



*Diagnosis-Related
Groups in Europe:
Towards Efficiency
and Quality*

Performance of DRG systems across Europe: a quantitative assessment

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- Classification system for describing hospital activity
 - Different DRG systems across Europe
 - Different patient classification for relatively standardised “procedure & treatments”
- Payment mechanism to reimburse hospitals
 - Transparent funding with price set in advance
 - Same price paid for all patients in the same DRG
 - Assumes cost variation between patients classified to the same DRG is random or due to hospital inefficiency

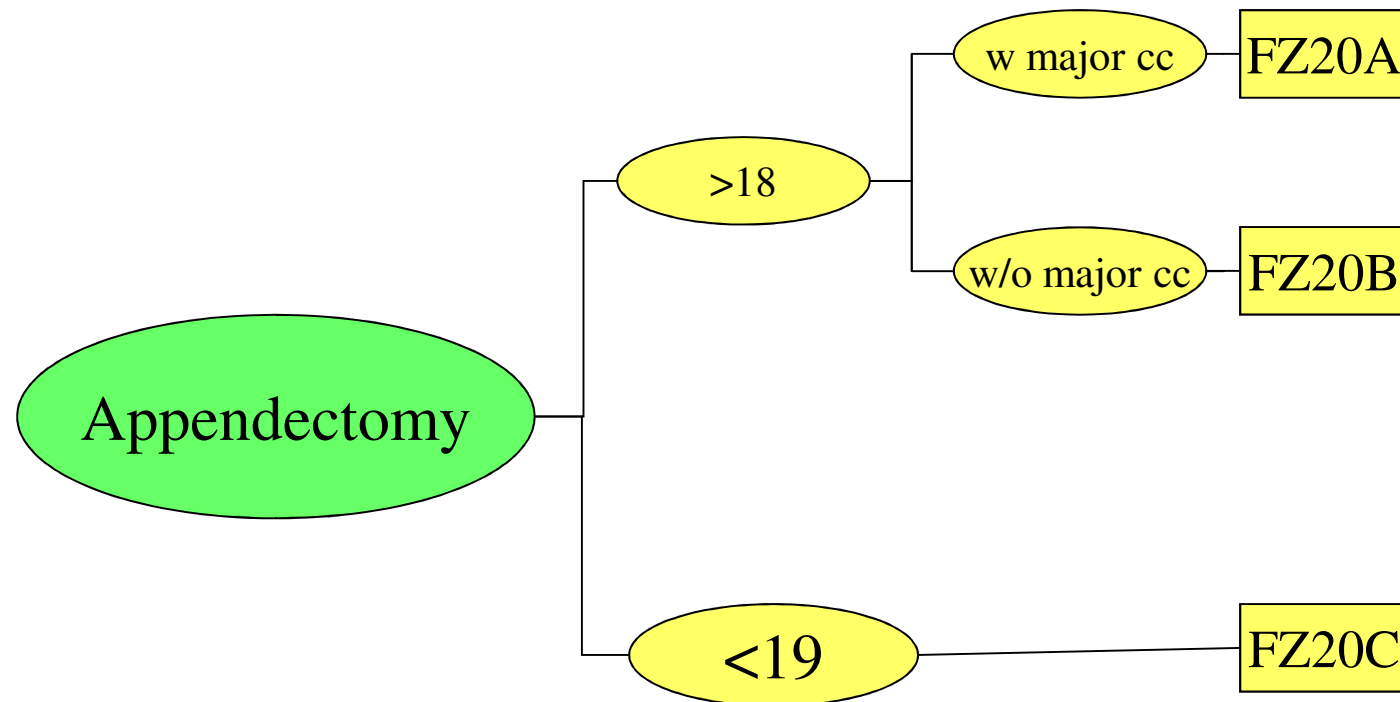


- But what if the actual cost of treating a patient differs systematically from the price paid?
 - Systematic variation due to inadequate accounting for patient characteristics (DRG classifications too crude to adequately account for all patient characteristic)
 - Due to quality of care provided
 - Hospital characteristics beyond its control
- Challenge is to ensure that DRGs pay for good quality effective care and not for inefficiency /bad practice

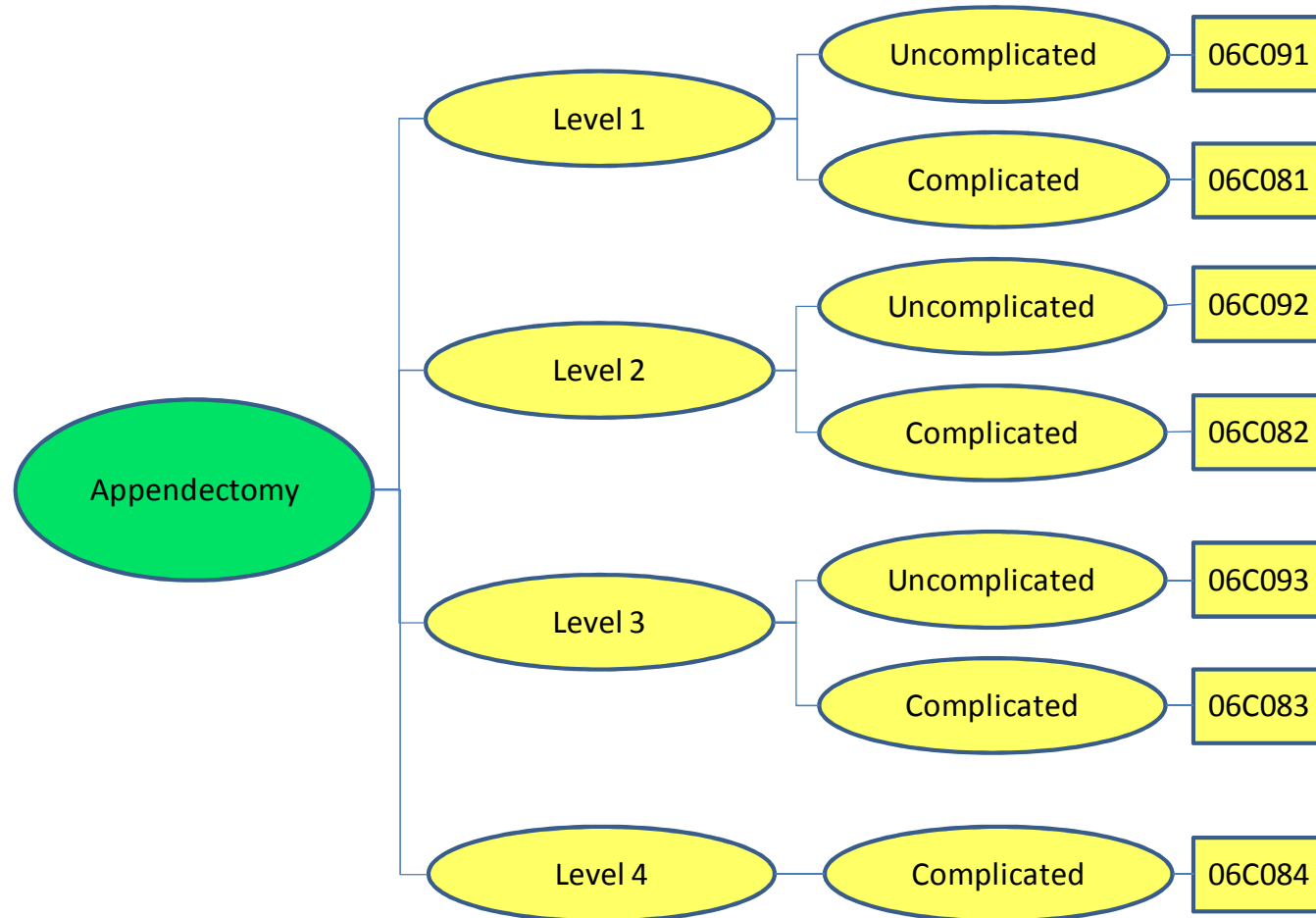


	<i>No of DRG covering 99% of cases</i>	<i>% of "vaginal delivery w/o cc." (= DRG1)</i>
<i>Austria*</i>	3	65,1
<i>England</i>	7	53,5
<i>Estonia</i>	4	70,6
<i>Finland</i>	6	68,2
<i>France (LOS)</i>	6	68,7
<i>Germany</i>	7	51,8
<i>Ireland**</i>	5	53,6
<i>Netherlands</i>	3	70,2
<i>Poland</i>	3	90,1
<i>Spain (LOS)</i>	5	59,9
<i>Sweden</i>	4	66,2

English DRGs



French DRGs (V11)





- Establish why/how costs vary for patients who are receiving the same treatment within & across countries
- Examine how well the DRG classifications used in each country explain the variations in resource use for patients having the same treatment (episode of care)
- Explore which adjustment factors explain variation in costs per country:
 - The DRG to which they are allocated
 - Diagnostic characteristics and co-morbidities
 - Socio-demographic characteristics of the patients
 - Quality (adverse events)
 - The hospital in which they are treated



- Analysis of routinely collected patient-level data for 2007/8 in 10 countries (national or reduced cost databases)
 - Costs (or length of stay) for all patients having the particular episode of care
 - Diagnostic and treatment details for all these patients

- Samples vary widely across episodes and countries

- Appendectomy sample :
 - Patients: range: 1,500 (Finland) to 85,300 (France)
 - Hospitals: range: 5 (Finland) to 829 (France)
 - mean length of stay: 3.8 days
 - range 1.9 (Finland) to 5.1 (Germany)

Methods: stage 1

- Why do some patients have different costs/LoS than others?
- Analysis of cost of patients for a given episode:
- Two-stage model recognising patients are clustered in hospitals

$$y_{ij} = \alpha + \sum_{n=1}^N \beta_n x_{ij} + u_j + \varepsilon_{ij}$$

1. Log cost patient i in hospital j
2. LOS for patient i in hospital j

Patient characteristics;
DRGs

Hospital effect

First stage models (X_{ij})

- **Model 1.** Just with DRGs.

 - **Model 2.** Patient characteristics
age + totdiag+ totproc + emergency + trans_in + trans_out + deceased +
adopted Charlson index (0, 1, 2) + episode specific variables (eg.
laparoscopy) + quality (infections, adverse events)

 - **Model 3.** DRG + Patient characteristics + quality
- *10 episodes x 10 countries*

Methods: Stage 2

- Why is the average cost of treating patients in one hospital higher than in another?
 - Factors influencing costs over and above the patient characteristics

$$\hat{u}_j = \alpha_o + \sum_{m=1}^M \gamma_m z_j + \mu_j$$

↑
Estimated fixed effect for
hospital j

↑
Hospital characteristics
Eg. activity volume, teaching status,
ownership, specialisation, quality

- Are the results coherent across cost and LoS analysis?
- Do DRGs perform better than our patient level variables?
- How does the capacity of the DRGs to explain variations in cost/LoS vary across countries?
- How does the capacity of DRGs to explain variations in cost/LoS vary across episodes of care?

Ongoing work...

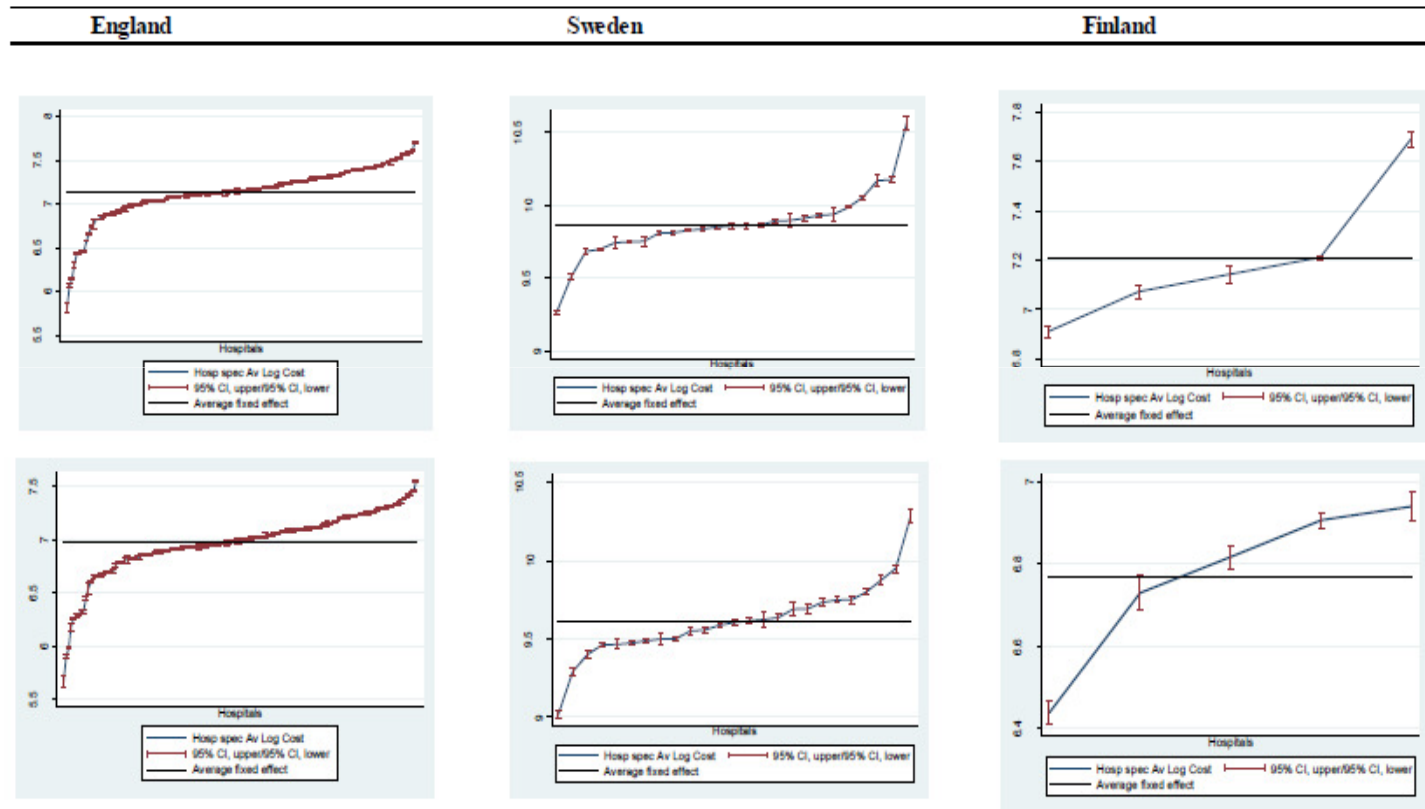
Appendectomy- overview of 1st stage results

	Length of stay (N=6)	Cost (N=7)
Total number diagnoses	More diagnoses ➤ sig longer LOS (6/6)	More diagnoses ➤ sig higher cost (7/7)
Total number procedures	More procedures ➤ sig longer LOS (6/6)	More procedures ➤ sig higher cost (7/7)
Transfers in	➤ sig longer LOS (2/6)	➤ sig higher cost (3/7) ➤ sig lower cost (1/7)
Transfers out	➤ sig shorter LOS (1/6) Ireland	➤ no significant effect (7/7)
Emergency admissions	➤ sig longer LOS (4/6)	➤ sig higher cost (3/7)
Death in hospital	sig shorter LOS (3/6)	➤ sig higher cost (3/7)

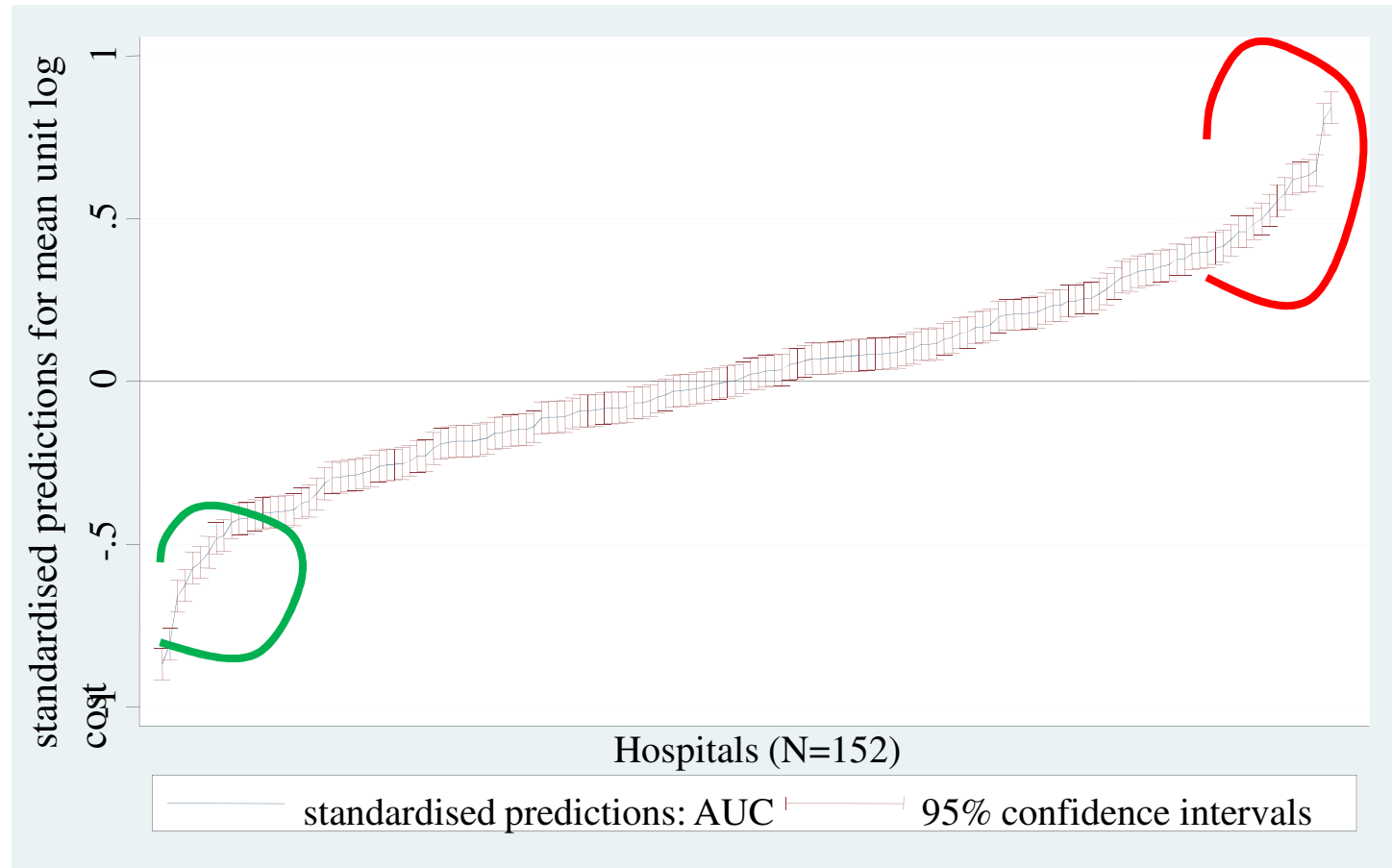
Appendectomy- overview of 1st stage results

DEP VAR	Country	M1 - DRGs	M3 - full	M2 – pat. char.	% Δ M1 - M3	% Δ M2 - M3	N
Length of Stay [pseudo R ²]	Austria	0.038	0.074	0.072	95%	3%	13,202
	France	0.096	0.113	0.084	18%	35%	85,295
	Ireland	0.055	0.091	0.086	65%	6%	5,813
	Poland	0.085	0.105	0.093	24%	13%	31,105
	Spain	0.137	0.177	0.143	29%	24%	5,807
	Sweden	0.086	0.106	0.060	23%	77%	5,609
COST [r ² _a]	England	0.617	0.644	0.609	4%	6%	33,435
	Estonia	0.487	0.614	0.430	26%	43%	2,113
	Finland	0.317	0.507	0.474	60%	7%	1,480
	France	0.581	0.665	0.585	14%	14%	9,948
	Germany	0.372	0.527	0.469	42%	12%	2,451
	Spain	0.252	0.316	0.247	25%	28%	1,825
	Sweden	0.450	0.485	0.424	8%	14%	5,609

Appendectomy: Standardised predicted mean hospital cost across countries



Standardised predicted mean hospital log cost (England)





- Both the number of reimbursement (DRG) categories used and factors for which payments are adjusted vary significantly (even for standard procedures)
- Capacity of DRGs to explain costs varies significantly across countries
- Using a high number DRGs does not always improve cost description
- Some patient characteristics (age, no of diagnoses) appear to have an impact on costs over and above DRGs in all countries
- In some countries DRGs compensate generously for adverse events which are due to bad care quality