



NATIONAL INSTITUTE FOR HEALTH AND WELFARE

The relationship between quality of care and hospital costs in Europe

Unto Häkkinen and EuroDRG teams in Finland, France, Germany, Spain and Sweden

Aims and data

- Motivation: Does introduction of cost control system (like DRG-system) lead to worsened quality of care
- To investigate whether cost and quality (measured by in-hospital mortality) are related to each other at hospital level in five European countries.
- Patient level data collected for EuroDRG project in Finland, France, Germany, Spain and Sweden
- Acute myocardial infarction (AMI) and stroke



AMI episodes

Hospital inpatient admission due to AMI (ICD-10: I21-I22) as main diagnosis

Excluded, if:

- bypass surgery
- LoS = 0
- LoS = 1 and patient transferred to another hospital
- Cost outlier (with a bilateral trim based on 3 times the standard deviation of the cost distribution)
- In a hospital with less than 50 cases



Stroke episodes

Hospital inpatient admission due to stroke (I61, I63 or I64 as main diagnosis)

Excluded, if:

- LoS = 0
- LoS = 1 and patient transferred to another hospital
- Cost outlier (with a bilateral trim based on 3 times the standard deviation of the cost distribution)
- In a hospital with less than 50 cases



Description of AMI samples

			Cost/patient (€)			Length of stay			Mortality %		
Country	Number of cases	Number of hospitals	Average	Min	Max	Average	Min	Max	Average	Min	Max
			hospital			hospit hospital			hospital hospital		
Finland	1253	5	4684	2118	5826	5,5	4,6	5,7	6,4	5,2	11,7
France	8415	38	5197	2961	8010	6,0	3,5	8,1	4,9	1,2	16,9
Germany	5159	18	4274	2844	5411	8,3	5,1	15,1	11,8	1,2	23,5
Spain	2781	6	6705	2140	7334	7,7	5,9	10,5	6,7	4,6	16,6
Sweden	15305	33	5113*	2110*	7310*	5,5	4,3	7,3	7,1	3,3	13,5

*transferred to € using exchange rate



Description of stroke samples

			Cost/patient (€)			Length of stay (days)			In-hospital mortality (%)		
Country	Number of cases	Number of hospitals	Average	Min hospital	Max hospital	Average	Min hospital	Max hospital	Average	Min hospital	Max hospital
Finland	2237	5	4 027	2 647	5 389	8,1	5,8	10,1	6,9	5,7	9,8
France	8826	32	5 156	2 946	8 500	12,3	6,9	17,6	15,1	7,4	27,6
Germany	7754	16	4 388	2 742	6 217	12,0	9,5	18,3	12,7	6,5	31,0
Spain	3785	8	3 587	2 582	5 365	8,5	6,5	10,2	12,9	7,5	16,0
Sweden	15680	33	6 016	3 851	9 592	11,7	6,1	17,6	11,5	3,8	18,9





Patient level variables used in estimations

- Age (classified)
- Gender
- Type of AMI / stroke
- Total number of different diagnoses coded in medical records
- Patients transferred to the hospital from other institutions
- Patients discharged from the hospital to another institution
- Emergency, describing if patient admitted from emergency department, ward or similar institution as relevant in each country
- Two variables of Charlson index describing single non severe comorbidity, and two comorbidities and more (or one single severe one), respectively



Estimation strategy in practice

Quality: Fixed effects probit model for survival

Cost: Fixed effects OLS for (log) cost with quality variable

Quality and cost models will be examined with correlation diagrams.

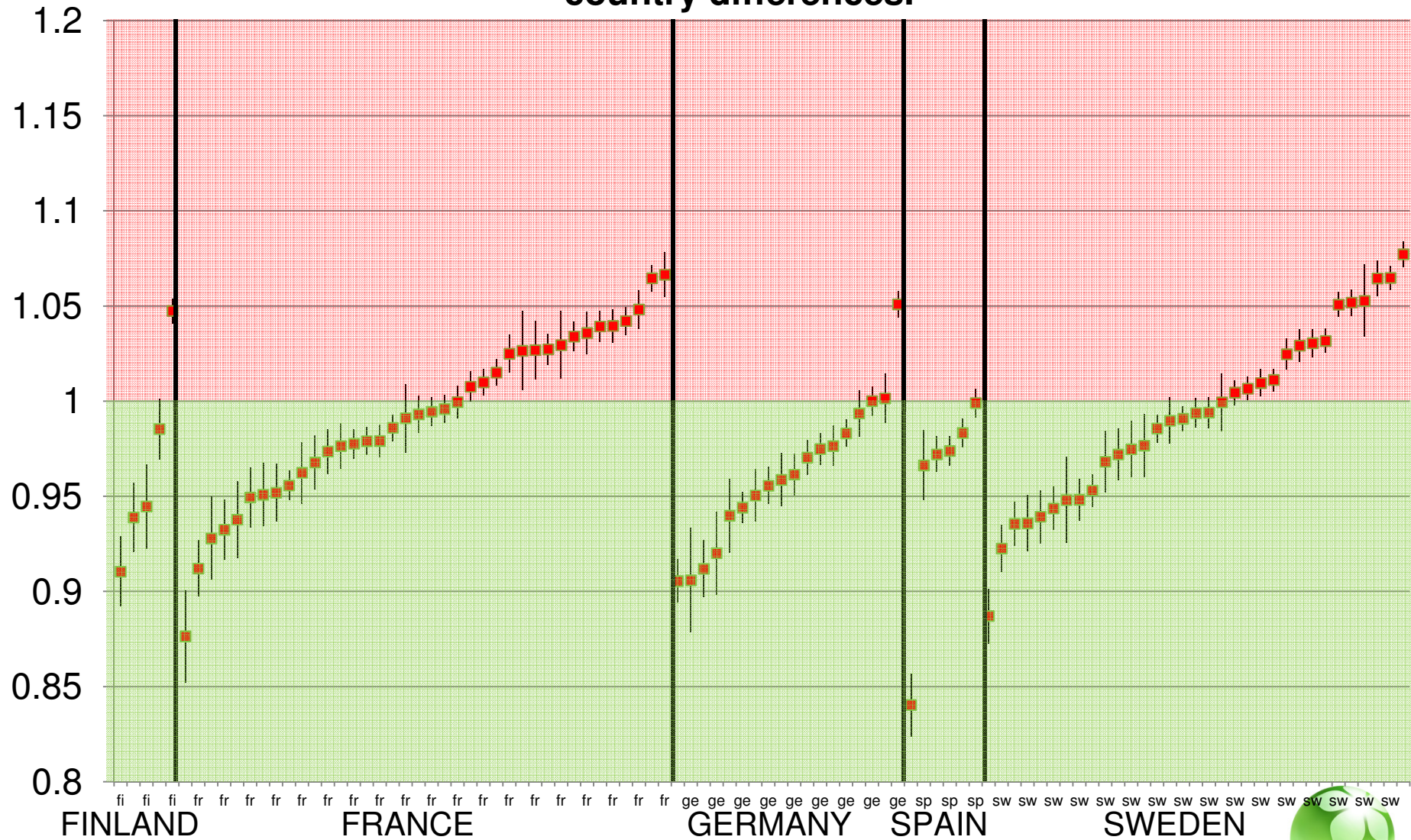
Describing the results

- Quality (discharged alive from the hospital stay): marginal effects (probit model) of hospital dummy variables (effect coding)
- Cost level: fixed effects scaled to country average and adjusted for whole sample (pooled data) average





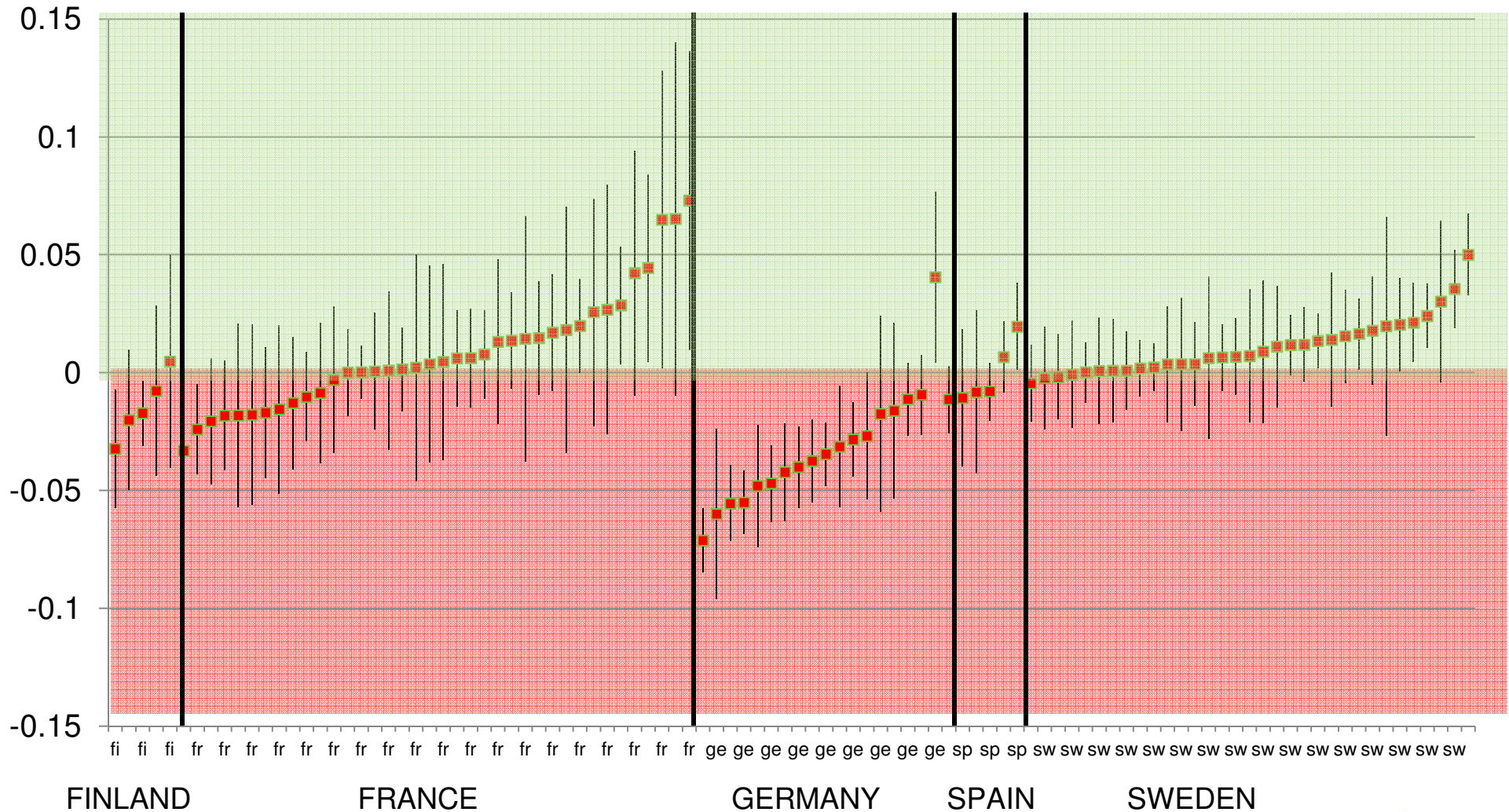
Cost level and their confidence intervals of 100 European hospitals. AMI patients. Whole sample average 1 . Adjusted with country differences.



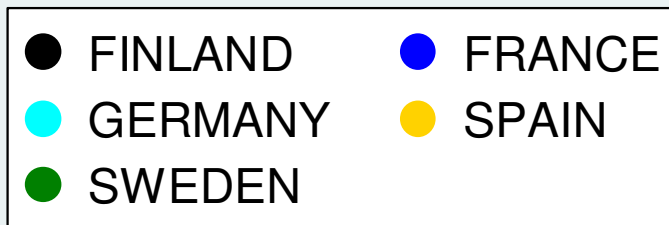
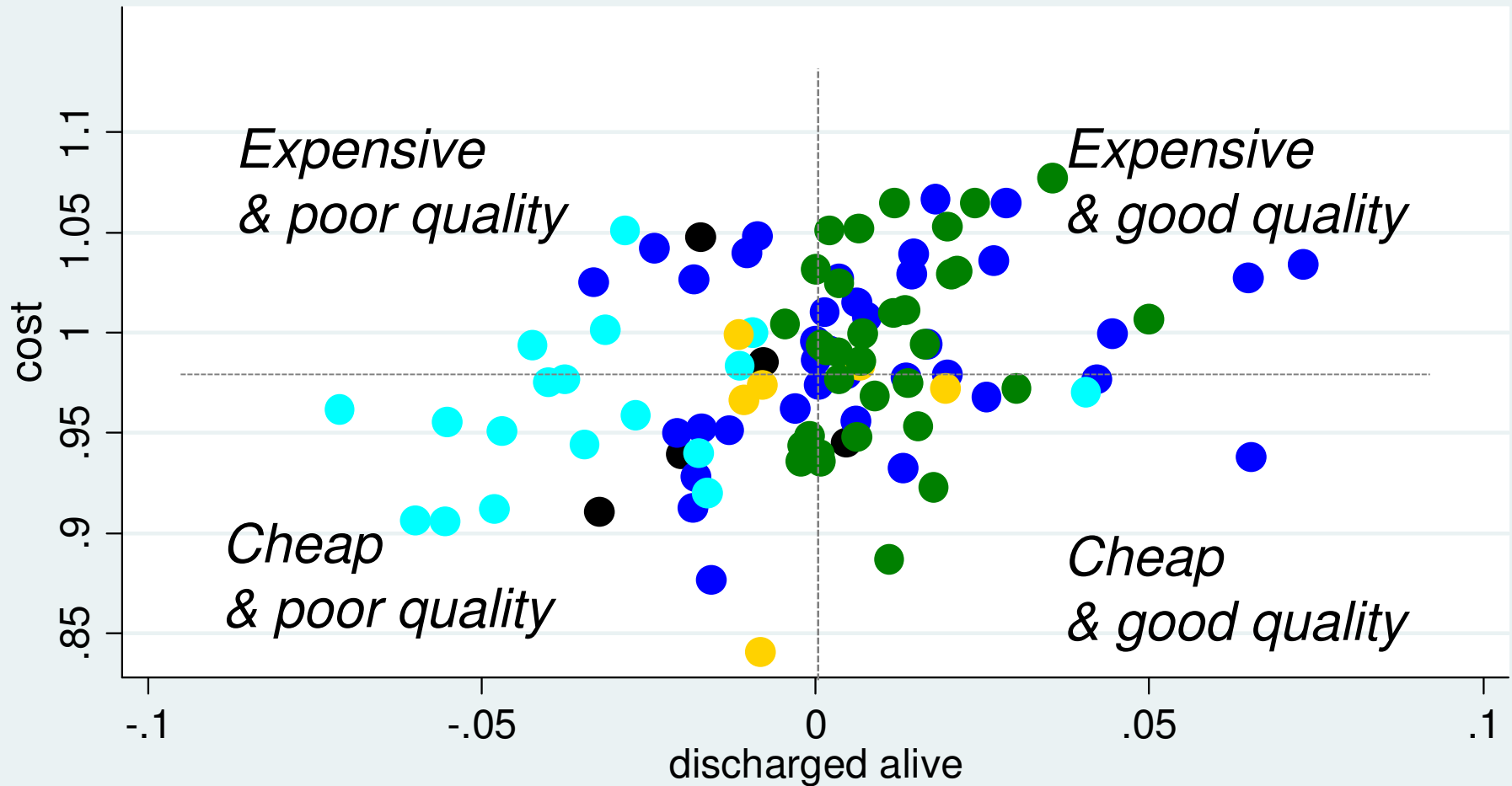
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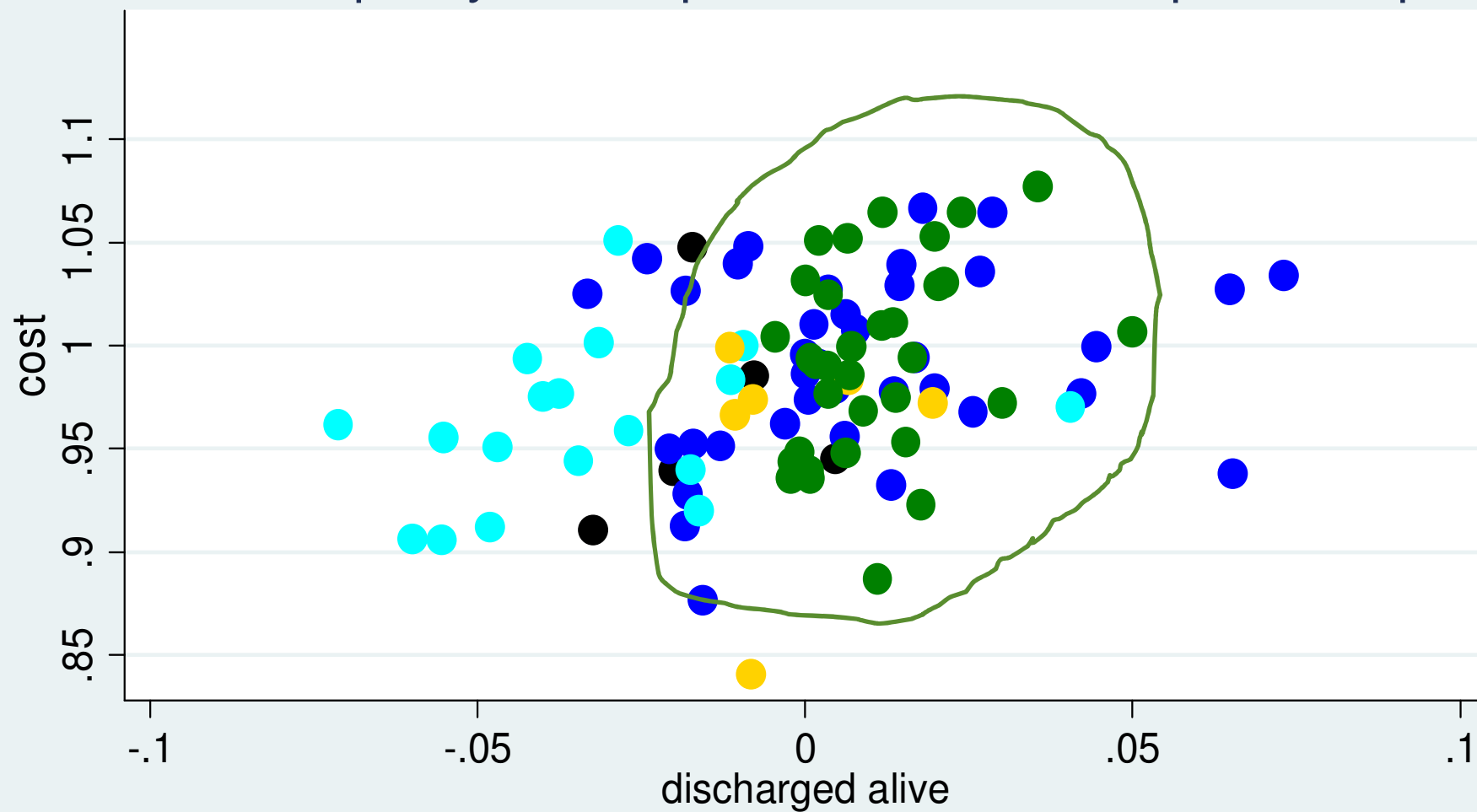
Quality(discharged alive) of Ami patients in 100 European hospitals, marginal effects and their confidence intervals



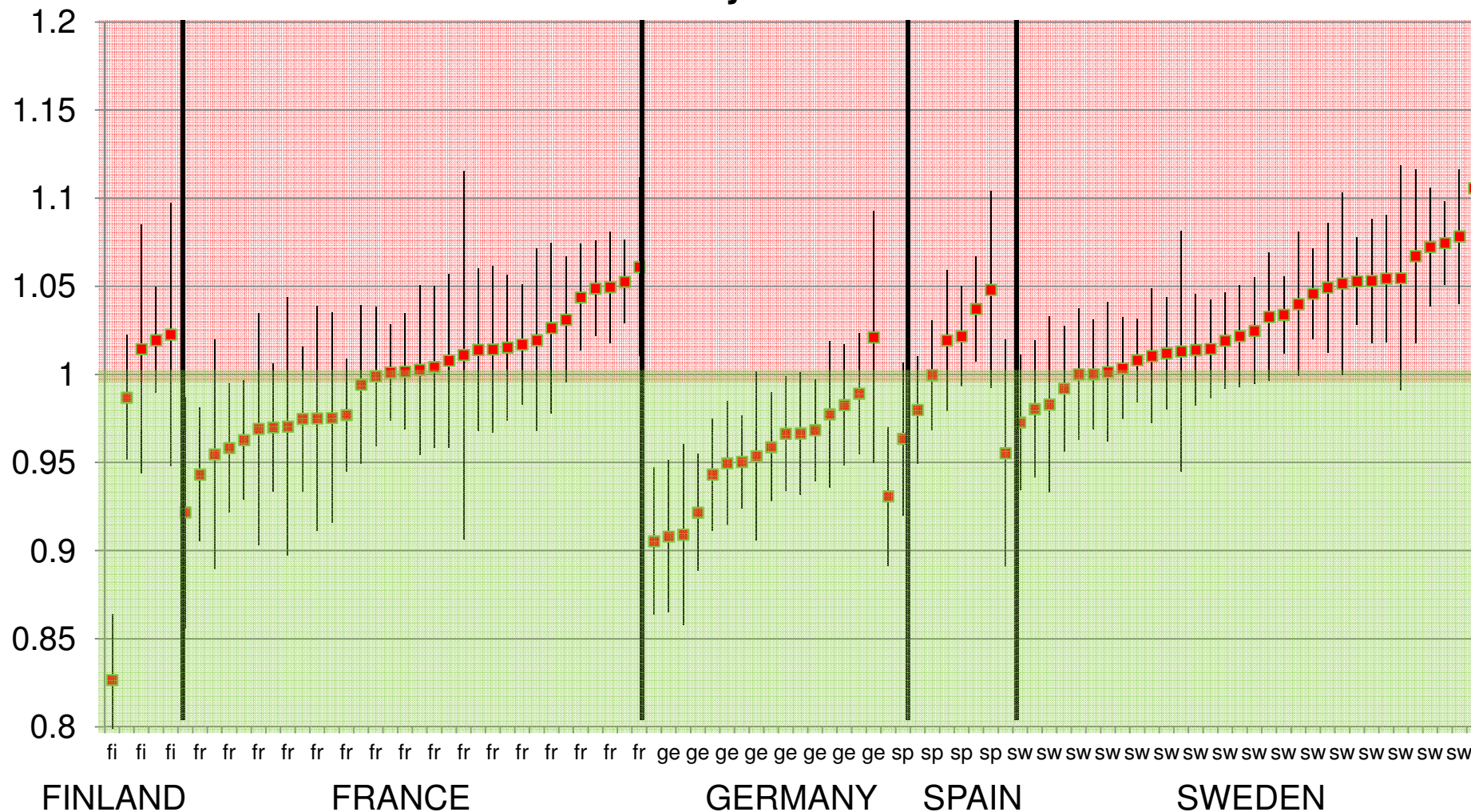
Cost and quality of AMI patients in 100 European hospitals



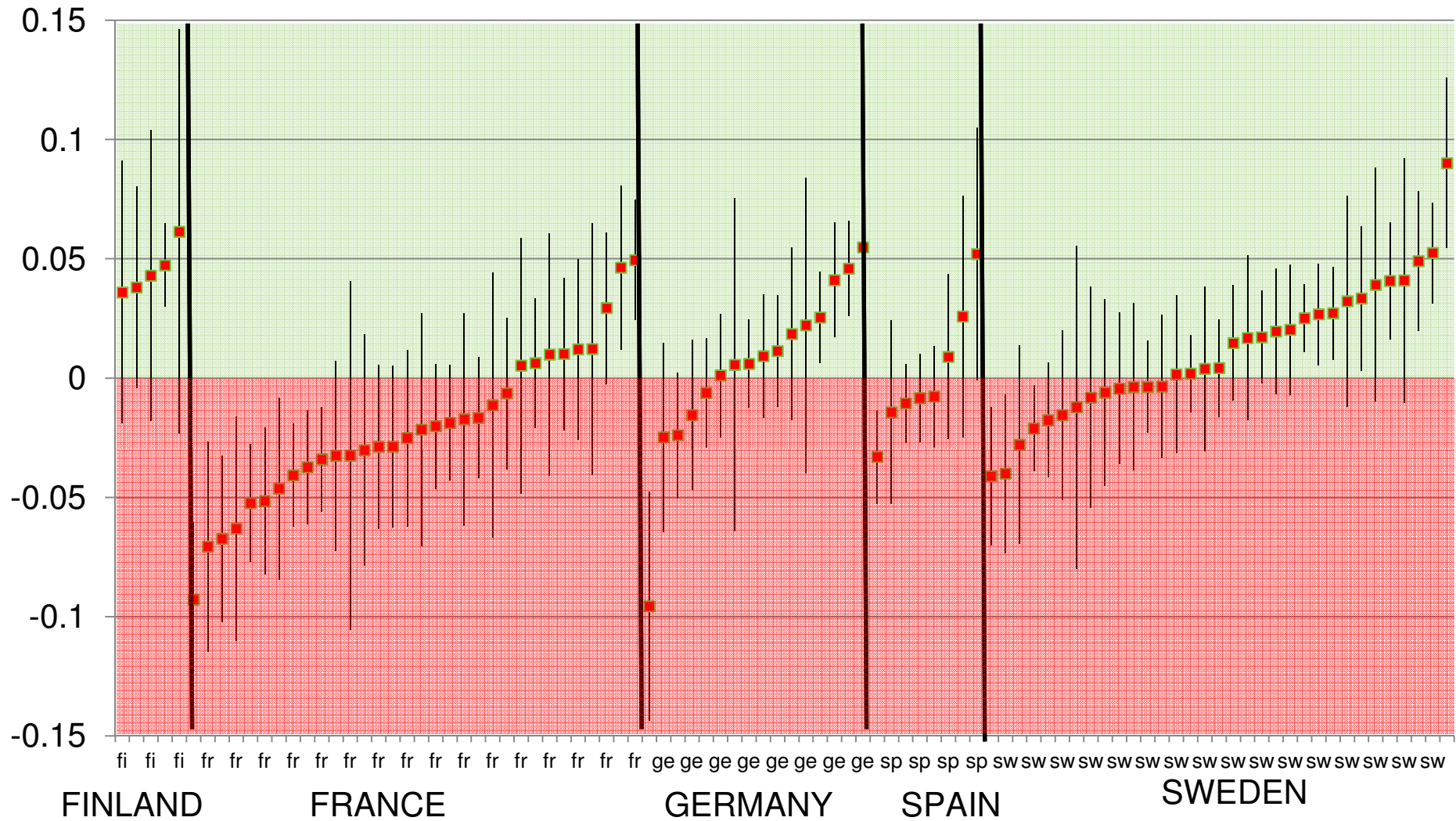
Cost and quality of AMI patients in 100 European hospitals



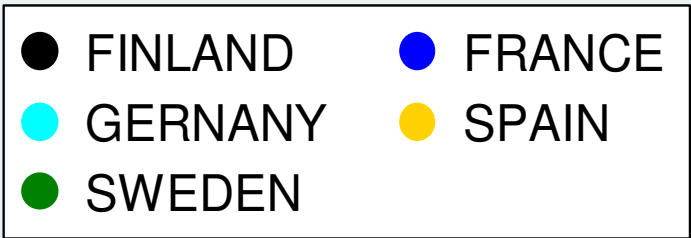
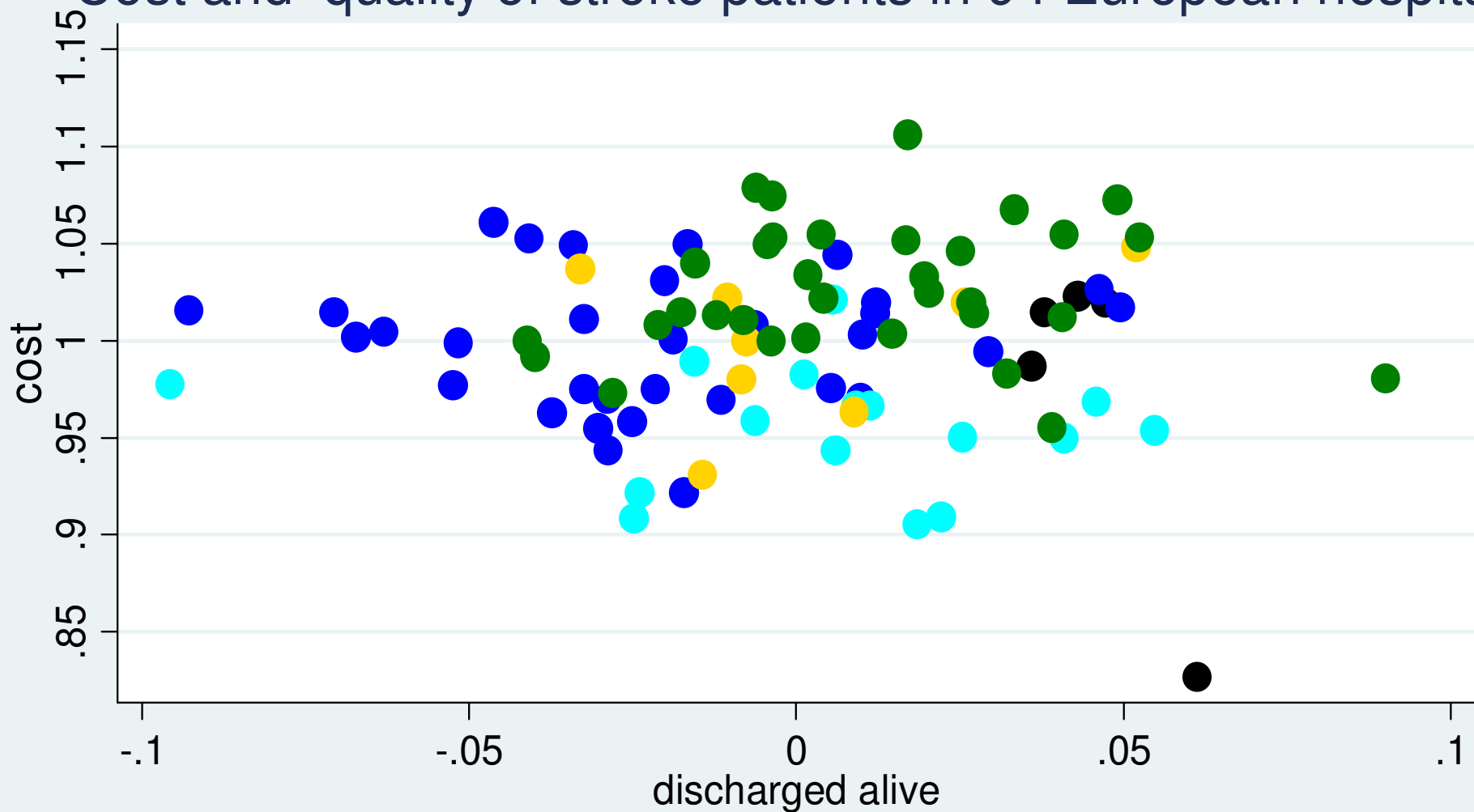
Cost level and their confidence intervals of 94 European hospitals. Stroke patients. Whole sample average 1 . Adjusted with country differences.



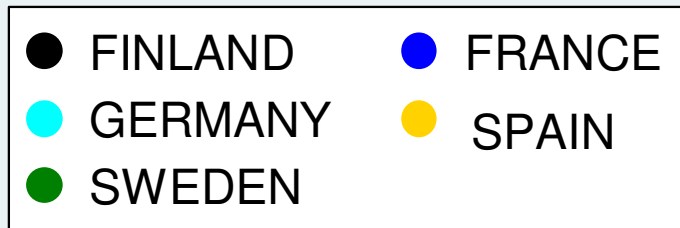
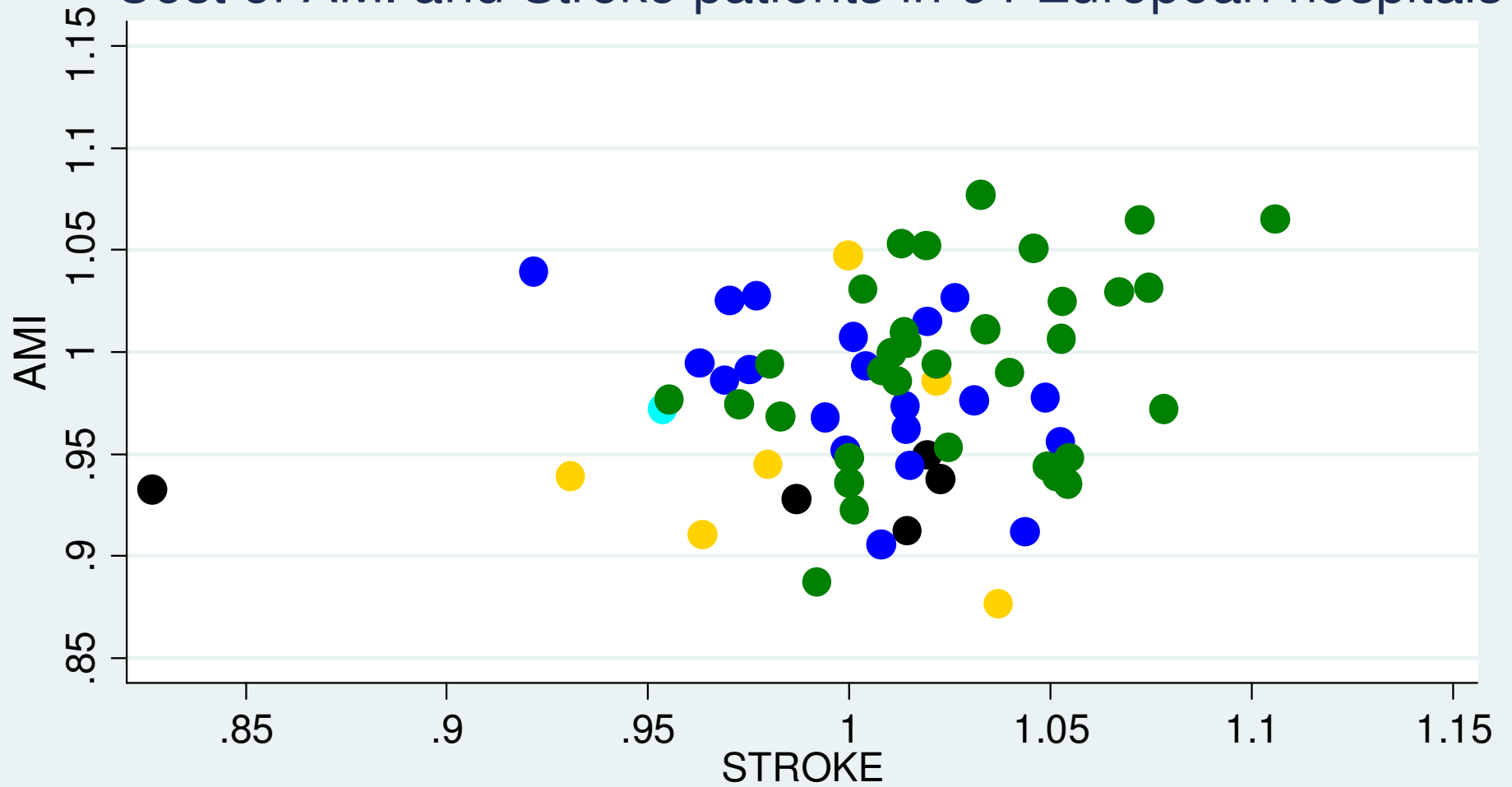
Quality of stroke patients in 94 European hospitals, marginal effects and their confidence intervals



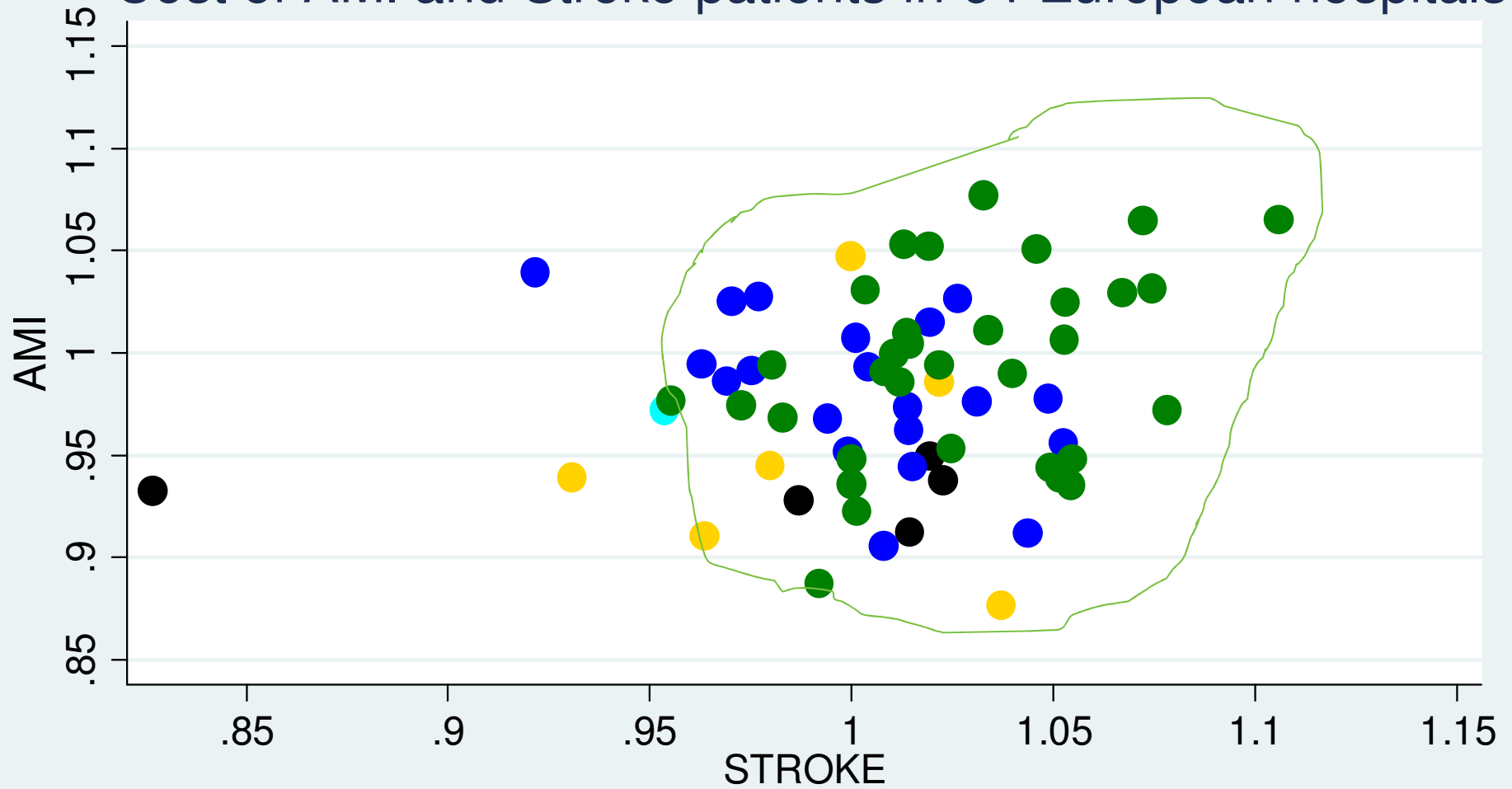
Cost and quality of stroke patients in 94 European hospitals



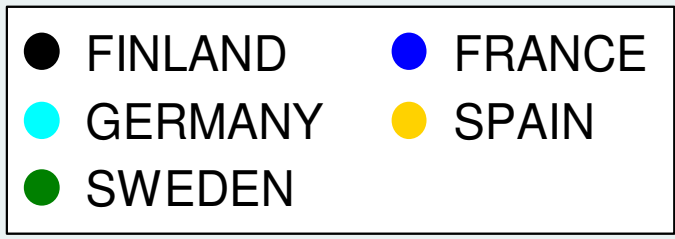
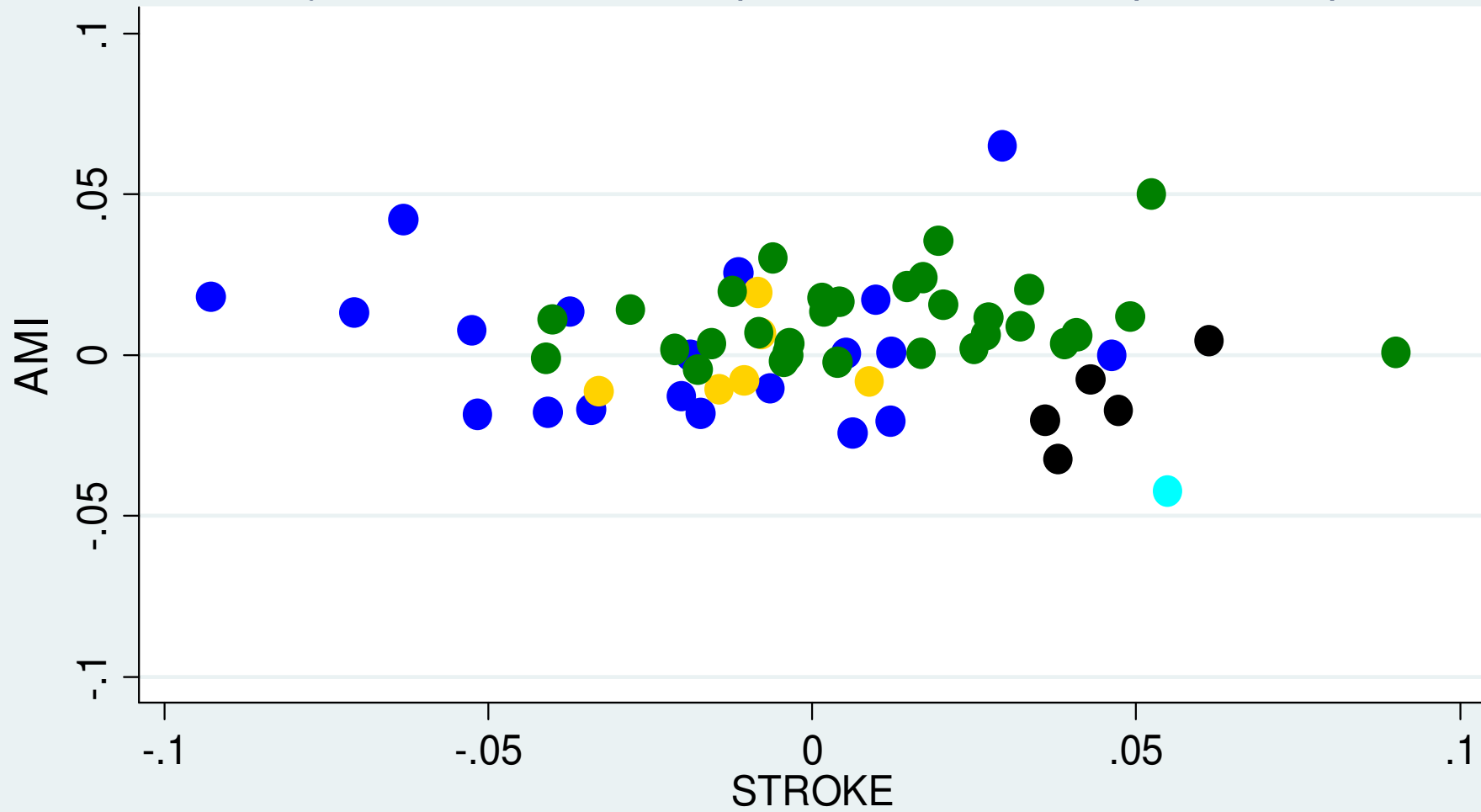
Cost of AMI and Stroke patients in 64 European hospitals



Cost of AMI and Stroke patients in 64 European hospitals



Quality of AMI and Stroke patients in 64 European hospitals



Limitations

The results only indicative:

- Not possible to follow patients for equally long times
- The risk adjustment crude: more information on co-morbidity and severity of patients
- Not possible to control patients previous use of services



Conclusions

No clear relation between cost and quality within countries

- ➔ We found no evidence that cost control included in DRG system does worsen quality
- ➔ Potential for improving performance by containing cost or improving quality/outcome.

Important to include quality into payment systems

Quality high in Sweden in both diseases, France in AMI and German in Stroke.

