

## GGIT-537

### Term Project

The relationship between total number of hospital per province and socio-economical variables

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## Research Questions

- What is the relationship between total number of hospital per province and socio-economical variables?
- Which socio-economical variables are the good predictor for hospitals at the province scale?

## Null Hypothesis

- $H_0$ : The relationship between the number of hospital in the province and related socio-economical indicators is misleading.
- $H_1$ : The relationship between the number of hospital in the province and related socio-economical indicators is not misleading.

## Variable List

### GROUP #1: HEALTH RELATED

- Baby death rate in 2000
- Daily number of clinic for out-patients
- Number of death person according to the age groups in 1999
  1. Age 0 (young)
  2. Age 1-4 (young)
  3. Age 5-14 (young)
  4. Age 15-24 (adult)
  5. Age 25-34 (adult)
  6. Age 35-44 (adult)
  7. Age 45-54 (adult)
  8. Age 55-64 (adult)
  9. Age 65-74 (old)
  10. Age 75+ (old)

### GROUP #2: Number of personnel in health sector in 1999 and 2000

1. Physician
2. Dentist
3. Nurse
4. Health officer
5. Midwife
6. Pharmacist

## Variable List

### GROUP #3: SOCIAL SECURITY (ALL IN 2000)

1. Number of retired person from Emekli Sandigi
2. Number of insured person from Emekli Sandigi
3. Number of retired person from Bagkur
4. Number of insured person from Bagkur
5. Number of retired person from SSK
6. Number of insured person from SSK
7. Number of retired person from public social security institutions
8. Number of insured person from public social security institutions
9. Number of person who has social security from public institutions

### GROUP #4: SOSYO-ECONOMICAL DEVELOPMENT

1. Sosyo-economical development index in 1996
2. Sosyo-economical development provincial rank in 1996
3. Sosyo-economical development provincial rank in 2003
4. Government investment in health sector in 2001

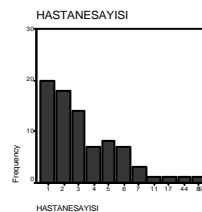
### GROUP #5: POPULATION

1. Total population in 2000
2. Urban population in 2000
3. Rural population in 2000

### Statistics

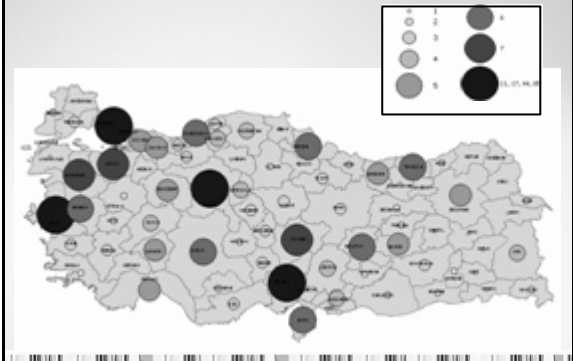
HASTANESAYISI	
N	Valid
	81
Mean	4,77
Median	3,00
Mode	1
Std. Deviation	10,405
Variance	108,267
Range	84
Minimum	1
Maximum	85
Sum	386

## Some Statistics on the number of hospital per province



HASTANESAYISI				
Valid	Frequency	Percent	Valid Percent	Cumulative Percent
1	20	24,7	24,7	24,7
2	18	22,2	22,2	46,9
3	14	17,3	17,3	64,2
4	7	8,6	8,6	72,8
5	8	9,9	9,9	82,7
6	7	8,6	8,6	91,4
7	3	3,7	3,7	95,1
11	1	1,2	1,2	96,3
17	1	1,2	1,2	97,5
44	1	1,2	1,2	98,8
85	1	1,2	1,2	100,0
Total	81	100,0	100,0	

### The Number of Hospital per the Province



### Normal Distribution

	HS_HASTANESAY	HS_SurgIPLKLNK_S	HE_BABYDEATHR	HE_DTH_CHLD_0-14	HE_DTH_ADULT_15-64
Normal Parameters (a)	Mean	4.462	4887.4	488.074	8427.6
	Std. Deviation	17.262	2312.82	770.7	1323.1
Most Extreme Differences	Statistic	0.361	0.123	0.174	0.344
	Probability	0.930	0.877	0.826	0.656
Minimum / Maximum	Statistic	0.000	0.000	0.000	0.000
	Probability	0.000	0.000	0.000	0.000

	HE_DTH_0-5	HE_DTH_5-14	HE_DTH_15-64	HE_DTH_65+	
Normal Parameters (a)	Mean	1181.701	1081.424	188.451	829.826
	Std. Deviation	200.110	1744.112	100.000	139.726
Most Extreme Differences	Statistic	0.501	0.182	0.182	0.289
	Probability	0.500	0.818	0.818	0.711
Minimum / Maximum	Statistic	0.000	0.000	0.000	0.000
	Probability	0.000	0.000	0.000	0.000

	HE_DTH_0-14	HE_DTH_15-64	HE_DTH_65+	HE_DTH_0-14	
Normal Parameters (a)	Mean	126.850	137.450	200.474	426.443
	Std. Deviation	188.810	302.820	100.000	100.000
Most Extreme Differences	Statistic	0.501	0.411	0.411	0.310
	Probability	0.500	0.612	0.612	0.690
Minimum / Maximum	Statistic	0.000	0.000	0.000	0.000
	Probability	0.000	0.000	0.000	0.000

	HS_HASTANESAY	HS_SurgIPLKLNK_S	HE_DTH_0-14	HE_DTH_15-64
Normal Parameters (a)	Mean	2981.610	17868.000	43292.77
	Std. Deviation	126.850	200.110	100.000
Most Extreme Differences	Statistic	0.501	0.411	0.411
	Probability	0.500	0.612	0.612
Minimum / Maximum	Statistic	0.000	0.000	0.000
	Probability	0.000	0.000	0.000

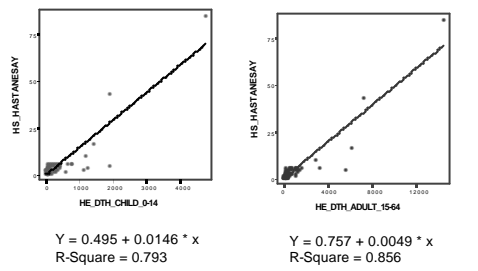
a. Full distribution is Normal.  
b. Calculated from data.

### Correlation Matrix

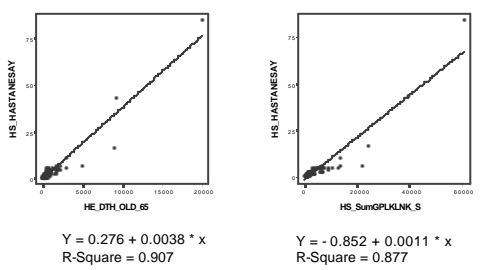
	HS_HASTANESAY	HS_SurgIPLKLNK_S	HE_BABYDEATHR	HE_DTH_CHLD_0-14	HE_DTH_ADULT_15-64
HS_HASTANESAY	Pearson Correlation	0.934	-0.1444	0.9900	0.9254
	Sig. (2-tailed)	0.000	0.000	0.000	0.000
	N	81	81	81	81
HS_SurgIPLKLNK_S	Pearson Correlation	0.9600	0.9772	0.9900	0.9241
	Sig. (2-tailed)	0.000	0.000	0.000	0.000
	N	81	81	81	81
HE_BABYDEATHR	Pearson Correlation	-0.1444	0.9772	0.9900	0.9241
	Sig. (2-tailed)	0.000	0.000	0.000	0.000
	N	81	81	81	81
HE_DTH_CHLD_0-14	Pearson Correlation	0.9900	0.9900	0.9900	0.9241
	Sig. (2-tailed)	0.000	0.000	0.000	0.000
	N	81	81	81	81
HE_DTH_ADULT_15-64	Pearson Correlation	0.9254	0.9241	0.9241	0.9241
	Sig. (2-tailed)	0.000	0.000	0.000	0.000
	N	81	81	81	81

Correlation is significant at the 0.01 level (2-tailed).

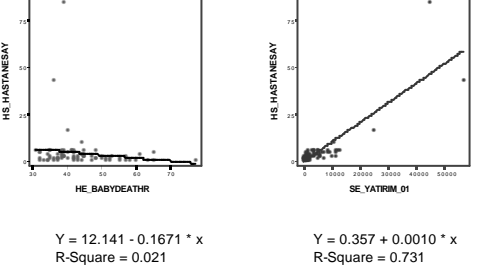
### Linear Regression (for each variables)



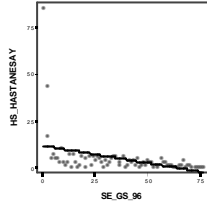
### Linear Regression (for each variables)



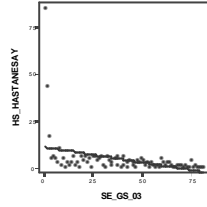
### Linear Regression (for each variables)



Linear Regression (for each variables)

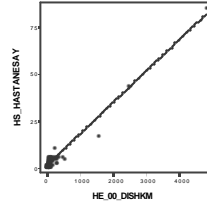


$Y = 12.036 - 0.1845 * x$   
R-Square = 0.144

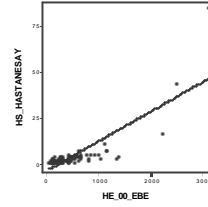


$Y = 11.432 - 0.1630 * x$   
R-Square = 0.135

Linear Regression (for each variables)

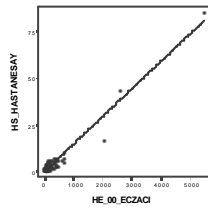


$Y = 1.655 + 0.0168 * x$   
R-Square = 0.960

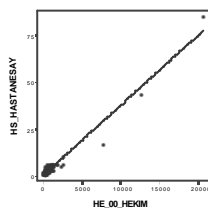


$Y = -3.493 + 0.0161 * x$   
R-Square = 0.651

Linear Regression (for each variables)

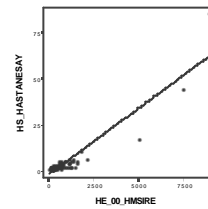


$Y = 0.523 + 0.0146 * x$   
R-Square = 0.945

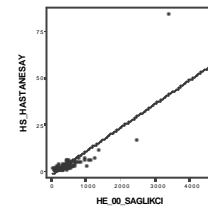


$Y = 0.819 + 0.0037 * x$   
R-Square = 0.958

Linear Regression (for each variables)

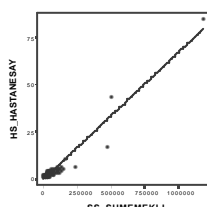


$Y = -1.306 + 0.0071 * x$   
R-Square = 0.854

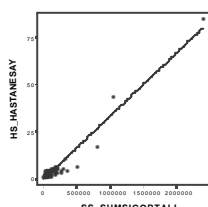


$Y = -2.260 + 0.0128 * x$   
R-Square = 0.682

Linear Regression (for each variables)

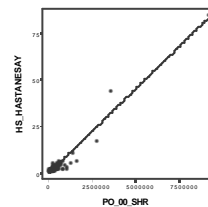


$Y = -0.197 + 6.7395 * x$   
R-Square = 0.926

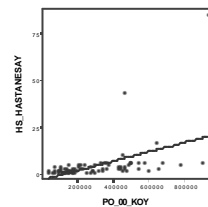


$Y = -0.218 + 3.3525 * x$   
R-Square = 0.934

Linear Regression (for each variables)



$Y = -0.206 + 9.1511 * x$   
R-Square = 0.938



$Y = -2.488 + 2.4689 * x$   
R-Square = 0.231

## Linear Regression Group #1

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.954 <sup>a</sup>	.910	.907	3.197

a. Predictors: (Constant), HE\_DTH\_OLD\_65, HE\_DTH\_CHILD\_0-14, HE\_DTH\_ADULT\_15-64

ANOVA<sup>a</sup>

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	7889,599	3	2629,866	257,000	.000 <sup>b</sup>
	Residual	176,788	76	10,221		
	Total	8066,388	79			

a. Predictors: (Constant), HE\_DTH\_OLD\_65, HE\_DTH\_CHILD\_0-14, HE\_DTH\_ADULT\_15-64

b. Dependent Variable: HS\_HASTANESAY

Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients		t	Sig.
		B	Std. Error	Beta			
1	(Constant)	154	404			.382	.703
	HE_DTH_CHILD_0-14	.003	.002	.183		1,505	.136
	HE_DTH_ADULT_15-64	-.001	.001	-.143		-.740	.461
	HE_DTH_OLD_65	.004	.001	.924		6,748	.000

a. Dependent Variable: HS\_HASTANESAY

## Linear Regression Group #2

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.987 <sup>a</sup>	.974	.972	1,720

a. Predictors: (Constant), HE\_00\_ECZACI, HE\_00\_SAGLIKCI, HE\_00\_EBE, HE\_00\_DISHKM, HE\_00\_HMSIRE, HE\_00\_HEKIM

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	847,884	6	140,281	686,054	.000 <sup>b</sup>
	Residual	222,850	74	3,012		
	Total	1070,734	80			

a. Predictors: (Constant), HE\_00\_ECZACI, HE\_00\_SAGLIKCI, HE\_00\_EBE, HE\_00\_DISHKM, HE\_00\_HMSIRE, HE\_00\_HEKIM

b. Dependent Variable: HS\_HASTANESAY

Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients		t	Sig.
		B	Std. Error	Beta			
1	(Constant)	2,140	340			6,278	.000
	HE_00_HEKIM	.005	.001	1,449		3,766	.000
	HE_00_DISHKM	.001	.004	.056		.250	.804
	HE_00_HMSIRE	-.006	.002	-.770		-3,432	.001
	HE_00_SAGLIKCI	.003	.002	.166		1,415	.161
	HE_00_EBE	.000	.002	-.014		-.158	.875
	HE_00_ECZACI	.001	.004	.088		.872	.711

a. Dependent Variable: HS\_HASTANESAY

## Linear Regression Group #3

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.966 <sup>a</sup>	.934	.932	2,706

a. Predictors: (Constant), SS\_SUMSIGORTALI, SS\_SUMMEKLI

ANOVA<sup>a</sup>

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	8089,903	2	4044,952	592,381	.000 <sup>b</sup>
	Residual	1,571,140	78	20,131		
	Total	9661,043	80			

a. Predictors: (Constant), SS\_SUMSIGORTALI, SS\_SUMMEKLI

b. Dependent Variable: HS\_HASTANESAY

Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients		t	Sig.
		B	Std. Error	Beta			
1	(Constant)	-0,220	336			-.661	.511
	SS_SUMMEKLI	8,36,9	.000	.119		.443	.659
	SS_SUMSIGORTALI	2,94,6	.000	.848		3,150	.002

a. Dependent Variable: HS\_HASTANESAY

## Linear Regression Group #4

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.855 <sup>a</sup>	.731	.724	5,464

a. Predictors: (Constant), SE\_GS\_03, SE\_YATIRIM\_01

ANOVA<sup>a</sup>

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	8331,498	2	4165,749	106,021	.000 <sup>b</sup>
	Residual	2328,045	78	29,860		
	Total	10659,543	80			

a. Predictors: (Constant), SE\_GS\_03, SE\_YATIRIM\_01

b. Dependent Variable: HS\_HASTANESAY

Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients		t	Sig.
		B	Std. Error	Beta			
1	(Constant)	-0,10541	1,507			-.070	.944
	SE_YATIRIM_01	0,00104	.000	.865		13,147	.000
	SE_GS_03	0,00959	.029	.023		.343	.732

a. Dependent Variable: HS\_HASTANESAY

## Linear Regression Group #5

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.975 <sup>a</sup>	.951	.950	2,337

a. Predictors: (Constant), PO\_00\_KOY, PO\_00\_SHR

ANOVA<sup>a</sup>

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	8234,472	2	4117,236	753,733	.000 <sup>b</sup>
	Residual	426,072	78	5,462		
	Total	8660,544	80			

a. Predictors: (Constant), PO\_00\_KOY, PO\_00\_SHR

b. Dependent Variable: HS\_HASTANESAY

Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients		t	Sig.
		B	Std. Error	Beta			
1	(Constant)	1,487	475			3,133	.002
	PO_00_SHR	9,9327	.000	1,051		33,733	.000
	PO_00_KOY	-7,2087	.000	-.140		-4,507	.000

a. Dependent Variable: HS\_HASTANESAY

## Final Socio-economical Variables that non-spatial linear regression is applied in order to estimate the number of hospitals in the province

1. Daily Number of Clinic for Out-patients
2. Number of Death People
3. Number of Health Personnel
4. Government Health Investment
5. Number of Person Having Social Security from Public Institutions
6. Urban Population

