

Supplementary file 1

Table S1. Patient Level Variables

All Patients (Breast Cancer Surgery)					
		2005		2012	
Percent admitted to closest hospital					
<i>from low- income area</i>		14.2		20.5	
<i>from middle income area</i>		14.8		21.4	
<i>high_income area</i>		13.7		16.9	
Distance to chosen hospital (km)					
		33.4km		31.9km	
		(62.1 km)		(57.4 km)	
	Sentinel lymph node biopsy		Immediate breast reconstruction		
		2005	2012	2005	2012
Age (%)					
<= 50	26.3	25.3	26.4	27.2	
50 - 60	27.1	23.6	24.3	20.6	
60 - 70	22.9	26.7	20.1	22.3	
> 70	23.8	24.4	29.2	29.9	
Charlson index (%)					
0	78.0	74.8	72.8	67.5	
1	5.8	5.7	5.9	6.2	
2 or more	16.2	19.5	21.4	26.3	
Carcinoma in situ					
0	92.1	91.7	91.7	92.2	
1	7.9	8.3	8.3	7.8	
Total mastectomy					
0	72.3	72.9			
1	27.7	27.1			
Total mastectomy + axillary dissection					
0			35.1	34.2	
1			64.9	65.8	
Chemotherapy in the year					
0			60.5	55.2	
1			39.5	44.8	
Residence area income					
low	33.5	33.6	34.1	34.1	
medium	33.0	32.6	33.5	32.7	
high	33.4	33.9	32.4	33.3	

Table S2. Sensitivity Analysis: HHI as a Linear Index*

	IBR		SLNB	
	model 1	model 3	model 1	model 3
Hospital characteristics				
Volume of activity				
<= 21	<i>Réf.</i>	<i>Réf.</i>	<i>Réf.</i>	<i>Réf.</i>
21-49	0.25	0.25	0.96***	0.71***
49-110	0.52**	0.52**	0.74***	0.95***
> 110	0.80***	0.78***	1.35***	1.30***
Hospital profile				
CHR	0.21	0.24	1.11***	1.17***
CH	-0.74***	-0.72***	0.20	0.22
CLCC	0.39	0.43	2.06***	2.09***
PNL	0.04	0.25	0.72***	0.79***
PL	<i>Réf.</i>	<i>Réf.</i>	<i>Réf.</i>	<i>Réf.</i>
Years				
2005	<i>Réf.</i>	<i>Réf.</i>	<i>Réf.</i>	<i>Réf.</i>
2012	0.35***	0.82***	1.74***	2.17***
ln(1/hhi)				
ln(1/hhi)	0.27***	0.55**	-0.32***	0.37**
ln(1/hhi) ²		-0.04		-0.23***
ln(1/hhi)*2012		-0.36***		-0.37***
Residual (inter-hospital variation)	1.26	1.28	1.94	1.97
MOR	2.92	2.94	3.78	3.82
Deviance	224,765	225,153	595,210	595,734

*Controlling for patient characteristics. HHI index is inversed (negative natural logarithm of the HHI) so that higher the HHI higher, the level of competition in the market.

Significance: *: 10%; **: 5%; ***: 1%.

IBR: Immediate breast reconstruction; SLNB: Sentinel lymph node biopsy.

Table S3. Test of Competition Measures¹

	IBR				SLNB			
	1	2	1	2	1	2	1	2
Année								
2005	<i>Réf.</i>	<i>Réf.</i>	<i>Réf.</i>	<i>Réf.</i>	<i>Réf.</i>	<i>Réf.</i>	<i>Réf.</i>	<i>Réf.</i>
2012	0.38***	1.14***	0.38***	1.03***	1.83***	2.58***	1.82***	2.56***
HHI all cancers								
high (<=1250)	0.61***	1.16***						
medium (1250-2990)	0.39***	0.98***						
low (>2990)	<i>Réf.</i>	<i>Réf.</i>						
high (<=1250) *2012		- 0.91***						
medium (1250-2990)*2012		- 0.88***						
low (>2990) *2012		<i>Réf.</i>						
Hospital count (N)								
high (>8)			0.71***	1.18***				
medium (3-8)			0.14	0.70***				
low (<=3)			<i>Réf.</i>	<i>Réf.</i>				
High (>8) *2012				- 0.76***				
medium (3-8)*2012				- 0.81***				
low (<3) *2012				<i>Réf.</i>				
HHI all cancer								
high (<=1250)					0.31***	0.89***		
medium (1250-2990)					-0.10	0.58***		
low (>2990)					<i>Réf.</i>	<i>Réf.</i>		
high (<=1250) *2012						- 1.01***		
medium (1250-2990)*2012						0.99***		
low (>2990) *2012						<i>Réf.</i>		
Hospital count (N)								
high (>8)							- 0.88***	- 0.34***
medium (3-8)							0.17**	0.89***
low (<3)							<i>Réf.</i>	<i>Réf.</i>
High (>8) *2012								- 1.05***

medium (3-8)*2012									- 0.98***
low (<3) *2012									Réf.
Résidu (variance inter-établissement)	1.24	1.27	1.26	1.26	2.40	2.49	2.45	2.60	
MOR	2.89	2.94	2.92	2.91	4.39	4.51	4.45	4.65	
Déviance	223,857	225,209	223,780	224,503	594,390	600,474	594,542	600,270	

1) Random effect models controlling for all patient characteristics.

Table S4. Correlation Between Different Competition and Quality Measures

Spearman correlation coefficients										
2005 (N=803)						2012 (N=526)				
	Breast_cancer_hhi_100	All_cancers_hhi_100	Hospital count	IBR	SLNB	Breast_cancer_hhi_100	All_cancers_hhi_100	Hospital count	IBR	SLNB
Breast_cancer_hhi_100 ¹	1	0.9133 <.0001	-0.9426 <.0001	-0.3146 <.0001	-0.2026 <.0001	1	0.8765 <.0001	-0.9542 <.0001	-0.3942 <.0001	-0.2458 <.0001
All_cancers_hhi_100 ²	0.9133 <.0001	1.0000	-0.9687 <.0001	-0.3442 <.0001	-0.2302 <.0001	0.8765 <.0001	1.0000	-0.9323 <.0001	-0.4429 <.0001	-0.3036 <.0001
Hospital count ³	-0.9426 <.0001	-0.9687 <.0001	1.0000	0.3406 <.0001	0.2149 <.0001	-0.9542 <.0001	-0.9323 <.0001	1.0000	0.4300 <.0001	0.2563 <.0001
IBR ⁴	-0.3146 <.0001	-0.3442 <.0001	0.3406 <.0001	1.0000	0.4734 <.0001	-0.3942 <.0001	-0.4429 <.0001	0.4300 <.0001	1.0000	0.6488 <.0001
SLNB ⁴	-0.2026 <.0001	-0.2302 <.0001	0.2149 <.0001	0.4734 <.0001	1.0000	-0.2458 <.0001	-0.3036 <.0001	0.2563 <.0001	0.6488 <.0001	1.0000

1) Herfindahl index (base 100) on breast cancer surgery admissions only

2) Herfindahl index (base 100) on all cancers surgery admissions

3) Number of hospitals providing breast cancer surgery within the catchment area

4) Number of patients offered IBR or SLNB