



RUHR

ECONOMIC PAPERS

Roman Mennicken
Boris Augurzky
Heinz Rothgang
Jürgen Wasem

Explaining Differences in Remuneration Rates of Nursing Homes in Germany

Imprint

Ruhr Economic Papers

Published by

Ruhr-Universität Bochum (RUB), Department of Economics
Universitätsstr. 150, 44801 Bochum, Germany

Technische Universität Dortmund, Department of Economic and Social Sciences
Vogelpothsweg 87, 44227 Dortmund, Germany

Universität Duisburg-Essen, Department of Economics
Universitätsstr. 12, 45117 Essen, Germany

Rheinisch-Westfälisches Institut für Wirtschaftsforschung (RWI)
Hohenzollernstr. 1-3, 45128 Essen, Germany

Editors

Prof. Dr. Thomas K. Bauer
RUB, Department of Economics, Empirical Economics
Phone: +49 (0) 234/3 22 83 41, e-mail: thomas.bauer@rub.de

Prof. Dr. Wolfgang Leininger
Technische Universität Dortmund, Department of Economic and Social Sciences
Economics – Microeconomics
Phone: +49 (0) 231/7 55-3297, email: W.Leininger@wiso.uni-dortmund.de

Prof. Dr. Volker Clausen
University of Duisburg-Essen, Department of Economics
International Economics
Phone: +49 (0) 201/1 83-3655, e-mail: vclausen@vwl.uni-due.de

Prof. Dr. Christoph M. Schmidt
RWI, Phone: +49 (0) 201/81 49-227, e-mail: christoph.schmidt@rwi-essen.de

Editorial Office

Joachim Schmidt
RWI, Phone: +49 (0) 201/81 49-292, e-mail: joachim.schmidt@rwi-essen.de

Ruhr Economic Papers #215

Responsible Editor: Christoph M. Schmidt

All rights reserved. Bochum, Dortmund, Duisburg, Essen, Germany, 2010

ISSN 1864-4872 (online) – ISBN 978-3-86788-242-2

The working papers published in the Series constitute work in progress circulated to stimulate discussion and critical comments. Views expressed represent exclusively the authors' own opinions and do not necessarily reflect those of the editors.

Ruhr Economic Papers #215

Roman Mennicken, Boris Augurzky, Heinz Rothgang,
and Jürgen Wasem

Explaining Differences in Remuneration Rates of Nursing Homes in Germany



UNIVERSITÄT
DUISBURG
ESSEN

Bibliografische Informationen der Deutschen Nationalbibliothek

Die Deutsche Bibliothek verzeichnet diese Publikation in der deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über:
<http://dnb.d-nb.de> abrufbar.

ISSN 1864-4872 (online)
ISBN 978-3-86788-242-2

Roman Mennicken, Boris Augurzky, Heinz Rothgang, and Jürgen Wasem¹

Explaining Differences in Remuneration Rates of Nursing Homes in Germany

Abstract

Remuneration rates of German nursing homes are prospectively negotiated between long-term care insurance (LTCI) and social assistance on the one side and nursing homes on the other. They differ considerably across regions while there is no evidence for substantial differences in care provision. This paper explains the differences in the remuneration rates by observable characteristics of the nursing home, its residents and its region with a special focus on the largest federal state North-Rhine-Westphalia, in which the most expensive nursing homes are located. We use data from the German Federal Statistical Office for 2005 on all nursing homes that offer full-time residential care for the elderly. We find that differences in remuneration rates can partly be explained by exogenous factors. Controls for residents, nursing homes, and district characteristics explain roughly 30% of the price difference; 40% can be ascribed to a regionally different kind of negotiation between nursing homes and LTCI. 30% of the raw price difference remains unexplained by observable characteristics.

JEL Classification: I11, I18

Keywords: Nursing homes; determinants of remuneration rates; regional price differences

October 2010

¹ Roman Mennicken, RWI and University of Cologne; Boris Augurzky, RWI; Heinz Rothgang, University of Duisburg-Essen; Jürgen Wasem, Zentrum für Sozialpolitik, Bremen. – All correspondence to Roman Mennicken, RWI, Hohenzollernstr. 1-3, 45128 Essen, Germany, E-Mail: roman.mennicken@rwi-essen.de

1 Introduction

The long-term care industry has experienced a dramatic growth over the last decade in Germany. In 2007 2.25 million people were in need of long-term care (LTC) (Statistisches Bundesamt 2007). They are looked after either by their relatives at home (1.03 million), by professional outpatient services (together with relatives) (0.50 million), or are residents in nursing homes (0.71 million). In 1999 2.02 million people were in need of long-term care. Between 1999 and 2007 the number of residents in nursing homes had the steepest increase of 25% from 0.57 million in 1999 (Statistisches Bundesamt 2001) to 0.71 million today. The number of nursing homes went up from 8,900 in 1999 to 11,000 in 2007. Thus, the relevance of residential care in nursing homes has increased considerably in the last years. As residential care is the most expensive form for the long-term care insurance (LTCI), a public debate on the prices for residential care has started in recent years (Roth and Rothgang 1999, Rothgang et al. 2005, Häcker et al. 2008). In Germany, remuneration rates are the result of a collective bargaining process between the LTCI and social assistance on behalf of payers and the nursing home. Residents do not participate in the negotiations. Remuneration rates are negotiated for each nursing home separately. Then, the prices are fixed until the next bargaining round only to be called in by the provider.

Since introduction in 1996 LTCI distinguishes between three levels of care (CL) with increasing severity of care: level I to level III. The level is formally assessed by an independent Medical Review Board of the Statutory Health Insurance Funds. The cost of care (CC) is lowest in level I and highest in level III. Within a level it is equal for all residents of a given nursing home. In addition to the cost of care residents pay for board and lodging (BL) and for investment costs (IC) that have not been publicly financed. Residents in a single room pay higher IC while residents in double or larger rooms pay less (Rothgang and Igl 2007). In total, the resident pays the sum of CC, BL, and IC to the nursing home. For a given level of care, but independent of the remuneration rate of the nursing home, the LTCI refunds part of the total costs (see Table 1), i.e. the residents pays the gap between the remuneration rate and the benefit of the LTCI, which is on average around 50%. The gap gets larger with higher remuneration rates and vice versa. If residents cannot pay the total gap, their children relatives or –if neither can pay– social assistance has to step in.

Table 1: Daily benefits of the LTCI for full-time residential care (in EUR)

	Level I	Level II	Level III
1996 - 2007	33.65	42.07	47.11
2008 - 2009	33.65	42.07	48.36
2010 - 2011	33.65	42.07	49.67
2012 - 2015	33.65	42.07	50.99

Notes: Table derived from Social Code Book XI (43) assuming 30.4 days per month.

Benefits increased in 2008 on the 1st of July, for 2010 and 2012 it will be the 1st of January.

The remuneration rates (prices) of nursing homes differ considerably across regions (Augurzky et al. 2006) –see Figure 1 and Table 2– although the concept of long-term care is defined uniformly by social law. Clusters of regions with high prices are clearly distinguishable. The most expensive nursing homes can be found in the federal state of North-Rhine-Westphalia (NRW) and in some regions of Baden-Württemberg and Bavaria. The least expensive nursing homes are located in Eastern Germany.

Table 2: Average daily price level II including B&L (in EUR) by federal states (2005)

	Price level II including B&L	SD	N
North Rhine-Westphalia	83.35	6.78	1 667
Hamburg	82.54	13.50	146
Baden-Württemberg	78.83	10.25	1 048
Bremen	78.01	9.78	79
Bavaria	77.24	9.22	1 277
Berlin	76.94	7.62	249
Schleswig Holstein	72.82	12.88	529
Hesse	72.56	7.92	560
Rhineland-Palatinate	71.91	5.10	389
Saarland	71.10	7.32	118
Lower Saxony	66.82	6.99	1 202
Saxony-Anhalt	64.76	6.95	310
Mecklenburg Western Pomerania	62.23	8.28	171
Brandenburg	62.13	3.39	255
Thuringia	61.33	5.76	215
Saxony	57.70	2.98	488

Note: Data refers to nursing homes offering full-time residential care for the elderly.

The question arises whether and how the observed price differences can be explained. International literature focusses on costs (Nyman 1994, Norton et al. 2000, Mukamel and Spector 2002, Mukamel et al. 2005) or profits (Knox et al. 1999) of nursing homes. Due to the unique price setting mechanism in Germany we cannot rely on international empirical studies. In particular, there might be inefficiencies in the bargaining process. The LTCI as the leader of the negotiations for the payer side has no incentive to negotiate for cost savings as any markups are totally at the expense of the residents or social assistance (Rothgang et al. 2005). Moreover, competition between nursing homes does not fully work: First, only recently public information on quality became available¹. Second, mobility of

¹The LTC reform in 2008 (Pflegeweiterentwicklungsgesetz 2008) increased transparency with regards to quality. From 2008 on, every nursing home is assessed yearly by the Medical Review Board of the Statutory Health Insurance Funds. Results are presented as school grades and are publicly available.

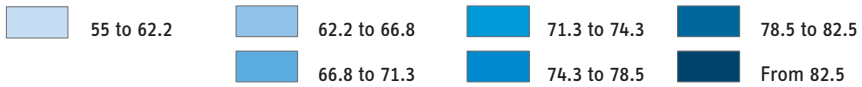
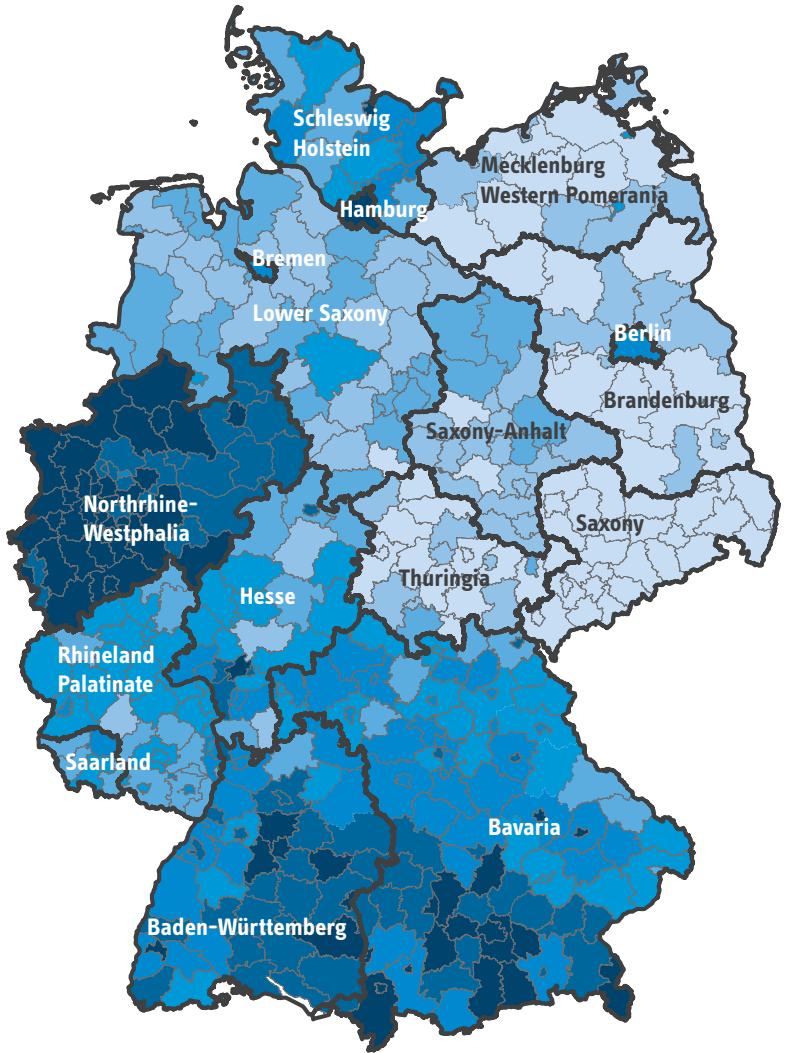


Figure 1: Average daily price for care level II (including B&L and excluding IC) (2005)

new residents is typically very low such that they choose one of the few providers in their vicinity. In case of sudden need for residential care (e.g. after hospital discharge) the choice is reduced even further, because there is often only one local provider available. Third, for some residents social assistance pays the remaining gap between the actual price and LTCI benefits (Häcker et al. 2008).

This paper analyzes the differences in prices between nursing homes in NRW and the comparable states of Baden-Württemberg, Bavaria, Hesse, Lower Saxony, and Rhineland-Palatinate by taking into account regional conditions, nursing home characteristics, and resident structure. The analyzes are based on a full sample of more than 6,000 nursing homes in 2005. The following section presents the data and outlines the estimation strategy. Section 3 provides the results and section 4 concludes.

2 Data and estimation strategy

We use data from the Research Data Centers of the Federal Statistical Office (FSO) and the statistical offices of the states that comprise a full sample of all 10,424 German nursing homes in 2005 (Forschungsdatenzentren der Statistischen Ämter des Bundes und der Länder 2007). They also include information on the more than 676,000 residents. Every second year, at 15th of December, nursing homes are obliged to provide information about their ownership, total number of resident places and other structural information, e.g. the average number of beds per room, being part of a hospital, rehabilitation center or another facility, and whether they additionally offer home care. There are three different types of ownership: private-for-profit, private not-for-profit, i.e. nursing homes owned by e.g. churches or charity groups and public ones. Furthermore, the data allow us to distinguish between nursing homes which provide care for the elderly, for people with disabilities, for mentally disordered people, or for the severely-ill, and between full, short- and part-time residential care. Part-time residential care means staying either over night or during the day only.

Moreover, for each nursing home we have information about the number of residents, their age, gender, the nursing care level and the remuneration rate. We refer to the total costs of care (TCC) as the sum of CC and BL. TCC differs by the level of care I to III as does CC. In order to measure the average price level of a nursing home i we build the average total cost of care (ACC) as the weighted average of TCC I, II, and III. Weights are the national average fraction of residents in level I, II, and III, respectively. In 2005, on average 35% of all residents were in care level I, 44% in level II, and 21% in level III:

$$ACC_i = 0.35 \times CC_{1i} + 0.44 \times CC_{2i} + 0.21 \times CC_{3i} + BL_i. \quad (1)$$

We refrain from using the individual distribution of the residents in each nursing home to avoid endogeneity problems: the distribution of the residents might depend on the

remuneration rates for each CL. Additionally, nursing homes with e.g. low remuneration rates in all CLs could turn out to be expensive, because they have a higher proportion of residents in CL III, thus, resulting in a high average price due to the weights per CL used for calculating the average.

Finally, the data contains information on the nursing homes' staff. For each employee we can distinguish between full- and part time contracts. There are four different working time intervals: "*full time*", "*more than 50%*", "*less than 50%*", and "*employees earning less than 400 EUR per month*". Using the official conversion factors of the FSO, we are able to approximately calculate full-time equivalents (FTEs). Additionally, we complement the data with regional information about the administrative district. The Federal Office for Building and Regional Planning provides rich information about the 439 German districts including income and the degree of rurality. Rurality indicates the average share of citizens in a district living in a rural area. Average regional income is defined as the average disposable income per citizen and year in euro. We also include the share of private-for-profit nursing homes in a district as we expect private-for-profit nursing homes to increase price competition.

We focus on nursing homes offering full-time residential care for the elderly (in total 9087 nursing homes in 2005). We only include nursing homes in the six federal states mentioned above (6184 homes) excluding outliers: nursing homes with more than two FTEs per resident (24 observations) and those with inconsistencies in the price information (19 observations). This leaves us with a total sample size of 6143 nursing homes.

Table 3 shows descriptive statistics of the data for NRW and the other five federal states. The comparison states are shown individually and as a whole. The average cost of care is highest in NRW with 81.03 EUR per day and lowest in Lower Saxony (66.64 EUR per day). There is considerable variation in the share of residents by care level across the federal states. In contrast, the average age of the residents is fairly similar. FTE per resident is highest in NRW and Baden-Württemberg - 7% more than in Lower Saxony. It is striking that North-Rhine Westphalia has the lowest share of private-for-profit nursing homes (20.2%). In Rhineland-Palatinate over 65% of the nursing homes is part of another (health care) facility compared to 20% in Lower Saxony. Furthermore, there is substantial variation across the federal states in beds per room and in the size of the nursing homes measured in number of places offered. Finally, NRW has by far the most urban areas and a high income level. Only Baden-Württemberg shows a higher income per citizen.

Table 3: Mean and standard deviation (in parentheses)

	North-Rhine Westphalia	Comparison States	Lower Saxony	Hesse	Rhineland- Palatinate	Baden- Württemberg	Bavaria
ACC [EUR per day]	81.10 (6.31)	73.01 (9.30)	66.30 (6.22)	71.44 (7.67)	72.51 (4.61)	79.22 (9.85)	75.60 (8.87)
Residents							
Share of unknown care level	0.01 (0.04)	0.02 (0.04)	0.01 (0.03)	0.01 (0.02)	0.01 (0.02)	0.02 (0.05)	0.03 (0.06)
Share in care level I	0.34 (0.11)	0.33 (0.12)	0.32 (0.12)	0.3 (0.11)	0.37 (0.11)	0.34 (0.12)	0.32 (0.11)
Share in care level II	0.45 (0.09)	0.43 (0.10)	0.43 (0.11)	0.44 (0.1)	0.43 (0.09)	0.46 (0.11)	0.40 (0.09)
Share in care level III	0.20 (0.10)	0.22 (0.12)	0.24 (0.12)	0.25 (0.12)	0.19 (0.01)	0.17 (0.11)	0.25 (0.11)
Age [in years]	82.66 (3.92)	82.74 (3.74)	82.54 (4.11)	83 (3.76)	82.97 (2.75)	82.99 (3.78)	82.54 (3.57)
Nursing homes							
FTE per resident	0.674 (0.171)	0.652 (0.162)	0.632 (0.155)	0.654 (0.172)	0.667 (0.184)	0.662 (0.145)	0.656 (0.169)
Private not-for-profit	0.27 (0.44)	0.42 (0.49)	0.60 (0.49)	0.45 (0.50)	0.37 (0.48)	0.35 (0.48)	0.30 (0.46)
Private for-profit	0.68 (0.47)	0.51 (0.5)	0.38 (0.48)	0.50 (0.50)	0.62 (0.49)	0.56 (0.50)	0.58 (0.49)
Public	0.05 (0.21)	0.07 (0.26)	0.03 (0.16)	0.05 (0.21)	0.01 (0.11)	0.09 (0.29)	0.12 (0.32)
Part of other facility	0.08 (0.27)	0.11 (0.31)	0.08 (0.27)	0.15 (0.36)	0.11 (0.31)	0.13 (0.33)	0.09 (0.29)
Provider of home care	0.20 (0.40)	0.28 (0.45)	0.17 (0.37)	0.28 (0.45)	0.63 (0.48)	0.27 (0.44)	0.29 (0.45)

Continued on the next page.

Table 3: Mean and standard deviation (in parentheses)

	North-Rhine Westphalia	Comparison States	Lower Saxony	Hesse	Rhineland- Palatinate	Baden- Württemberg	Bavaria
Provider of part-time care	0.09 (0.28)	0.12 (0.33)	0.02 (0.15)	0.13 (0.34)	0.23 (0.42)	0.23 (0.42)	0.08 (0.27)
Beds per room	1.32 (0.25)	1.37 (0.28)	1.32 (0.26)	1.37 (0.30)	1.42 (0.28)	1.38 (0.28)	1.40 (0.29)
Up to 45 places	0.17 (0.38)	0.29 (0.45)	0.37 (0.48)	0.27 (0.44)	0.18 (0.39)	0.32 (0.47)	0.22 (0.42)
Between 46 - 76 places	0.23 (0.42)	0.26 (0.44)	0.29 (0.45)	0.26 (0.44)	0.24 (0.43)	0.26 (0.44)	0.24 (0.43)
Between 77 - 107 places	0.30 (0.46)	0.22 (0.42)	0.19 (0.39)	0.21 (0.41)	0.25 (0.44)	0.20 (0.40)	0.26 (0.44)
More than 107 places	0.31 (0.46)	0.23 (0.42)	0.15 (0.35)	0.25 (0.44)	0.33 (0.47)	0.22 (0.41)	0.27 (0.45)
District							
Degree of rurality	0.06 (0.11)	0.26 (0.25)	0.30 (0.23)	0.19 (0.24)	0.24 (0.23)	0.16 (0.19)	0.35 (0.28)
Share of private nursing homes	0.27 (0.15)	0.42 (0.22)	0.60 (0.20)	0.45 (0.17)	0.37 (0.19)	0.35 (0.18)	0.30 (0.18)
Income per citizen	18.382 (1.632)	17.893 (1.806)	16.881 (1.139)	18.067 (2.075)	16.744 (0.918)	19.094 (1.338)	18.133 (1.995)
N	1 667	4 474	1 202	559	389	1 048	1 276

For a deeper understanding of the price setting mechanism in different federal states we conducted 25 in-depth telephone or personal interviews with individuals taking part in negotiation processes on the payer or on the provider side². Interviews were semi-structured, providing subjective information regarding inter alia specifics in each federal state’s method of the collective bargaining process. All interviews were conducted in 2007 and lasted between one and two hours. Notes were taken with the permission of each respondent³. The interviews revealed that the payers are supposed to take on a “softer” negotiation style in NRW than in other federal states. In general, the negotiations in NRW are based more on the internal cost structure of the respective nursing home while external benchmarks, i.e. comparisons with other providers, are less often used (Augurzky et al. 2008).

In a least-squared framework we model the average price of care ACC_{ik} as follows

$$ACC_{ik} = \alpha + \beta_1 N_{ik} + \beta_2 R_{ik} + \beta_3 H_{ik} + \beta_4 D_k + \epsilon_{ik}. \quad (2)$$

The index i refers to the nursing home and k to the district. N_{ik} indicates the federal state of North-Rhine-Westphalia. R_{ik} includes the residents’ characteristics: the share of residents by the care levels and the average age and age squared of the residents. H_{ik} contains characteristics of the nursing home: FTE per resident, kind of ownership, beds per room, dummies for size, being part of another facility, and provision of part-time or home care. The district vector D_k bears the share of private nursing homes, the degree of rurality, and the average income per citizen. Finally, ϵ_{ik} is the stochastic error term.

We start with the simplest regression model which only includes the dummy variable N_{ik} for NRW. This regression shows the raw difference in ACC_{ik} between NRW and the other federal states. Stepwise we expand the model with the resident, nursing home, and market characteristics. This allows us to assess the impact of additional variables on the price difference captured by the coefficient of N_{ik} in the simplest specification. Mukamel and Spector (2000) showed differing effects of ownership in different regions. Therefore, we include an interaction between N_{ik} and ownership. In the final specification we also include an interaction term of FTE per resident with N_{ik} , because staff is the most important cost driver for nursing homes, which should be reflected in higher prices. If the institutions in NRW indeed negotiate differently concerning personnel costs as suggested by the results of the interviews, this interaction should capture differences in regards to staffing costs.

²These interviews were conducted by a consulting agency and the co-author Heinz Rothgang as part of a commissioned research project of the Ministry of Labor, Health and Social Welfare of North Rhine-Westphalia in 2007.

³For full results of these interviews see Augurzky et al. (2008).

3 Results

Table 4 shows the regression results for ten model specifications. In model 1 the raw difference in ACC between NRW and the comparison states is estimated at 8.97 EUR. The ACC in the comparison states amounts to 72.13 EUR and in NRW to 81.10 EUR, i.e. 12.4% higher. Step by step we include further variables and have a look at the estimate of the coefficient of the NRW-dummy. If it decreases the added variables explain part of the price difference.

In model 2 we include the individual distribution of the residents. The price difference increases to 9.01 EUR as in NRW there is a larger share of less severe cases than in the other regions. Therefore, NRW should actually be less expensive. Controlling for the average age of the residents (model 3) has no impact on the price difference. The small non-linear effect of age appears to be negligible as the threshold at which age increases the price again lies around 74.5 years. Given that the average age in our sample is around 82 years, a higher age of the residents leads c.p. to a higher price. In model 4 we add ownership, with private not-for-profit nursing homes being the baseline. The price difference drops to 7.85 EUR. Adding FTEs per resident (Model 5) the difference does hardly alter. The ownership structure seems to explain about 15% of the price differences between NRW and the comparison states. Controlling for other characteristics of the nursing homes like being part of another facility, provision of community care or part-time care, and beds per room (model 6) and size (model 7), the price differences increases slightly to 8.09 EUR and drops to 7.88 EUR, respectively.

Once we add the regional control variables (model 8), the price difference drops by 1.70 EUR in comparison to model 7. As expected, the share of private homes, which might indicate stronger competition, significantly decreases the prices. So does the degree of rurality. Higher disposable income in the district increases the average price. Taking all these factors into account we can explain around 30% of the raw price difference between NRW and the comparison states.

Table 4: Regression results for ACC

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
NRW	8.970*** (0.256)	9.014*** (0.258)	9.014*** (0.255)	7.849*** (0.237)	7.803*** (0.237)	8.091*** (0.237)	7.881*** (0.238)	6.136*** (0.245)	5.795*** (0.292)	2.613** (0.926)
Unknown care level		9.429** (2.864)	10.81*** (2.838)	11.69*** (2.597)	12.36*** (2.601)	11.75*** (2.582)	12.61*** (2.577)	9.071*** (2.43)	9.030*** (2.429)	8.843*** (2.428)
Care level II		-2.895* (1.247)	-3.065* (1.239)	1.96 (1.1439)	1.749 (1.143)	0.932 (1.151)	2.003 (1.159)	0.881 (1.091)	0.945 (1.091)	0.997 (1.09)
Care level III		-3.302** (1.115)	-3.803*** (1.104)	-2.825** (1.01)	-3.344** (1.019)	-3.405*** (1.029)	-2.814** (1.03)	-1.606 (0.974)	-1.632 (0.974)	-1.613 (0.973)
Age			-4.240*** (0.394)	-3.240*** (0.361)	-3.117*** (0.363)	-3.219*** (0.361)	-3.355*** (0.361)	-2.769*** (0.342)	-2.766*** (0.342)	-2.780*** (0.341)
Age squared			0.0284*** (0.00253)	0.0202*** (0.00233)	0.0194*** (0.00233)	0.0201*** (0.00233)	0.0210*** (0.00233)	0.0168*** (0.0022)	0.0168*** (0.0022)	0.0169*** (0.0022)
Private-for-profit				-7.549*** (0.229)	-7.492*** (0.23)	-7.425*** (0.238)	-6.936*** (0.249)	-5.003*** (0.25)	-5.284*** (0.278)	-5.308*** (0.278)
Public				1.617*** (0.429)	1.630*** (0.429)	1.543*** (0.426)	1.511*** (0.425)	1.267** (0.4)	1.191** (0.451)	1.196** (0.451)
FTE per resident					2.281*** (0.638)	1.782** (0.637)	2.606*** (0.647)	2.657*** (0.609)	2.725*** (0.61)	1.383 (0.713)
(Health care) facility						1.007*** (0.242)	0.889*** (0.241)	0.995*** (0.227)	0.959*** (0.228)	0.967*** (0.228)
Community care						1.142** (0.35)	1.150*** (0.348)	0.872** (0.328)	0.873** (0.328)	0.855** (0.328)
Part-time care						2.348*** (0.327)	2.217*** (0.327)	1.793*** (0.308)	1.794*** (0.308)	1.780*** (0.308)
Beds per room						1.254** (0.41)	1.179** (0.41)	0.0642 (0.388)	0.104 (0.388)	0.134 (0.388)
46 -76 places							0.963*** (0.294)	0.970*** (0.277)	0.983*** (0.277)	0.984*** (0.277)
77 - 107 places							1.736*** (0.309)	1.417*** (0.291)	1.432*** (0.291)	1.436*** (0.291)

Continued on the next page.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
More than 107 places										
Degree of rurality										
Share of private homes										
Income per citizen										
Private-for-profit x NRW										
Public x NRW										
FTE x NRW										
Constant	72.13*** (0.133)	73.96*** (0.706)	230.0*** (15.33)	204.0*** (14.05)	198.0*** (14.14)	200.3*** (14.04)	203.2*** (14.0)	171.4*** (13.36)	171.2*** (13.36)	172.6*** (13.35)
Observations	6141	6141	6141	6141	6141	6141	6141	6141	6141	6141
Adjusted R-squared	0.167	0.171	0.191	0.323	0.325	0.335	0.34	0.416	0.416	0.417

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Standard Errors in parentheses

In model 9 we include the interactions of ownership and location. The interaction between private-for-profit and the NRW-dummy shows a significant positive effect, i.e. the price difference between public nursing homes and private-for-profit nursing homes is smaller in NRW than in other federal states. The price difference decreases by another 0.34 EUR. In the last model we include the interaction between FTE per resident and NRW. The interaction is highly significant, i.e. more FTEs in NRW increase remuneration rates significantly. The price difference drops by nearly 3.20 EUR. Thus, this interaction explains by far the most part of the price difference between NRW and the comparison states. However, the NRW-dummy still remains significantly positive at about 2.60 EUR. In sum, observable characteristics explain about 70% of the raw price difference between NRW and the other states. 30% remains unexplained.

4 Conclusion

Since remuneration rates are not the result of a free market process, but are negotiated between nursing homes and the LTCI and social assistance, the question arises what factors determine the large price differences between nursing homes in Germany. This paper is the first that analyzes the determinants of remuneration rates in particular with respect to North-Rhine-Westphalia, where –on average– prices are more than 12% higher than in other large West German federal states.

Characteristics of residents, nursing homes, and the respective district explain roughly 30% of the price difference. Once we take the interaction between number of FTE per resident and NRW as well as ownership and NRW into account we can explain another 40% of the difference. We think that a different kind of negotiation in NRW explains the large impact of the interaction term of FTE and the NRW-dummy: In NRW additional personnel costs of nursing homes might be more easily accepted as a driver of prices in negotiations with the LTCI and social assistance than in other federal states. In other states higher staffing levels tend to be regarded as a matter for providers. If they are exceeding regional norm patterns they are not considered in the negotiation process for setting daily rates. For example in Lower Saxony, the less expensive federal state, price negotiations strongly take into account the prices of local competitors –independent of the internal cost structure of the negotiating nursing home. This interpretation is in line with the explanation we received in the interviews (Augurzky et al. 2008). Finally, roughly 30% of the raw price difference remains unexplained by observable characteristics.

In 2005 there have been around 150 000 residents living in nursing homes located in North-Rhine Westphalia. In total, residents, their relatives or social assistance pay between 40 and 240 million EUR per year more for nursing homes than residents in comparable states. We have calculated these figures with the upper and lower bound of the 95% confidence interval of the point estimate of the NRW-Dummy in the last estimation model. Using the point estimate itself the sum adds up to around 140 Mio EUR per year. It is up to the public and the policy makers to decide whether they are willing to pay this

amount of money for what an interviewee called “*institutional inheritance: Even before introduction of the LTCI in Germany, prices of nursing homes in NRW have been higher. Nowadays, there are extrapolated.*”

Some limitations remain. As we cannot measure the quality of care it is not possible to judge whether price differences can be justified by different quality levels. Higher staff numbers in NRW can be interpreted as better structural quality. To identify whether this transforms into better outcome quality, which alone would justify higher prices, is left to further research. Additionally, we have not been able to test empirically whether nursing homes in NRW pay wages according to the collective wage agreements more so than in other states. A separate analysis with census data showed a 6% higher income of nurses in NRW compared to the other federal states (Augurzky et al. 2008). However, this effect would also be captured in the interaction effect between FTEs and the NRW-dummy. We cannot disentangle the effects of different negotiation styles and generally paying higher wages in NRW. While the first would be a clear inefficiency in the system, the latter is ambiguous. Finally, future analyzes should also incorporate investment costs, be expanded to all federal states and use data for more years to apply panel data methods.

References

- Augurzky, B., L. Borchert, R. Deppisch, S. Krolop, R. Mennicken, M. Preus, H. Rothgang, M. Stocker-Mller, J. Wasem. 2008. Heimentgelte bei der stationren Pflege in Nordrhein-Westfalen - Ein Bundeslndervergleich. Materialien 44, RWI, Essen.
- Augurzky, B., S. Krolop, H. Schmidt, S. Terkatz. 2006. Pflegeversicherung, Rating und Demografie. Materialien 27, RWI, Essen.
- Forschungsdatenzentren der Statistischen Ämter des Bundes und der Länder. 2007. Pflegestatistik. Antragsnummer 564-2007.
- Häcker, J., B. König, B. Raffelhüschen, M. Wernicke, J. Wettke. 2008. Effizienzreserven in der stationren Pflege in Deutschland: Versuch einer Quantifizierung und Implikationen fr die Reform der Gesetzlichen Pflegeversicherung. *Zeitschrift für Wirtschaftspolitik* **57**(1) 92–116.
- Knox, K. J., E. C. Blankmeyer, J.R. Stutzman. 1999. Relative economic efficiency in texas nursing facilities: a profit function analysis. *Journal of Economics and Finance* **23**(3) 199–213.
- Mukamel, D. B., W. D. Spector. 2000. Nursing home costs and risk adjusted outcome measure of quality. *Medical Care* **38**(1) 78–89.
- Mukamel, D. B., W. D. Spector. 2002. The competitive nature of the nursing home industry: price mark ups and demand elasticities. *Applied Economics* **34**(4) 413 – 420.
- Mukamel, D. B., W. D. Spector, A. Bajorska. 2005. Nursing home spending patterns in the 1990s: The role of nursing home competition and excess demand. *Health Services Research* **40**(4) 1040–1055.
- Norton, E. C., J. C. Anthony, J. P. Newhouse. 2000. Chapter 17 long-term care. *Handbook of Health Economics*, vol. Volume 1, Part 2. Elsevier, 955–994.
- Nyman, J. 1994. The effects of market concentration and excess demand on the price of nursing home care. *The Journal of Industrial Economics* **42**(2) 193–204.
- Roth, G., H. Rothgang. 1999. Die Auswirkungen des Pflege-Versicherungsgesetzes auf die Entwicklung der Heimentgelte. *Zeitschrift für Gesundheitswissenschaften* **7**(4) 306–335.
- Rothgang, H., G. Igl. 2007. Long-term care in germany. *The Japanese Journal of Social Security Policy* **6**(1) 54–58.
- Rothgang, H., J. Wasem, S. Greß. 2005. Vergütungsfindung auf dem stationären Pflegemarkt in Nordrhein-Westfalen Bestandaufnahme und Alternativen. Report, Universität Duisburg-Essen, Essen.
- Statistisches Bundesamt. 2001. Kurzbericht: Pflegestatistik 1999 Pflege im Rahmen der Pflegeversicherung - Deutschlandergebnisse. Report, Bonn.
- Statistisches Bundesamt. 2007. Pflegestatistik 2005: Pflege im Rahmen der Pflegeversicherung Deutschlandergebnisse. Report, Wiesbaden.