

**Descriptive Analysis**

**Table A***Detailed summary characteristics for hospital revenue proxies (per hospital-year)*

	University hospitals (N=35)	Cantonal hospitals (N=260)	Supply level.3 hospitals (N=109)	Supply level 4 hospitals (N=155)	Supply level 5 hospitals (N=81)	Specialized clinics (N=276)
<b>Equipment (diagnostic and treatment)</b>						
Mean (SD)	66.9 (14.8)	31.1 (25.3)	12.0 (8.7)	5.0 (5.3)	2.2 (5.7)	1.07 (2.8)
Median [1 <sup>st</sup> IQR, 3 <sup>rd</sup> IQR]	59 [50, 101]	23 [1, 124]	11 [1, 33]	3 [0, 31]	1 [0, 35]	0 [0, 34]
Missing	0 (0%)	1 (0.4%)	0 (0%)	2 (1.3%)	0 (0%)	0 (0%)
<b>Outpatient consultations (/1000)</b>						
Mean (SD)	728 (177)	201 (154)	89 (65.7)	43.1 (31.3)	16 (16.3)	32.9 (47.1)
Median [1 <sup>st</sup> IQR, 3 <sup>rd</sup> IQR]	98 [508, 1120]	151 [20.5, 670]	73.2 [18.8, 320]	37.3 [7.76, 126]	11.1 [0, 83.1]	11.6 [0, 266]
Missing	0 (0%)	0 (0%)	0 (0%)	0 (0%)	7 (8.6%)	58 (21%)

*Note.* Equipment represents the number of machines used for diagnostic and treatment purposes. SD = Standard Deviation, IQR = Inter Quartile Range

**Table B***Detailed summary characteristics in the nurses' analysis sample (2014-2020)*

	University hospitals (N=35)	Cantonal hospitals (N=260)	Supply level.3 hospitals (N=109)	Supply level 4 hospitals (N=155)	Supply level 5 hospitals (N=81)	Specialized clinics (N=276)
<b>Wage (CHF/month)</b>						
Mean (SD)	7720 (669)	6120 (1390)	6260 (1210)	5920 (1580)	6120 (988)	6720 (1740)
Median [1 <sup>st</sup> IQR, 3 <sup>rd</sup> IQR]	7720 [6890, 9100]	6380 [3430, 11300]	6360 [3970, 9820]	5960 [2890, 13700]	5920 [4500, 9630]	6500 [3550, 14900]
<b>Age (years)</b>						
Mean (SD)	39.2 (2.21)	38.6 (1.72)	39.4 (1.58)	40.1 (2.52)	42.3 (2.70)	41.5 (4.97)
Median [1 <sup>st</sup> IQR, 3 <sup>rd</sup> IQR]	39.1 [36.3, 43.4]	38.7 [33.2, 42.4]	39.4 [35.6, 44.1]	39.9 [35.3, 47.9]	42.1 [37.1, 50.6]	40.6 [32.7, 55.0]
<b>Females (%)</b>						
Mean (SD)	83.0 (3.57)	87.6 (3.28)	86.7 (6.28)	87.1 (7.37)	87.9 (9.08)	86.7 (8.14)
Median [1 <sup>st</sup> IQR, 3 <sup>rd</sup> IQR]	82.1 [79.3, 91.2]	88.0 [75.9, 93.1]	88.6 [68.8, 94.4]	88.9 [55.4, 95.0]	88.7 [59.1, 100]	86.7 [60.9, 100]
<b>Swiss employees (%)</b>						
Mean (SD)	57.9 (16.8)	73.2 (10.9)	62.0 (21.9)	66.1 (19.7)	56.1 (22.5)	61.0 (21.6)
Median [1 <sup>st</sup> IQR, 3 <sup>rd</sup> IQR]	55.8 [34.5, 85.4]	72.3 [46.5, 92.1]	66.3 [10.4, 100]	70.7 [17.3, 99.4]	57.6 [11.6, 94.3]	64.1 [0, 94.4]
<b>Professional role:</b>						
<b>RNs (%)</b>						
Mean (SD)	75.7 (3.50)	72.9 (8.85)	72.8 (7.84)	73.2 (7.08)	64.6 (15.0)	66.9 (16.1)
Median [1 <sup>st</sup> IQR, 3 <sup>rd</sup> IQR]	74.8 [67.5, 83.8]	74.0 [24.7, 86.4]	74.8 [51.6, 88.3]	74.1 [42.9, 84.5]	68.0 [31.6, 92.6]	67.6 [7.69, 100]
<b>LPNs (%)</b>						
Mean (SD)	8.4 (3.52)	11.6 (8.27)	9.1 (4.22)	9.3 (6.18)	6.8 (8.13)	11.6 (12.1)
Median [1 <sup>st</sup> IQR, 3 <sup>rd</sup> IQR]	8.1 [2.2, 18.5]	9.8 [0, 54.8]	9.3 [0, 17]	9.3 [0, 30.2]	4 [0, 39.3]	9.9 [0, 92.3]
<b>Assisting nurses (%)</b>						
Mean (SD)	15.9 (4.17)	15.5 (6.02)	18.1 (8.43)	17.5 (5.85)	28.5 (14.6)	21.4 (13.8)
Median [1 <sup>st</sup> IQR, 3 <sup>rd</sup> IQR]	15.6 [9.7, 27.9]	14.7 [6.1, 39.8]	17.5 [2.4, 37.1]	16.7 [7.6, 42.7]	25.0 [0, 61.7]	20.3 [0, 85.7]

*Note.* LPNs= Licensed practical nursed, RNs= Registered Nurses; SD = Standard Deviation, IQR = Inter Quartile Range

**Table C***Detailed summary characteristics in the physicians' analysis sample (2014-2020)*

	University hospitals (N=35)	Cantonal hospitals (N=260)	Supply level.3 hospitals (N=108)	Supply level 4 hospitals (N=153)	Supply level 5 hospitals (N=79)	Specialized clinics (N=272)
<b>Wage (CHF/month)</b>						
Mean (SD)	13900 (1900)	16800 (3510)	17300 (5360)	16400 (4930)	16700 (5320)	16800 (5340)
Median [1 <sup>st</sup> IQR, 3 <sup>rd</sup> IQR]	13500 [11700, 19000]	16200 [11200, 28700]	17100 [4760, 30500]	15100 [7470, 30500]	15400 [6310, 30200]	15800 [4710, 30500]
<b>Age (years)</b>						
Mean (SD)	37.7 (0.580)	38.6 (1.88)	40.2 (3.40)	41.4 (4.77)	44.3 (5.56)	44.0 (6.87)
Median [1 <sup>st</sup> IQR, 3 <sup>rd</sup> IQR]	37.7 [36.3, 38.5]	38.4 [33.2, 44.5]	39.9 [28.6, 51.0]	40.1 [34.3, 56.5]	44.0 [32.4, 56.7]	42.3 [27.0, 65.0]
<b>Females (%)</b>						
Mean (SD)	49.1 (3.29)	50.3 (5.95)	45.3 (11.1)	43.2 (11.8)	49.3 (20.7)	43.6 (22.4)
Median [1 <sup>st</sup> IQR, 3 <sup>rd</sup> IQR]	48.7 [42.5, 54.4]	50.3 [26.7, 69.9]	48.2 [0, 68.4]	45.1 [0, 71.4]	49.1 [0, 100]	46.0 [0, 100]
<b>Swiss employees (%)</b>						
Mean (SD)	55.7 (5.52)	60.3 (9.90)	52.6 (16.1)	49.6 (20.6)	47.0 (21.0)	47.4 (26.8)
Median [1 <sup>st</sup> IQR, 3 <sup>rd</sup> IQR]	58.9 [47.1, 62.6]	61.8 [30.6, 82.0]	50.2 [0, 100]	48.7 [4.76, 100]	50.0 [0, 87.5]	50.0 [0, 100]
Missing	0 (0%)	0 (0%)	1 (0.9%)	1 (0.6%)	0 (0%)	0 (0%)
<b>Professional role:</b>						
<b>Chief and leading</b>						
<b>physicians (%)</b>						
Mean (SD)	16.7 (7.33)	25.2 (8.7)	26.3 (14.1)	29.9 (19.1)	32.9 (19.2)	26.5 (23.2)
Median [1 <sup>st</sup> IQR, 3 <sup>rd</sup> IQR]	14.4 [8.8, 31.1]	24.3 [0, 55.6]	25.7 [0, 100]	28.8 [0, 100]	30.6 [0, 100]	22.0 [0, 100]
<b>Attendings and hospitals</b>						
<b>physicians (%)</b>						
Mean (SD)	30.7 (7.16)	28.6 (9.72)	32.5 (22.4)	23.2 (20.3)	32.7 (30.2)	40.1 (30.8)
Median [1 <sup>st</sup> IQR, 3 <sup>rd</sup> IQR]	33.3 [17.0, 41.3]	28.3 [8.1, 59.7]	25.4 [0, 100]	19.6 [0, 100]	26.7 [0, 100]	33.3 [0, 100]
<b>Residents and medical</b>						
<b>students (%)</b>						
Mean (SD)	52.6 (4.03)	46.2 (7.77)	41.2 (16.7)	46.8 (21.0)	34.4 (23.2)	33.4 (27.9)
Median [1 <sup>st</sup> IQR, 3 <sup>rd</sup> IQR]	52.3 [44.8, 62.2]	46.9 [14.8, 66.7]	45.9 [0, 96.2]	47.5 [0, 100]	35.5 [0, 76.9]	36.9 [0, 100]

*Note.* SD = Standard Deviation, IQR = Inter Quartile Range

Missing data is only noted for variables where there is data absence.

## **Inferential Analysis**

**Table1**

*Linear mixed-effects models with Outcome Monthly Wage/FTE for Nurses and Physicians*

<i>Predictors</i>	<b>Monthly Wage/FTE Nurses (CHF)</b>			<b>Monthly Wage/FTE Physicians (CHF)</b>		
	<i>Estimates</i>	<i>CI</i>	<i>p</i>	<i>Estimates</i>	<i>CI</i>	<i>p</i>
(Intercept)	4053.60	653.52 – 7453.67	<b>0.020</b>	10722.91	3368.55 – 18077.26	<b>0.004</b>
age (years)	52.82	0.65 – 104.99	<b>0.047</b>	92.07	-13.58 – 197.73	0.088
% females	0.78	-22.73 – 24.28	0.948	22.55	-0.57 – 45.66	0.056
% Swiss employees	-2.38	-11.26 – 6.49	0.598	-2.00	-20.21 – 16.21	0.829
% RNs	17.20	6.65 – 27.76	<b>0.001</b>			
% residents and medical students				-75.38	-100.75 – -50.00	<b>&lt;0.001</b>
monthly wage/FTE physicians (CHF)	0.04	0.02 – 0.05	<b>&lt;0.001</b>			
monthly wage/FTE nurses (CHF)				0.25	0.02 – 0.48	<b>0.034</b>
hospital type (not university)	-1478.47	-2962.16 – 5.22	0.051	2796.91	-1443.18 – 7036.99	0.196
outpatient consultations (/1000)	0.69	-1.34 – 2.73	0.505	-0.23	-6.66 – 6.19	0.944
Equipment (items)	-8.47	-22.36 – 5.42	0.232	13.32	-28.85 – 55.49	0.536
t	-66.32	-210.85 – 78.21	0.368	-121.28	-634.43 – 391.87	0.643
t 2	10.00	-7.56 – 27.56	0.264	22.78	-39.68 – 85.24	0.474
<i>Random effects</i>		<i>Variance</i>	<i>Std. Dev.</i>		<i>Variance</i>	<i>Std. Dev.</i>
<i>Hospital ID</i>		1448875	1203.7		10485145	3238
<i>Residuals</i>		769911	877.4		9805643	3131
N	145 <sub>Hospital_ID</sub>			145 <sub>Hospital_ID</sub>		
ICC	0.65			0.52		
Observations	848			846		
Marginal R <sup>2</sup> / Conditional R <sup>2</sup>	0.078 / 0.680			0.160 / 0.594		

*Note.* CI = Confidence Interval, RNs = Registered Nurses, FTE = Full Time Equivalent.

Significant estimates are displayed in bold.

Example for interpretation: For each 1% increase in the share of RNs, wages would increase by 17.2 CHF, holding all other covariates constant.

**Table 2**

*Sensitivity Analysis: Linear mixed-effects models with Outcome Logged Monthly Wage/FTE for Nurses and Physicians*

<i>Predictors</i>	<b>log Monthly Wage/FTE Nurses</b>			<b>log Monthly Wage/FTE Physicians</b>		
	<i>Estimates</i>	<i>CI</i>	<i>p</i>	<i>Estimates</i>	<i>CI</i>	<i>p</i>
(Intercept)	10.14	9.38 – 10.89	<b>&lt;0.001</b>	10.94	9.78 – 12.10	<b>&lt;0.001</b>
age	0.008639	0.00 – 0.02	<b>0.032</b>	0.005915	-0.00 – 0.01	0.073
% females	0.00006234	-0.00 – 0.00	0.973	0.001567	0.00 – 0.00	<b>0.031</b>
% Swiss employees	-0.0005106	-0.00 – 0.00	0.457	0.000338	-0.00 – 0.00	0.553
% RNs	0.002389	0.00 – 0.00	<b>0.003</b>			
% residents and medical students				-0.004208	-0.01 – -0.00	<b>&lt;0.001</b>
monthly log wage/FTE physicians	0.07489	0.03 – 0.12	<b>0.002</b>			
monthly log wage/FTE nurses				0.08583	-0.01 – 0.18	0.074
hospital type (not university)	-0.2299	-0.46 – -0.00	<b>0.046</b>	0.1621	-0.10 – 0.42	0.221
outpatient consultations	0.0001319	-0.00 – 0.00	0.401	-0.00007265	-0.00 – 0.00	0.717
equipment	-0.001560	-0.00 – 0.00	0.147	0.001677	-0.00 – 0.00	0.203
t	-0.01566	-0.04 – 0.01	0.158	-0.002224	-0.03 – 0.03	0.890
t 2	0.002402	-0.00 – 0.01	0.075	0.0007911	-0.00 – 0.00	0.686
<i>Random effects</i>		<i>Variance</i>	<i>Std. Dev.</i>		<i>Variance</i>	<i>Std. Dev.</i>
Hospital ID		0.03383	0.1839		0.03918	0.1979
<i>Residuals</i>		0.01743	0.1320		0.03705	0.1925
N	145 <sub>Hospital_ID</sub>			145 <sub>Hospital_ID</sub>		
ICC	0.66			0.51		
Observations	848			846		
Marginal R <sup>2</sup> / Conditional R <sup>2</sup>	0.080 / 0.687			0.142 / 0.583		

*Note.* CI = Confidence Interval, RNs = Registered Nurses, FTE = Full Time Equivalent, ICC = Intraclass Correlation, Std. Dev.= Standard Deviation

Significant estimates are displayed in bold.