	(0.095)	(0.094)	(0.088)
Number of criminal cases related to disrupting the order of the socialist market economy per thous. workers	East	0.004	0.029	0.027	0.019
		(0.008)	(0.015)	(0.015)	(0.017)
	Middle	0.002	0.027	0.027	0.018
		(0.006)	(0.016)	(0.012)	(0.017)
	West	0.002	0.019	0.019	0.012
		(0.004)	(0.010)	(0.011)	(0.012)

- 人口数自十八世纪起得到爆炸式增长；
- 相应的城市人口也在增长；

Background

公式页面

根据

$$\lambda\theta a_i - b_i + 2\varepsilon b_i = \lambda\theta(a_i + b_i)e_i - \lambda\theta \cdot b_i e_j$$

$$\lambda\theta a_j - b_j + 2\varepsilon b_j = \lambda\theta(a_j + b_j)e_j - \lambda\theta \cdot b_j e_i$$

求解得到

$$e_i^* = -\frac{-\theta\lambda a_j b_i - \theta\lambda a_i b_j - 2\varepsilon a_j b_i + a_j b_i - \theta\lambda a_i a_j - 4\varepsilon b_i b_j + 2b_i b_j}{\theta\lambda\left(a_j b_i + a_i b_j + a_i a_j\right)}$$

$$e_j^* = -\frac{-\theta\lambda a_j b_i - \theta\lambda a_i b_j - 2\varepsilon a_i b_j + a_i b_j - \theta\lambda a_i a_j - 4\varepsilon b_i b_j + 2b_i b_j}{\theta\lambda\left(a_j b_i + a_i b_j + a_i a_j\right)}$$

代码页

```
reg A B,r
estat vif
est store a1
//普通回归

xtreg A B,r
es store a2
//面板回归

xtreg A B,r fe
es store a3
//固定效应的面板回归
```

Thanks for listening

感谢批评指正