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General Internists at the hospital: cost saving or big spenders?

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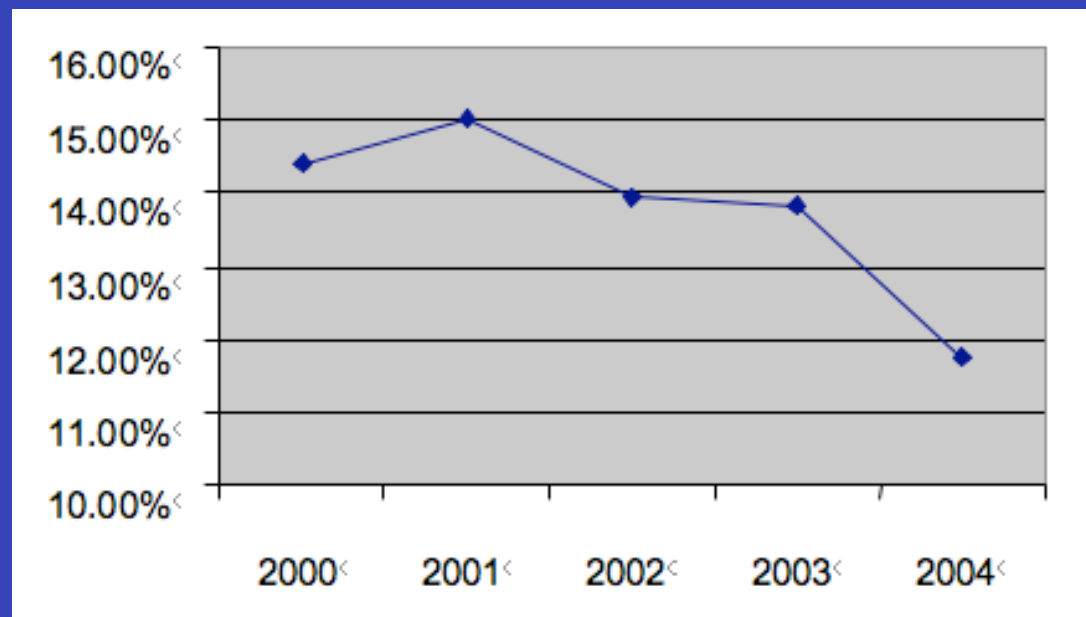
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Motivation

- Fact: decreasing relative number of specialists in internal medicine
- Question: how should we assess this trend?



Motivation

- Common perception:
 - internal medicine services are expensive within the hospital
 - based on simple indicators, not controlling for complexity
- Rephrasing question:
 - Are specialists of internal medicine big spenders or cost savers, after accounting for the patients' initial condition?

Methodology

- Retrospective analysis
- Two sources of data/two levels of analysis
 - Aggregate hospital information (2003-2005): costs, % internal medicine specialists, activity (discharges, emergency room episodes and external consultations), case-mix, etc...
 - DRG data (2005): length of stay, mortality, age, admission codes, procedures
- Statistical approach
 - Cost frontier estimation at the hospital level
 - Matching estimator approach at the DRG level

Analysis at the hospital level

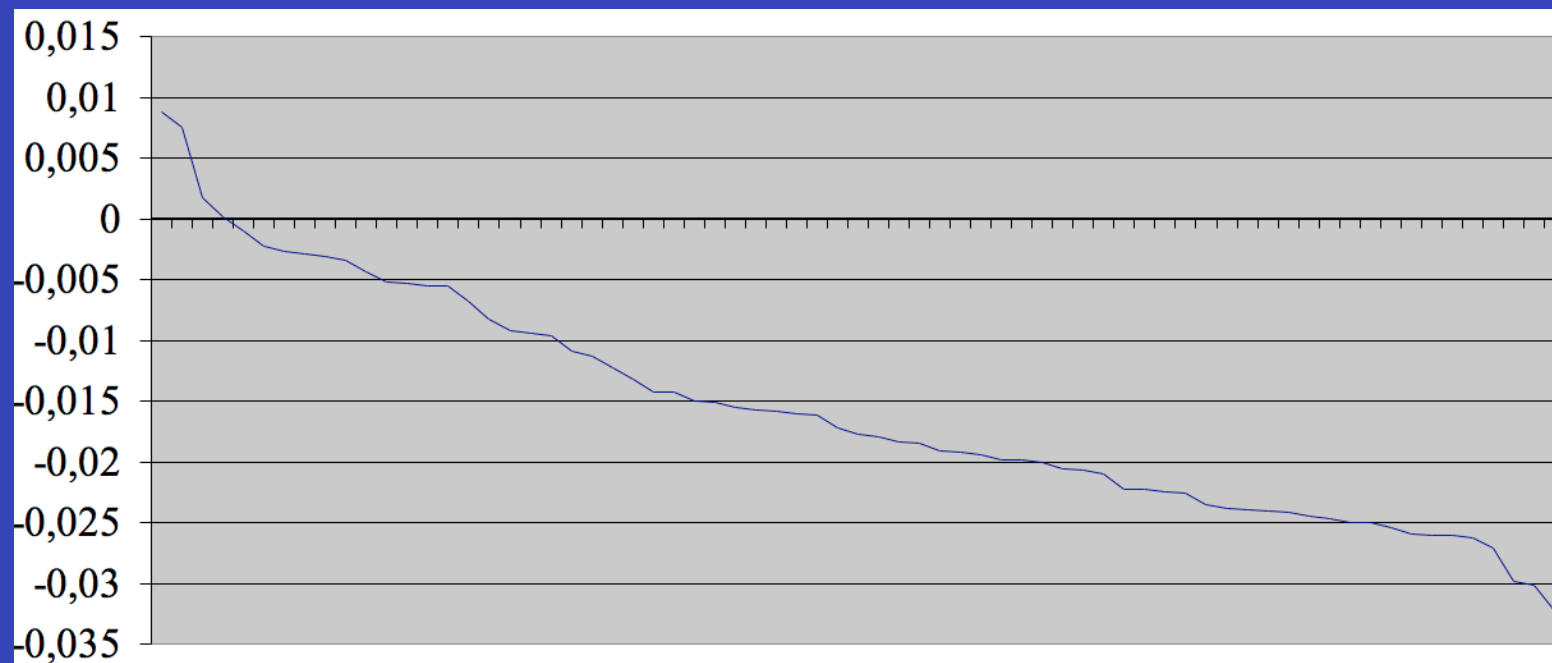
- Stochastic cost frontier
 - Dependent variable: operating cost
 - Explanatory variables: outputs, case-mix, teaching hospital, inputs price index, yearly dummy variables, % internal medicine specialists (also interacted with total number of discharges)
- *Interpretation:* A negative coefficient means that hospitals with a higher role for internal medicine have lower costs, for the same output and case-mix variables.

Results at the hospital level

- Coefficient of “% internal medicine specialists” is positive and statistically significant
- BUT
- Coefficient of interaction term with total number of patients discharged is negative and statistically significant
- Total effect must be computed

Results at the hospital level

- Thought experiment: increase 1% the number of internal medicine specialists, keeping total number of doctors constant, and outputs constant



- Converting into €, we get 32 M € savings.
- Larger hospitals benefit more.

Analysis at the DRG level

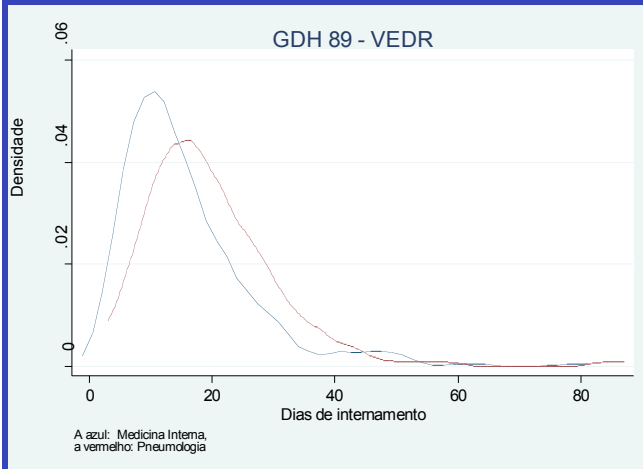
- Difference from having been treated in internal medicine service instead of at another service:
 - Length-of-stay & mortality (whenever it applies)
- Comparison with pneumology:
 - DRGs 79 88 89 96 97
- Comparison with cardiology:
 - DRGs 127 134 138 139 140
- Comparison with gastroenterology:
 - DRG 174

Analysis at the DRG level

- Matching estimator for LOS: find a “twin” in the control group (other service within the same hospital);
- This is a flexible non-parametric approach
- confounding factors accounted for: age, severity level (based on scale 1-3), diagnosis codes, and number of procedures
- Compute the matching for each of the five largest hospitals for each DRG conditional on having the information on the service

Results at the DRG level

LOS differences



Example from one hospital and one DRG before controls

Pneumology

		SATE(1)	SATT(1)	SATE(4)	SATT(4)
79	MARI	-*	-	-*	-*
	PULI	-*	-	-*	-
	GAIA	+	+	+	+
	HUCO	+	+	+	+
88	AMAD	-*	-*	-	-*
	PULI	-*	-*	-*	-*
	WISE	-	-	-	+
	GUAR	-*	-	-*	-*
	COVI	-	-	-	-
89	HUCO	-*	-	-	-
	WISE	-	-	-	-
	VEDR	-*	-*	-*	-*
	TOMA	-	-	-	-
	GUIM	+	+	+	+
96	GAIA	-	+	+	+
	PULI	-*	-*	-*	-*
	ALMA	+	+	+	+
	COVO	-	-	-	-
97	HUCO	-*	+	-*	+
	AMAD	+	+	+	+
	PULI	+	-	+	-
	GAIA	+	+	-*	-*
	FEIR	-	-	-	+

Gastroenterology

		SATE(1)	SATT(1)	SATE(4)	SATT(4)
174	HUCO	+	-	+	+
	AMAD	+	+	+	+
	WISE	+	+	-	+
	ALMA	+	+	+	+
	ANTO	-	-	-	-

Cardiology

		SATE(1)	SATT(1)	SATE(4)	SATT(4)
127	SANT	+	+	+	+
	AMAD	+	+	+	-
	COVI	+	+	+	+
	WISE	-*	-	-*	-*
	FARO	+	+	+	+
	HUCO	+	+	-	+
134	CAST	+	-	+	-
	GUIM	+	+	+	+
	AMAD	-*	-*	+	+
	COVO	-	-	-*	-
	MARI	+	+	+	+
138	AMAD	-*	-*	-*	-*
	WISE	-*	-	-*	-
	GUIM	+	+	+	+
	COVI	+	-	-	+
139	GUIM	-*	+	-*	+
	AMAD	+	+	+	+
	MARI	+	+	+	+
	FARO	+	+	+	+
	WISE	-	-*	-	-*
140	MARI	+	+	+	+
	HUCO	+	+	+	+
	COVI	+	+	+	+
	MART	+	+	+	+
	AMAD	+	+	-*	+

Results at the DRG level

- In most of the cases, mortality rates were not significantly different across services (using Probit regression to control for determinants of mortality)
- How to put all the information in one number?
- Assess the differences in LOS, valued at the per day value implicit in DRG prices posted by the Government
- The “negative” signs are more relevant.
- Savings of about 4 M€, 10,5% of total DRG valuation for these hospitals and DRGs.

Final Remarks

- Big Spenders or Cost Savers?
 - From hospital-level analysis - cost savers
 - From DRG-level analysis
 - Cost savers when compared with pneumology
 - Spend more when compared with cardiology
 - In cardiology, many different situations occur
 - Quantitatively the first effect is more important
- Rethink the role of the internal medicine services, namely the downward trend reported initially
- Not always better than others, but “common perception” does not hold.
- Importance of reporting the “right” numbers, i.e. complexity adjusted for management purposes.