



8th European Conference on Health Economics

# From *HealthBASKET* to *EuroDRG*: Background and objectives of the *EuroDRG* project

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&

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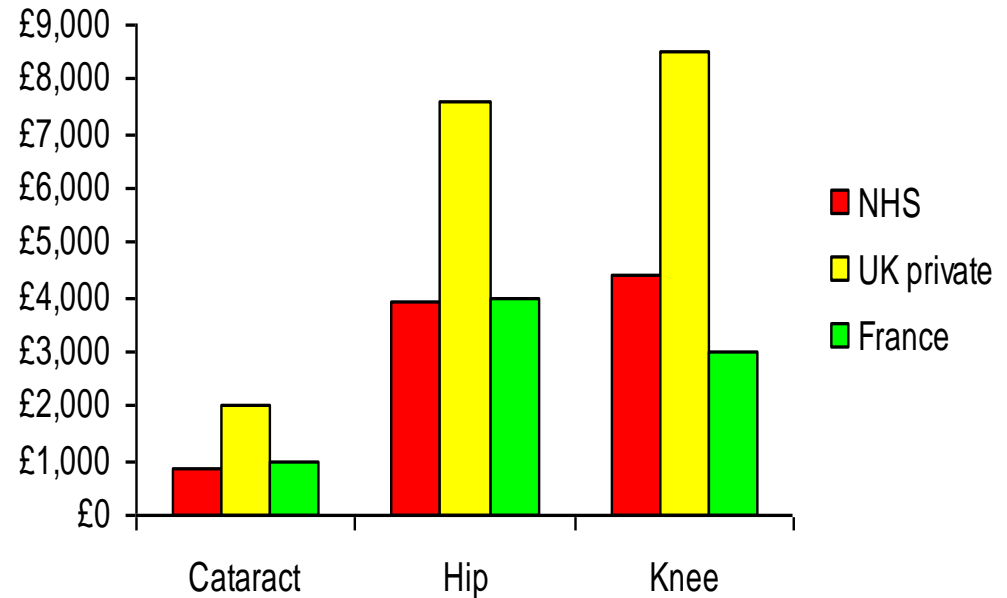
European  
**Observatory**   
on Health Systems and Policies

# How I got interested in DRGs (2002)

- **A policy question in the 6th EU Framework Programme:**  
Why do costs of health services differ among EU countries at the micro level?



The first nine patients sent to France by the English NHS (not shown: the 40 journalists who accompanied them)



Are these data realistic?  
Are they representative?  
How can the differences be explained?

## Research questions in our successful HealthBASKET bid:

1. What is a “health service“ and how is it defined?  
(Phase I -> suppl. *European Journal Health Economics* 2005)
2. How are prices (and underlying costs) calculated per service? (Phase II -> special issue on DRGs *Health Care Management Science* 2006)
3. Are differences in prices/ reimbursement rates (for similar patients) explained by systematic factors (e.g. in/exclusion of capital costs), differences in service intensity/ technologies used or costs per service?  
(Phase III -> suppl. *Health Economics* 2008)

## Phase III Methodology

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- 10 case vignettes (“service packages”) were designed around episodes of care
  - To ensure homogeneity within case vignettes (*i.e. to avoid risk adjustment*), health status and indication of each patient was defined in detail for each vignette
  - To ensure comparability across vignettes, each was divided into detailed path components e.g. diagnostic procedures, care before operation etc.
  - Partners in each country documented technology use, service intensity and costs (prices) for case vignettes with data from at least 5 representative providers
- Costs (and prices) compared and differences analysed

Female, 65-75 years old, with hip osteoarthritis requiring hip replacement because of considerable impairment is finally (after waiting time if normal in the hospital) admitted for her first hip replacement (one side).

(= standardised severity)

The patient is without co-morbidity (i.e. expensive drugs due to treating co-morbidity should be excluded), the surgeon uses the most frequently used implant for female patients; the operation is without severe complications

(= standardised outcome)

End of case vignette: discharge  
(home or *to separate rehabilitation institution*).

Phase	Elements	Units	No. of units used/patient	Unit Cost	Total costs
	<b>Example: Hip replacement</b>				
Pre-operative (admission and planning)	<i>Diagnostic Procedures</i>				
	Imaging (e.g. X-Ray)	No.			
	Imaging (e.g. ultrasound)	No.			
	Imaging (e.g. CT)	No.			
	Laboratory (e.g. blood count)	No.			
	Laboratory (e.g. blood coagulation, C-reactive protein (CRP), etc.)	No.			
	Other (ECG, lung-function, etc.)	No.			
	<i>Care before OP</i>				
	Surgeon/Physician input	Patient days*			
	Nursing input	Patient days			
	Other (paramedical)	Patient days			
	<i>Drugs, infusions, injections, etc. Drug A, Drug B, etc.</i>	DD**			
Operation	<i>Devices (type of implant, stent, etc.) total price paid by hospital</i>	No.			
	OP-Team (altogether or separately)	Min.			
	Surgeon	Min.			
	Anaesthetist	Min.			
	OP-nurses etc.	Min.			
	Drugs (anaesthetics, other?)	DD			
	OP-Theatre running costs (e.g. sterilisation)***	Min.			
Wake-up room****					
Post-operative	<i>Intensive Care Unit</i>				
	Surgeon/Physician	Patient days			
	Nursing	Patient days			
	Other	Patient days			
	Drugs	DD**			
	Diagnostic Procedures (e.g. imaging, laboratory)	No.			
	Therapeutic Procedures (e.g. punctures, drainages, special wound dressing)	No.			
	<i>Normal Ward</i>				

## Example: Hip replacement

Table 2: Total cost, cost components and reimbursement of total hip replacement

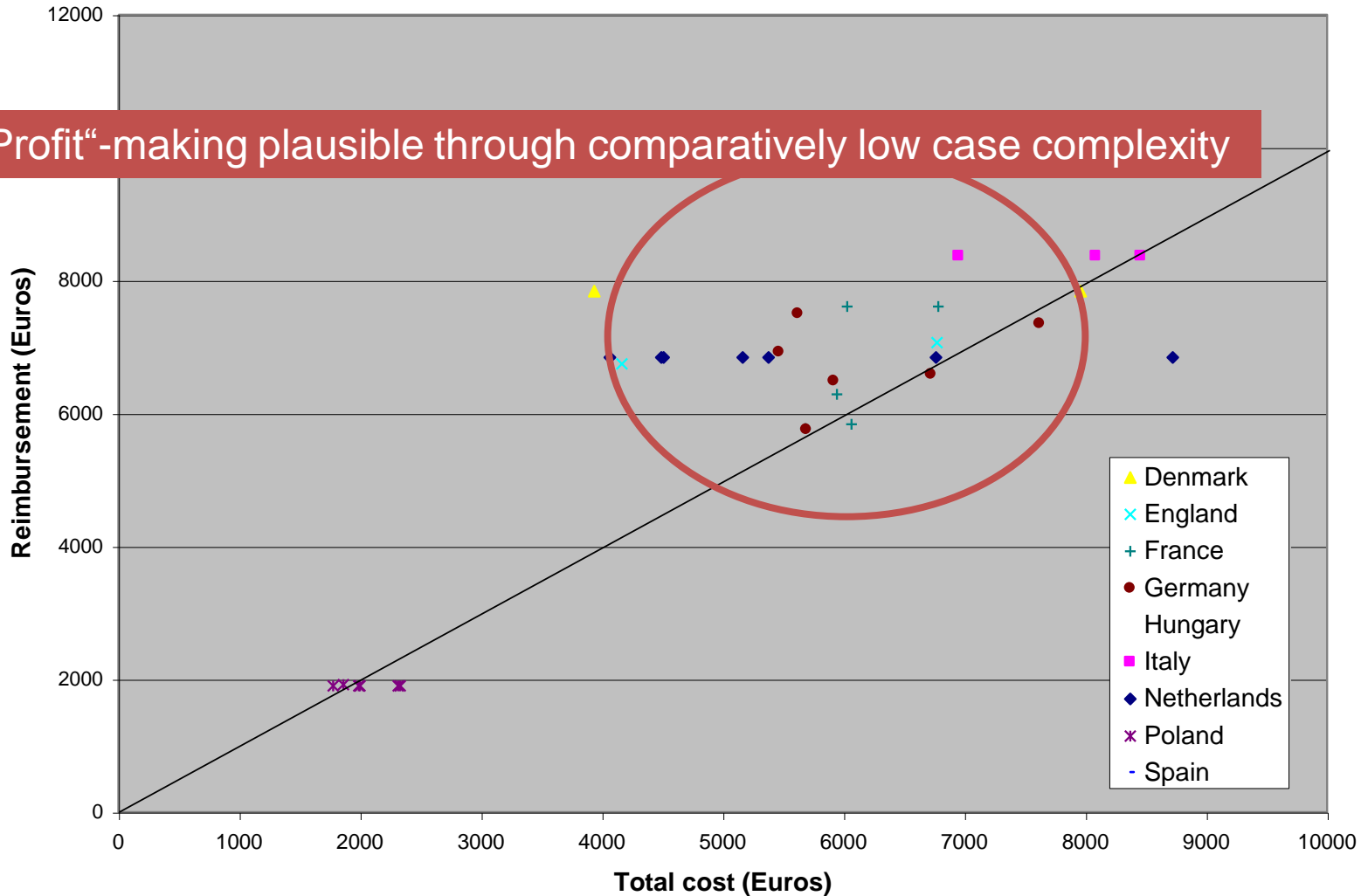
	Denmark	England	France	Germany	Hungary	Italy	Netherlands	Poland	Spain
<b>Diagnostic Procedures</b>									
- Imaging	€ 141.00	€ 87.95	€ 60.01	€ 79.83	€ 7.82	€ 63.37	€ 32.90	€ 33.80	€ 42.53
- Laboratory	€ 35.01	€ 5.74	€ 100.58	€ 137.00	€ 10.02	€ 58.42	€ 45.12	€ 14.00	€ 54.62
- Other	a)	€ 6.22	€ 0.00	€ 107.39	€ 2.87	€ 18.06	€ 19.07	€ 15.30	€ 2.52
<b>Normal/Intensive Ward</b>									
- Physician	€ 18.04	€ 450.88	€ 88.80	€ 414.40	€ 135.49	€ 171.90	a)	€ 236.62	€ 203.67
- Nursing	€ 470.98	€ 1,237.22	€ 428.14	€ 1,167.56	€ 341.15	€ 104.58	€ 538.40	€ 192.42	€ 278.19
- Other Staff	€ 111.37	€ 274.78	€ 193.11	€ 249.24	€ 0.51	€ 78.00	€ 189.64	€ 45.97	€ 0.00
- Material	a)	a)	€ 6.40	€ 129.46	a)	€ 5.78	a)	€ 16.75	€ 1.27
<b>Operation (including wake-up room)</b>									
- Anaesthetist / Surgeon	€ 202.04	€ 534.55	€ 728.15	€ 596.34	€ 93.25	€ 228.51	€ 669.47	€ 52.08	€ 400.16
- Nursing	€ 136.90	€ 123.47	€ 171.78	€ 283.77	€ 18.53	€ 99.57	€ 200.50	€ 9.64	€ 108.69
- Other Staff	€ 42.52	€ 0.00	€ 44.75	€ 133.18	a)	€ 11.42	€ 177.69	€ 0.00	€ 0.00
- Implant	a)	€ 657.50	€ 1,852.24	€ 963.46	€ 481.75	€ 3,416.05	€ 1,825.00	€ 978.38	€ 1,780.00
- Material	€ 115.61	€ 106.63	€ 154.54	€ 249.13	a)	€ 22.31	a)	€ 35.00	€ 0.18
<b>Drugs</b>	€ 59.63	€ 571.28	€ 60.99	€ 178.85	€ 72.50	€ 74.30	€ 104.12	€ 175.13	€ 46.20
<b>Overhead</b>	€ 4,599.14	€ 1,634.72	€ 2,211.60	€ 1,675.59	€ 129.92	€ 2,629.63	€ 1,803.01	€ 320.27	€ 680.99
<b>% overhead of total</b>	<b>77.5%</b>	<b>28.7%</b>	<b>36.2%</b>	<b>26.3%</b>	<b>10.0%</b>	<b>37.7%</b>	<b>32.2%</b>	<b>15.1%</b>	<b>18.9%</b>
<b>TOTAL COST</b>	<b>€ 5,932.24</b>	<b>€ 5,690.94</b>	<b>€ 6,101.09</b>	<b>€ 6,365.20</b>	<b>€ 1,293.81</b>	<b>€ 6,981.90</b>	<b>€ 5,604.92</b>	<b>€ 2,125.36</b>	<b>€ 3,599.02</b>
<b>Total cost (adjusted by PPP)</b>	<b>€ 4,401.10</b>	<b>€ 5,273.78</b>	<b>€ 5,679.66</b>	<b>€ 6,047.12</b>	<b>€ 2,147.05</b>	<b>€ 6,795.04</b>	<b>€ 5,328.38</b>	<b>€ 3,861.48</b>	<b>€ 3,964.99</b>
<b>Reimbursement</b>	€ 7,840.00	€ 6,905.45	€ 6,622.14	€ 6,767.36	€ 1,794.93	€ 8,963.60	€ 6,842.00	€ 1,903.17	b)

a) subsumed in overhead costs

b) hospitals are receive budget. It only partly depends on the number of cases treated.

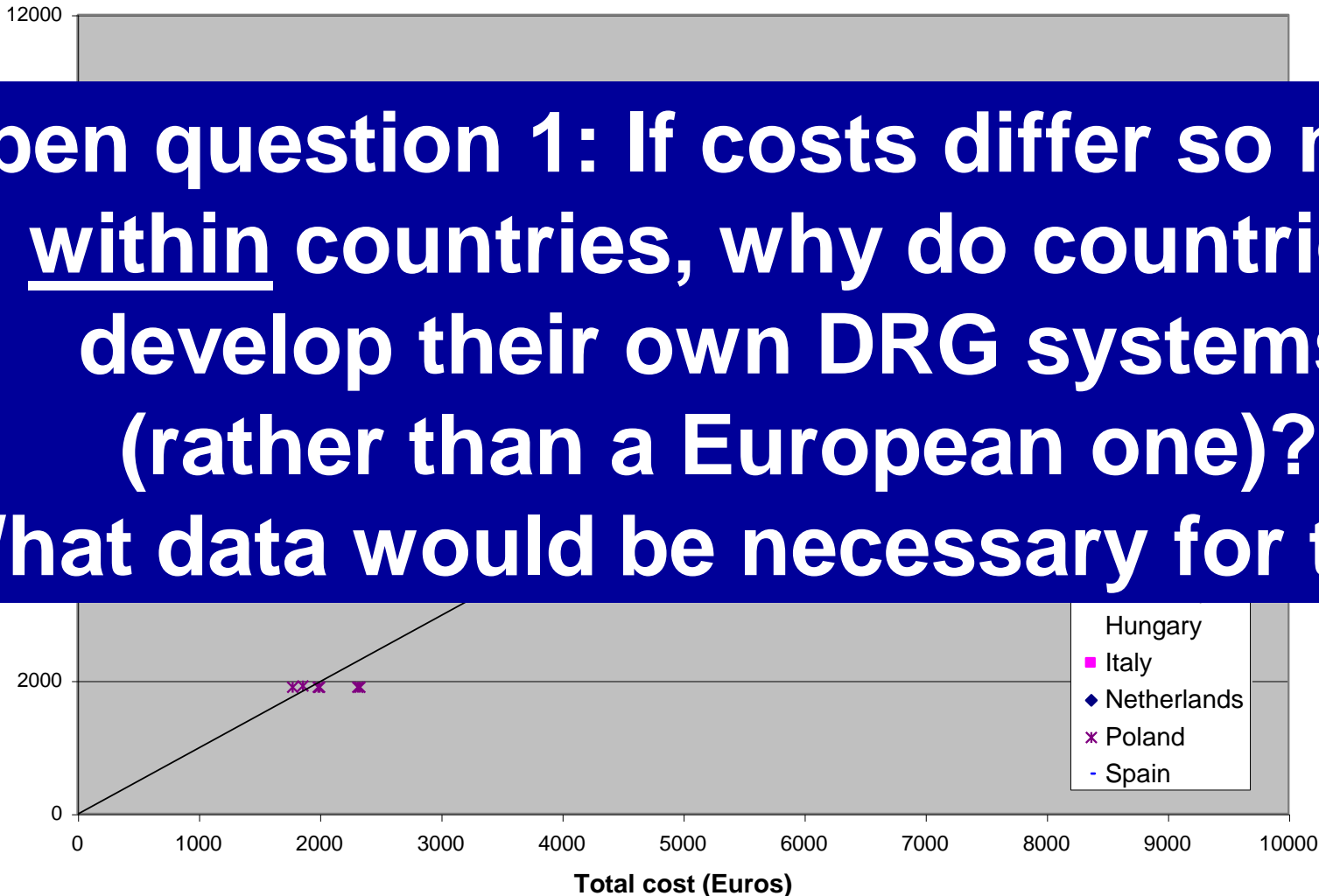
# Example: Hip replacement

“Profit”-making plausible through comparatively low case complexity

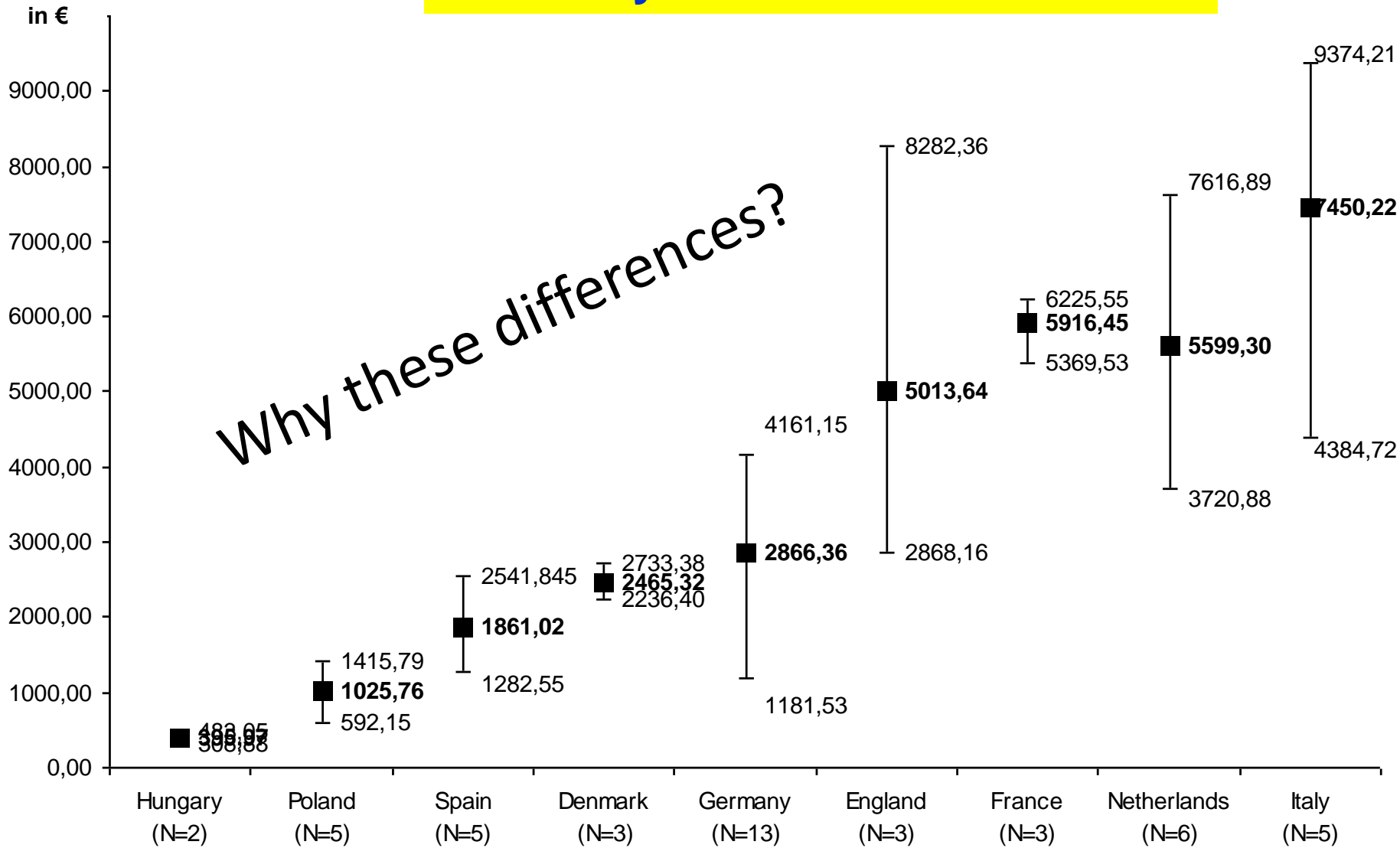


**Example: Hip replacement**

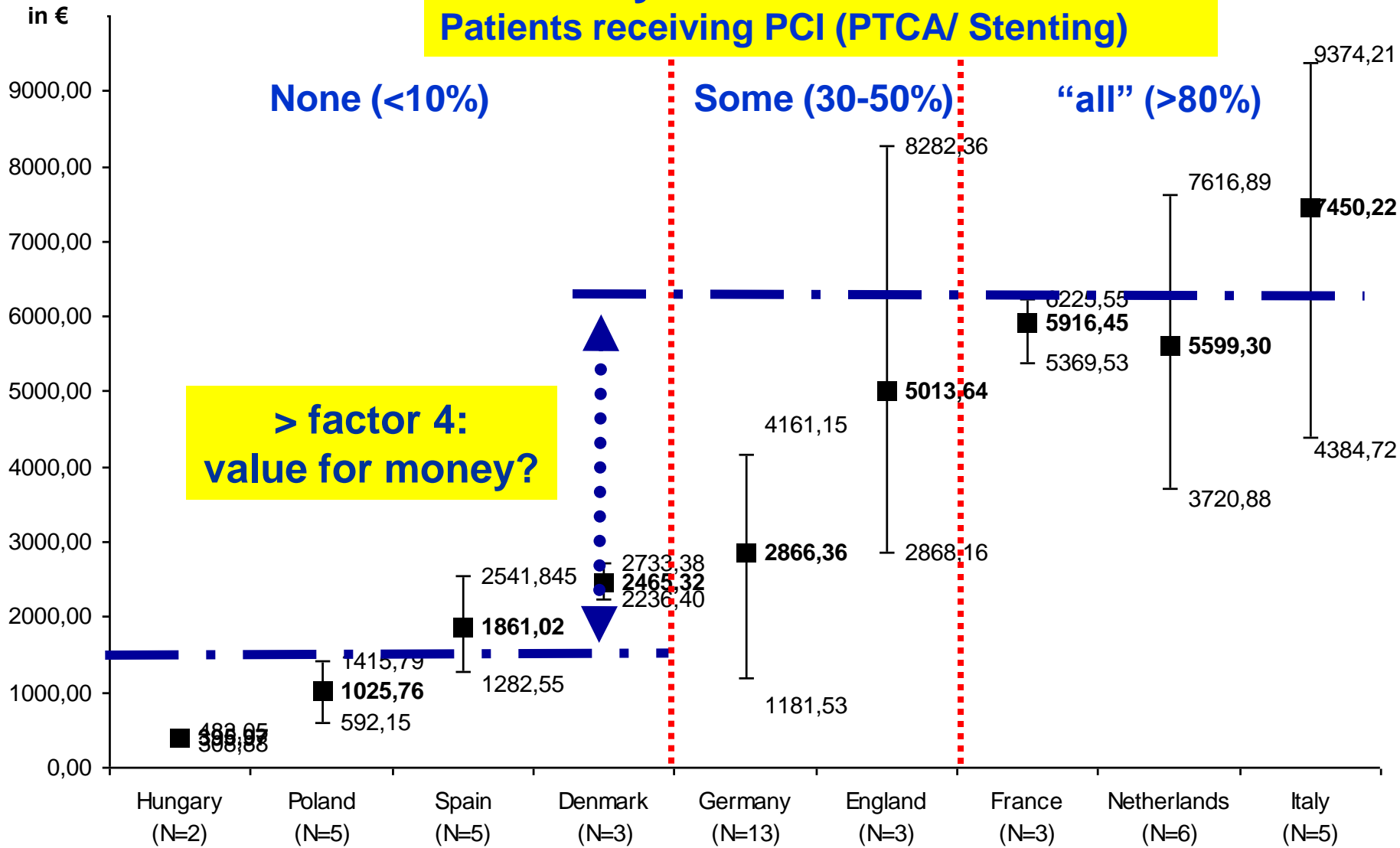
**Open question 1: If costs differ so much within countries, why do countries develop their own DRG systems (rather than a European one)? What data would be necessary for this?**



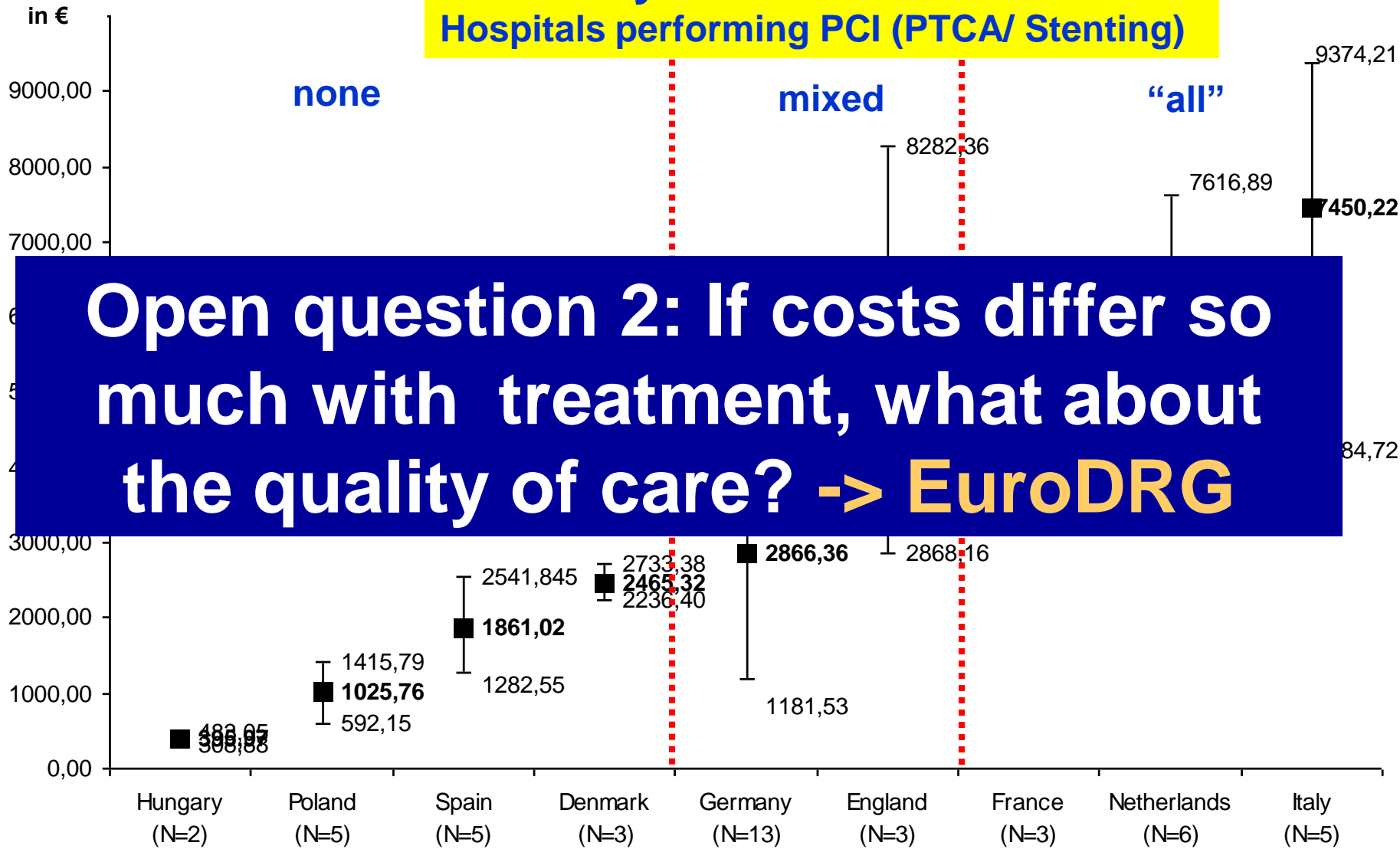
# Acute myocardial infarction



**Acute myocardial infarction:  
Patients receiving PCI (PTCA/ Stenting)**



**Acute myocardial infarction:  
Hospitals performing PCI (PTCA/ Stenting)**



## → Definition of homogeneous cost categories

- material costs
- drug costs
- physician costs
- nursing costs
- costs related to diagnostic procedures

Constitute  
> 50% of  
total costs

Care episode	Country								Average
	Germany	England	France	Hungary	Italy	Netherlands	Poland	Spain	
<i>Hip</i>	0.68	0.66	0.60	0.90	0.61	0.61	0.83	0.81	0.71
<i>AMI</i>	0.73	0.68	0.74	0.76	0.55	0.85	0.73	0.74	0.72
<i>Appendectomy</i>	0.64	0.41	0.39	0.68	0.45	0.62	0.46	0.76	0.55
<i>Delivery</i>	0.78	0.43	0.39	0.40	0.34	0.64	0.63	0.78	0.55
<i>Stroke</i>	0.64	0.32	0.52	0.52	0.34	0.39	0.57	0.76	0.51

# Average adjusted costs per case by country and care episode

Care episode/ Conversion approach	Country							
	Germany	England	France	Hungary	Italy	Netherlands	Poland	Spain
<i>Hip</i>								
Exchange rate	6,365	5,691	6,101	1,294	6,982	5,605	2,125	3,599
GDP per head	6,365	5,372	5,985	4,251	7,771	5,016	9,866	4,929
GDP PPP	6,365	5,551	5,979	2,260	7,152	5,609	4,065	4,174
Medical care PPP	6,365	5,146	6,245	2,782	5,709	5,633	5,121	4,269
ESPPP	6,365	5,646	7,880	4,979	6,924	7,687	5,334	5,770
<i>AMI</i>								
Exchange rate	2,866	5,014	5,916	396	7,450	5,599	1,026	1,861
GDP per head	2,866	4,732	5,803	1,301	8,292	5,011	4,762	2,549
GDP PPP	2,866	4,891	5,798	692	7,632	5,603	1,962	2,158
Medical care PPP	2,866	4,533	6,056	852	6,092	5,627	2,472	2,208
ESPPP	2,866	2,403	2,728	2,060	4,804	2,481	2,154	2,006
<i>Appendectomy</i>								
Exchange rate	1,922	2,037	2,027	469	1,632	1,898	466	594
GDP per head	1,922	1,923	1,988	1,541	1,816	1,698	2,164	813
GDP PPP	1,922	1,987	1,986	819	1,672	1,899	891	688
Medical care PPP	1,922	1,842	2,074	1,008	1,334	1,907	1,123	704
ESPPP	1,922	2,203	2,872	1,362	2,246	1,979	2,429	1,454
<i>Delivery</i>								
Exchange rate	2,365	1,638	2,107	342	1,534	762	400	572
GDP per head	2,365	1,546	2,067	1,124	1,707	682	1,857	783
GDP PPP	2,365	1,598	2,065	597	1,571	763	765	663
Medical care PPP	2,365	1,481	2,157	735	1,254	766	964	679
ESPPP	2,365	3,868	4,751	5,239	4,226	2,552	2,538	2,257
<i>Stroke</i>								
Exchange rate	3,456	6,123	4,337	628	4,588	6,872	1,238	1,932
GDP per head	3,456	5,779	4,255	2,065	5,106	6,150	5,746	2,645
GDP PPP	3,456	5,972	4,250	1,098	4,700	6,877	2,367	2,240
Medical care PPP	3,456	5,536	4,440	1,352	3,751	6,907	2,983	2,291
ESPPP	3,456	5,378	3,859	3,220	5,072	4,473	3,337	2,486

**Open question 3: Does this adjustment hold with better data? Euro-DRG:**

**(1) routine cost and activity data for broader patient categories and  
(2) hospital benchmarking club.**

**If yes, has more emphasis to be put on exogeneous factors (such as wages) when using DRGs for reimbursement? Could this lead to a European system with differing base rates (as in US)?**

	3,456	5,972	4,250	1,098	4,700	6,877	2,367	2,240
GDP PPP	3,456	5,972	4,250	1,098	4,700	6,877	2,367	2,240
Medical care PPP	3,456	5,536	4,440	1,352	3,751	6,907	2,983	2,291
ESPPP	3,456	5,378	3,859	3,220	5,072	4,473	3,337	2,486



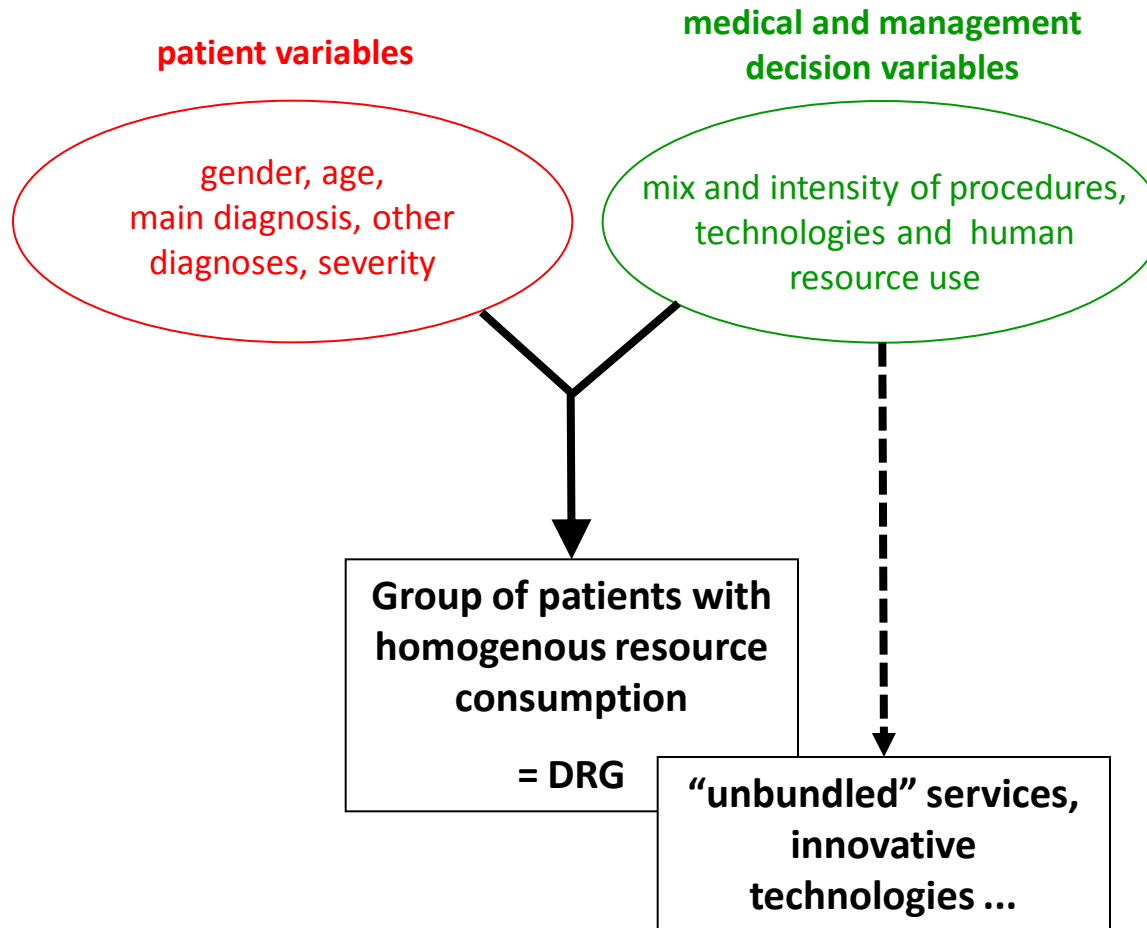
**... taking up the open questions, based on the observation that costs differ due to three groups of factors:**

- (1) Patient characteristics, i.e. main diagnosis, age, sex, secondary diagnoses (upon admission)
- (2) Medical/ treatment variables, i.e. procedures/ technologies used, type of ward (e.g. intensive care), intensity of inputs (e.g. personnel), length of stay, secondary diagnoses (-> complications)  
between (2) and (3): activity levels
- (3) Exogenous factors
  - at hospital level: size (beds, personnel), emergency room, teaching status
  - at regional/national level: wage level, costs of other inputs



Countries in (HealthBASKET and) EuroDRG projects

# Understanding the role of the 3 factors in cost differences and price setting (1)



# Understanding the role of the 3 factors in cost differences and price setting (2)

patient variables

medical and management  
decision variables

gender, age,  
main diagnosis, other  
diagnoses, severity

mix and intensity of procedures,  
technologies and human  
resource use

DRG  
reimbursement

=

cost weight

adjusted for actual  
costs/ length of stay

+

additional payments

# Understanding the role of the 3 factors in cost differences and price setting (3)

**patient variables**

**medical and management  
decision variables**

**structural variables on  
hospital/ regional/  
national level**

gender, age,  
main diagnosis, other  
diagnoses, severity

mix and intensity of procedures,  
technologies and human  
resource use

e.g. size, teaching status;  
urbanity; wage level

**DRG  
reimbursement**

=

**cost weight**

**adjusted for actual  
costs/ length of stay**

+

**additional payments**

X

**base rate**

*adjusted for quality*

## Phase I (2009 until now)

- Description of DRG systems, updates and usage for patient classification and reimbursement across countries
  - Detailed description of grouping algorithm and cost weights for 10 episodes of care
  - Analysis of commonalities and differences
  - Literature review on effects in regard to quality and efficiency
- Book on DRGs in Europe (Open University Press early 2011) with chapters on patient classification systems, cost accounting, DRGs for reimbursement/ avoiding unintended consequences, efficiency, quality, innovations in DRG systems + country chapters



## determinants of hospital costs for 10 episodes of care

patient variables

medical and management decision variables

structural variables on hospital/ regional/ national level

gender, age, main diagnosis, other diagnoses, severity

intensity of procedures, technologies and human resource use

e.g. size, status; wage level

**Phase II (2010): within countries**

**Phase III (2011): across countries**

DRG reimbursement

=

cost weight

adjusted for actual costs/ length of stay

+

additional payments

X

base rate

*adjusted for quality*

**“Hospital Benchmarking Club” – start 1.7. at EHMA conference in Lahti**

**DRGs and quality**

Final conference regarding policy conclusions in November 2011 in Berlin:

- Are hospital services and costs across European countries really so different to justify different systems for patient classification and cost weights? Could cost differences not be handled through base rate adjustments (as in the US)?
- What do we know regarding the effects on hospital efficiency and quality of service delivery under DRGs?



[www.eurodrg.eu](http://www.eurodrg.eu)