

# **NORWEGIAN PHYSICIAN MARKET POLICY**

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## **ABSTRACT**

I discuss what the government can do and has done to reach its equity-oriented policy targets concerning the geographical distribution of physicians in the municipality health service. Current policies has been inadequate to solve the problems. Securing an adequate supply of physicians seems to be a crucial policy tool. Forecasts in the 80s mistakenly predicted a future oversupply of physicians. The education capacity was reduced. The physician shortage was severe during the 1990s. The forecasts used in planning today are based on dubious assumptions. Cost-benefit analyses with a risk averseness perspective can provide more suitable information for deciding what the education capacity for physicians should be.



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## PREFACE

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Comments are very much appreciated. I can be reached by email at [Are-Harald.Brenne@ugagn.info](mailto:Are-Harald.Brenne@ugagn.info).

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Originally this thesis was intended to be a contribution to the official evaluation of the list patient reform. I have received a scholarship for writing it.

(Part of) the data used in this publication have been taken from The Norwegian Social Science Data Services' municipality data base. The Norwegian Social Science Data Services are not responsible for analysis of the data or for the interpretations done here.





# DEFINITIONS

## Commonly used abbreviations:

RTV: Rikstrygdeverket. The National Insurance Organisation.

FLO: Fastlegeordningen. The list patient system, introduced in 2001.

KS: Kommunenes Sentralforbund. Norwegian Association of Local and Regional Authorities.

DNLf: Den Norske Lægeforening. The Norwegian Medical Association.

TDNLf: Tidsskrift for Den Norske Lægeforening. Journal of the Norwegian Medical Association.

SSB: Statistisk Sentralbyrå. Statistics Norway.

HD: Helsedepartementet. The Ministry of Health<sup>1</sup>.

FFS: Fee-for-service.

GP: General practitioner, general physicist, family doctor.

SHDir: Sosial- og Helsedirektoratet. The Norwegian Directorate for Social and Health Affairs.

SAFH: Statens Autorisasjonskontor for Helsepersonell. The Norwegian Registration Authority for Health Personnel.

## Use of terms:

When I refer to 'specialists with private practice', I mean non-GP specialists. Specialized and non-specialized GPs belong to the primary health service, whereas the specialists I refer to when using the term in that context belong to the domain of the specialist health service.

I use the terms 'municipality health service' and 'primary health service' interchangeably when referring to the municipality health service.

Municipalities need to employ physicians for administrative and community health purposes. In many cases I do not distinguish between these type of positions and GP positions when I refer to physician positions in municipalities throughout the text.

When I use the term 'government', I refer to all government levels, including the central government and municipalities.

I use 'stability' and 'stable' to refer to the property of having physicians that stay in their positions for a long time. For example, by 'a stable municipality' I mean a municipality with low turnover in its physician workforce.

## Cross-references

The text contains many cross-references. Selected paragraphs are numbered to make cross-referencing easy. The first digit in the paragraph numbers refer to the chapter where the paragraph belongs. The paragraph count restarts in each chapter.

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<sup>1</sup> What I refer to as The Ministry of Health has had various official names up through the years according to how the areas of responsibilities have been distributed between the ministries. I refer to the ministry that at the time had responsibility for the health service.

# Chapter 1: INTRODUCTION

The topic discussed in this thesis is the Norwegian physician market policy. I define physician market policy as the policies used by the government to come closer to reaching its policy targets concerning the geographical distribution of physicians. Key questions are: What policies has the government used to address the political challenges related to the physician distribution? What is the political action space in this area? Are the measures currently used suitable and sufficient to reach the policy targets? I focus on the last ten to twenty years, and draw lines further back in time when appropriate. I look at the geographical distribution of physicians in the municipality health service only. My main focus is on aspects related to the aggregate level of demand and supply for physicians.

The geographical physician coverage in Norway has always been a political concern, particularly because of difficulties in recruiting physicians to rural areas. The Norwegian welfare state is based on equity oriented distribution goals for public services, including health services. To quote the accession manifest for the centre-left coalition currently in government (the Soria Moria-declaration): *"Everyone should have access to equally good health- and caretaking services, independently of personal economic situation or place of residence."*<sup>2</sup>. With such policy targets, geographical differences in the quality of health services becomes a source for social inequity.

If health services are to be equitably distributed, the physicians that provide health services need to be distributed according to the same equity principle. A good physician market policy promotes social justice, because it makes the distribution of physicians and consequently the distribution of health services more equitable.

A special property of the GP-patient relation is that the quality of GP services has been found to be dependant on the duration of the relation. Scott

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2 The source document is "Plattform for regjeringssamarbeidet mellom Arbeiderpartiet, Sosialistisk Venstreparti og Senterpartiet 2005-09." The quote in Norwegian is "Alle skal ha tilgang til gode og likeverdige helse- og omsorgstjenester, uavhengig av personlig økonomi og bosted."

(2000) discusses this and has further references. In some areas in Norway, mainly rural, this can be a major problem. Kjekshus and Tjora (1998) and Abelsen and Bæck (2005), which I present in more detail in chapter 3, both talk about stability in the physician work force as being the most crucial target for rural municipalities when they recruit physicians. One of the goals of the list patient reform has been to promote stability in GP-patient relations.

It is not clear whether the government's policy target regarding the distribution of health services is ensure equal access to health services or the provision of health services according to need. The manifest quoted above for example, only state equity in access as a policy goal. On the other hand SHDir have developed a plan of action to reduce social inequalities in health<sup>3</sup>, which implies a need-oriented distribution goal. Wagstaff and van Doorslaer (2000) discuss why there is a possible conflict between the equal access and provision according to need policy goals. I quote from page 1813, paragraph 2.2.2: *"...equality of access will not necessarily result in health care being allocated according to need, or in the attainment of – or even promotion of – equality of health."* and from page 1814, under paragraph 2.2.3: *"Contrary to what appears to be believed in many policy-making circles, then, one cannot logically espouse simultaneously equality of access, allocation according to need, and equality of health. A choice has to be made."*

This implies that whether the Norwegian government's distribution target for health services is provision according to need or equality of access has consequences for how the physicians that provide the health services should be distributed geographically. (There is also a possible conflict between policies related to upholding the population level in rural areas on one hand and equity in the distribution of health care on the other hand<sup>4</sup>). Wagstaff and van Doorslaer (2000) also discuss why

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3 "The Norwegian Directorate for Health and Social Affairs' Plan of Action to Reduce Social Inequalities in Health: The Challenge of the Gradient." SHDir 2005.

4 As an illustration: According to a newspaper report, the minister for regional affairs in 1994, Gunnar Berge, gave the following answer when asked to comment on the differences between a poor central municipality and a rich remote municipality: "I understand that inequalities can be provocative, but it is a national [political] target to maintain the population pattern." In norwegian "Jeg forstår at ulikheter kan virke provoserende, men det er et nasjonalt mål å beholde bosetningsmønsteret." Source: Aftenposten 27.10.1997 "De økonomiske ulikhetene er store".

any of these policy targets may involve a rejection of the Pareto criteria. I quote from page 1815: *“In short, acceptance of the Paretian value judgements seem to be inconsistent with a desire to equalize access to medical care. Or, to put it the other way around, a desire to equalize access suggests a rejection of the Paretian value judgements.”*

When the political target for how health services and physicians should be distributed is unclear, it becomes difficult to evaluate to what extent the physician distribution is in accordance with the politically targeted distribution. Furthermore; in the empirical chapter I discuss methodological problems for adapting an equity oriented approach given the data I have available (the discussion starts in paragraph 5.4). These two issues makes it problematic for me to adapt an approach were the physician density is evaluated according to what extent it is equitable in the sense of being distributed according to the population’s demand for GP services or health status. Besides, it has partly been done already: Carlsen (2006) is an empirical study that builds on a very extensive data material. He discusses equity in GP distribution - according to need.

Instead I choose to take the governments’ demand for physicians as it can be observed through occupied or vacant physician positions as granted, and treat that as the normative goal for how the physician distribution should be. I assume that the government wants to avoid geographically systematic differences between central and rural areas in GP position vacancy rates and in the instability of GPs, and that any such pattern is a source for inequity. Specifically, I operationalize the government's policy targets to be: to minimize the number of vacant physician positions, to avoid geographically systematic variation in GP position vacancies and in the instability of GPs along the center-periphery axis and to maximize the stability of GPs. Carlsen (2006) justifies this operationalization, because he finds that low quality in GP services is related to instability in the GP workforce, thereby validifying the treatment of differences in GP stability as a source for inequity. Kjekshus and Tjora (1998) and Abelsen and Bæck (2005) give strong support to the notion that vacancy rates and instability in physician positions are closely

related. Aakvik and Holmås (2005) find that there is a significant relationship between mortality and physician vacancies but not between mortality and physician work years at municipality level in Norway. This supports looking at vacancy rates instead of physician work years.

To summarize: I discuss physician market policies on the area of promoting a socially geographically equitable GP distribution. I assume observed physician positions as the normative goal, and that the government wants to avoid vacant GP positions and unstable GPs and inequities in the distribution of those two.

The next chapter contains a chronological presentation of institutional changes, policy measures and other events pertinent to the problem for discussion. Next there is a literature review chapter, where I present selected research concerning the physician market. In the proceeding theoretical analysis chapter I present a theoretical framework and use it to analyze different policy measures. In the empirical chapter I use descriptive statistics to look at trends in the physician market. In the final chapter I provide policy recommendations and suggest topics for further research.

## **Chapter 2: PRESENTATION OF EVENTS**

This chapter contains a chronological presentation of relevant institutional developments and policy measures. In the end there is a figure with an overview followed by a summary of the most important trends.

Norway has a dispersed population pattern. The travel distances within municipalities and from municipalities to the closest hospital can be long. In 2001 there were 435 municipalities. The median population size of municipalities that year was 4358. The municipalities carry the responsibility to organize the municipality health service, of which the primary health service and GPs are a part.

2.1 In the 1970s all hospitals were required to have a permit from the Health Directorate for each physician position. The regulation was not effective – hospitals disregarded the permit system and hired physicians illicitly. From 1979 to 1983 all new physician positions in central parts of the country required a permit from a government-appointed council<sup>5</sup>. (Buhaug (1997))

2.2 In 1983 a government report<sup>6</sup> predicted that there would be a future oversupply of physicians in Norway. (Skoglund og Taraldset (2000) discuss these mispredictions further.) Subsequently the domestic education capacity for physicians was reduced, and the funding for tuition fees for Norwegian medical students abroad was removed.

2.3 The municipalities have had the responsibility for the GP service since 1984, when the municipality health service bill<sup>7</sup> took effect. They also have the responsibility for emergency physician services, nursing care, health station services and other community health service duties.

After 1984, with the municipality health service bill, the funding for physicians with private practice had three components. They received FFS funding from RTV. If they had a contract or agreement with a municipality or county, they also received a block grant based on the size of amenities and number of auxiliary personnel in the practice. User payments were the third income source. Physicians were free to establish private practices without any agreement with a municipality or county. They would still receive the FFS refunds. These private practices without government contract were mainly located in the most central parts of the country. In rural or small municipalities GPs were commonly hired as ordinary employees paid by the hour, instead of having private practices.

2.4 In 1988 the Parliament passed a bill that granted the government, specifically HD, wide powers over

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5 Ot.prp. nr. 16 (1978-1979) "Om midlertidig lov om adgang til regulering av legetjenester." Case number 1230286 in the archives at [www.odin.dep.no](http://www.odin.dep.no).

6 "Utdanningskapasiteten for leger og fysioterapeuter. Fra en interdepartemental arbeidsgruppe nedsatt mai 1982, Formann Egil Willumsen." Oslo, Sosialdepartementet, 1982.

7 "Lov av 1982-11-19 nr. 66 om helsetjenesten i kommunene".

the physician market<sup>8</sup>. The purpose was to remedy the difficulties rural municipalities had in recruiting physicians. The bill included a general moratorium on establishing new physician positions, including privately financed positions. Under the bill the government could overrule the hiring of physicians to existing positions, and command physicians to take specific positions. The bill was replaced by an agreement in 1989 (Legefordelingsavtalen – The Physician Distribution Agreement<sup>9</sup>). The agreement was between KS, the municipality of Oslo and DNLF. HD later joined. Under this agreement all municipalities and hospitals were required to apply to a council, consisting of appointees from the agreement partners, for a permit before they could establish a new physician position. The idea behind this agreement, and the similar regulation in effect prior to 1983 referred to in paragraph 2.1 above, was to limit the number of available physician positions in central areas in order to make physicians accept employment in more rural parts of the country. (Buhaug (1997))

2.5 In the beginning of the 1990s the policy of reducing the education capacity of physicians from the mid-1980s was reversed. The number of students admitted to Norwegian medical schools was increased throughout the 1990s. I have not found accurate annual figures on the number of students admitted to Norwegian medical schools. The figures in Stølen et al (2002) indicate an increase close to 100% from 1990 (310 students) to 1998 (594 students). However, those figures include the student capacity bought at foreign universities discussed in paragraph 2.13.

2.6 The tuition fee scholarships for Norwegians studying medicine abroad were reintroduced in the beginning of the 1990s<sup>10</sup>.

2.7 Prior to 1992 physicians, including GPs, could freely establish private practices in any part of the country and receive FFS funding from RTV. The Parliament in 1992 decided to remove FFS funding to

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8 Ot.prp. nr. 36 (1987-1988) "Om midlertidig lov om stillingsstopp for leger m.v." Case number 1320212 in the archives at [www.odin.dep.no](http://www.odin.dep.no).

9 The agreement was later renegotiated. The 1995 version is reproduced in Buhaug (1997).

10 Most likely around 1992, but I have not found an accurate source.

private physician practices without a contract with the government established after October 1992<sup>11</sup>. Those established before this date would still receive the FFS funding. According to a news report, the purpose was to save money and limit the number of physicians in central areas of the country<sup>12</sup>.

2.8 There has been a common Nordic labor market for physicians since 1965 (Skoglund et al. (2005)). In 1994 Norway entered the EU's inner market through the EEA agreement. The agreement involves free flow of labour, and has made it easier for physicians from the EU to seek employment in Norway.

2.9 In 1994 KS and DNLF made an agreement that allowed for planned overtime, and standard work-weeks for physicians of more than the standard 37.5 hours<sup>13</sup>. According to DNLF, in 1994 the average work week for physicians at hospitals was 49 hours, 63 hours if time on resting alert duty<sup>14</sup> was included. The average salary for hospital specialists including overtime payment was NOK 400 000.<sup>15</sup>

2.10 Between 1995 and 1998 physicians working at hospitals received large wage increases. Table 1 shows the development of the average monthly total salary for employees with physician education employed in municipalities and counties. The figures are taken directly from the PAI-statistics publications and adjusted for inflation with 1998 as reference year. The PAI-statistics are published annually by KS and are based on the municipalities' accounting

11 Ot.prp. nr. 6 (1992-1993) "Endringer i lov 17 juni 1966 nr 12 om folketrygd og i visse andre lover." Case number 1370010 in the archives at [www.odin.dep.no](http://www.odin.dep.no).

12 NTB (Norwegian Telegram Bureau) November 30 1992 "Refusjonsordningene for leger strammes inn".

13 As source, see for example <http://www.ssb.no/helsetjko/om.html> (at least as per september 2006) which is part of the documentation for the municipality physician work year data I use in the empirical chapter: "Overtid skal generelt ikke takast med, men for legane vart det frå statistikkåret 1994 også inkludert timeverk etter avtaler om forlenga arbeidstid (sentral forbundsvís særavtale mellom Kommunenes sentralforbund og Den Norske Lægeförening). Denne avtalen opnar for at ein, for inntil eitt år om gongen, inngår avtale om forlenga arbeidstid utover 37,5 timar i veka." In English: "Overtime should generally not be included, but for physicians work hours from planned overtime are included - as per the Central Unionwise Special Agreement between KS and DNLF". This agreement makes it possible for physicians to arrange with their employers to have regular work weeks extending 37.5 hours."

14 "hvilende vakt"

15 Source: Bergens Tidende February 17 1994 "Leger tvinges til overtid". The newspaper quotes a DNLF staff member on the figures.

figures<sup>16</sup>. Physicians with a municipal contract and private practice are not included. The hospitals are not included for 2001. The drop in salary from 2000 to 2001 indicates that hospital physicians on average had a higher salary than physicians employed in municipalities. Baltagi et al. (2003) also use data from the PAI-register. They calculate the average hourly wage for physicians working in hospitals only.

**Table 1 Salary development for physicians 1993-2001 (based on PAI-data). 1998 NOK.**

Year	Total average monthly salary for all physicians in the PAI-register	Average hourly wage for physicians working at hospitals
1993	32349	186
1994	32532	187
1995	31988	191
1996	36952	221
1997	38369	221
1998	41694	-
1999	41119	-
2000	41390	-
2001	32472 (excl. hospitals)	-

It is unclear whether the data on which these figures are based include all extra payments from overtime and shift work. For this reason, they might be underestimating the increase around 1996. A newspaper article from 1997 says that calculations based on the negotiation results points towards an increase in salary for physicians in the period 1995-1997 of around 40%<sup>17</sup>. According to Askildsen and Holmås (2004) the salary increase from 1995 to 1996 was considerably higher for assistant physicians than for consultant physicians.

2.11 Prior to 1997 hospitals were financed by block grants. In 1997 an activity-based reimbursement system for hospitals was introduced.

16 KS (1992-2000): "Kommunale Arbeidstakere. Lønns- og personalstatistikk. Hovedoversikt." Kommuneforlaget, Oslo. Annual editions 1993-2002. PAI is an acronym for personnel administrative information.

17 Dagbladet June 5 1997 "Men legene er fortsatt i streikehumør" is the source for the 40% figure. See also Dagbladet June 19 1997 "Dagbladet avslører HERNES' hemmelige spill - legenes lønnsoppgjør avgjort på forhånd".

2.12 From 1997 to 2004 The Norwegian Labour Administration (Aetat) actively recruited health personnel, including physicians, from selected foreign countries. Germany was the most important target country. The recruits were given job interviews, employment contracts and language courses in their home country prior to arriving in Norway. Only personnel planning to stay at least 12 months were recruited by the project<sup>18</sup>.

2.13 From 1997 to 2005 the government bought education capacity at foreign medical schools. The application routines were facilitated and were the same as for Norwegian medical schools.<sup>19</sup>

2.14 In 1997 the Parliament decided to terminate the FFS funding to all specialist physicians in private practices that did not have a contract with the government<sup>20</sup>. The GPs were exempted because the list patient reform was forthcoming. This change did not have any immediate effect on the number of specialist practitioners, since funding were provided for the counties to give existing specialists with practices contracts.

2.15 Starting at the beginning of the 1990s, there was a development towards permitting private companies to rent out health personnel and otherwise intermediate in the job market for health personnel. In 1993 these activities were not allowed except for companies with special permits. The government became less restrictive in issuing permits throughout the 1990s, chiefly because of pressure from the health service sector<sup>21</sup>. From January 1998 private companies were allowed to intermediate between Norwegian employers and foreign physicians. Renting out health personnel was

mostly forbidden until it was legalized in 2000<sup>22</sup>. From 2003 private companies can unfetteredly act as intermediaries and rent out labour of any type.

2.16 From 1998, the government has had action plans directed towards securing the future recruitment of health personnel<sup>23</sup>. SHDir is now responsible for the planning of education capacity and recruitment policies for health personnel. On commission from SHDir, SSB has made two similar reports with estimates of future supply and demand of health personnel (Stølen et al. (2002) and Texmon and Stølen (2005)). I present the latter in paragraph 3.14.

2.17 Buhaug (1997) evaluates the agreement based regulation of the physicians market (see paragraph 2.4), and concludes that it was ineffective. (See paragraph 3.1 for a further presentation of the evaluation.) In 1999 it was replaced by legislative regulation, which is still in effect. Under the 1999 law all government-financed physician positions require a permit from HD. A council named the National Council for Position Structure and Physician Distribution (Nasjonalt råd for spesialistutdanning og legefordeling) was established to process applications for new physician positions on behalf of HD. The 'position structure' part of the council's name refer to its responsibilities in governing the physician specialist position education structure, which is a topic I will not look further into. This council's composition is similar to the composition of the council mentioned in paragraph 2.4, which had the same function under the former agreement based regulation.<sup>24</sup>

2.18 In 2000 the Parliament decided to change the immigration policy to make it easier for foreigners from non-EEA countries to seek employment in Norway. The health service's need for labor was a

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18 Source: "Evalueringsrapport for Aetat helserekuttering (1998-2001)", acquired from The Norwegian Labour Administration (Aetat) in 2003.

19 The Norwegian Medical Journal has a feature article about this: "Vårt femte fakultet" by Geir Jacobsen, . TDNLF no. 8 2000 (volume 120) page 2326.

20 Ot.prp. nr. 47 (1996-1997) "Endringer i lov 28. februar 1997 nr. 19 om folketrygd (Avvikling av refusjoner til helsepersonell uten driftsavtale - oppretting av flere driftsavtaler for privatpraktiserende helsepersonell.)" Case number 1410276 in the archives at [www.odin.dep.no](http://www.odin.dep.no).

21 See for example Aftenposten July 24 1996 "Arg på formidlingsforbud" where an HD representative expresses opinions in favor of letting private companies act as intermediaries between physicians and Norwegian health care institutions.

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22 The legal change in 2000 was based on the green paper NOU 1998:15 "Arbeidsformidling og arbeidsleie. (Blaalid-utvalgets rapport)". Case number 1430310 in the archives at [www.odin.dep.no](http://www.odin.dep.no).

23 The latest is from 2002, and available from SHDir in print and electronically: "Rekutteringsplan for helse- og sosialpersonell 2003-2006: Rekuttering for bedre kvalitet", SHDir november 2002.

24 The source for this paragraph is "Nasjonalt råd for spesialistutdanning av leger og legefordeling: Årsmelding 2000" which I acquired from SHDir.

consideration behind the change<sup>25</sup>.

2.19 In 2001 the list patient reform (FLO) was introduced<sup>26</sup>. The core aspect of FLO was to strengthen the bond between physician and patient by assigning each patient to one particular GP through a patient list system. FLO established clearer areas of responsibilities for GPs and municipalities. The GPs became responsible for providing the patients on their list with physician services within office hours through the entire year.

2.20 Under FLO, municipalities are legally obliged to provide all inhabitants with a spot on a GP's list. They should also have at least two GPs with non-full patient lists, in order to give patients a real choice between different GPs. Each GP can specify the maximum number of patients on her or his list. FLO consequently impose a minimum standard for physician density which municipalities should comply to.

After the introduction of FLO, GPs receive a fixed amount of money per patient on their list from the municipality, FFS payments from RTV and some modest user payments. 30% of the total salary is supposed to come from the per capita part, and 70% as FFS payments from RTV and patients.

2.21 Some small and rural municipalities still have GPs as employees, but that type of relation between GP and municipality has become less common after FLO was introduced.

2.22 All GPs with private practices without government contracts were offered contracts within the FLO system, and most of them accepted. This is similar to what happened with private practice specialists in 1998. After the introduction of FLO, no physician with private practice in Norway receive FFS payments from RTV unless they have a contract with the government.

2.23 GPs got a significant increase in their salary following the introduction of FLO. Lacking reliable data on physician salaries, I refer to a newspaper in Bergen, a municipality with approximately 230 000 inhabitants. The newspaper checked income statement reports on GPs for 2000 and 2001<sup>27</sup>.

According to their calculations, GPs participating in FLO on average increased their before-tax income with NOK 90 000 from 2001 to 2002. FLO was introduced July 1st 2001, thus the figures from the newspaper indicate an increase in average annual salary directly after the reform in the vicinity of NOK 180 000. A GP quoted in Carlsen, B (2005) mentions NOK 210 000 as his salary increase with FLO.

2.24 The 1<sup>st</sup> of January 2002, ownership of the specialist health service, chiefly hospitals, was transferred from the 19 counties to the central government.

2.25 According to a newspaper report referring to SSB data, the average salary for physicians in hospitals increased with NOK 85 000 from 2002 to 2003, and almost doubled from 1994 to 2004<sup>28</sup>. Another newspaper article refers to the negotiation results between DNLF and the employers' organisation, and writes that the increase in salary for hospital physicians from 2002 to 2003 was 20%<sup>29</sup>.

2.26 Since 2004 it has become easier for physicians from the new EU countries in Eastern Europe to enter the Norwegian labor market. Eventually physicians with recent medical degrees from the new EU countries will be flowing just as freely as people from the old EEA member countries are doing<sup>30</sup>.

2.27 Hunskår and Røttingen (2004) discuss the lack of research oriented institutions in the GP area in Norway. In 2006 the Parliament set aside three millions to plan for research institutions dedicated to general practice related topics<sup>31</sup>.

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25 Innst.S. nr. 117 (1999-2000) "Regulering av arbeidsinnvandring". Case number 1440134 in the archives at [www.odin.dep.no](http://www.odin.dep.no).

26 St meld nr 23 (1996-97) "Trygghet og ansvarlighet Om legetjenesten i kommunene og fastlegeordningen." Case number 1410228 in the archives at [www.odin.dep.no](http://www.odin.dep.no).

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27 Bergens Tidende October 11 2003 "Fikk 140.000 i lønnsøkning".

28 Dagens Næringsliv July 22 2005 "Legelønn nær doblet på ti år".

29 Dagsavisen March 22 2004 "Nesten 100 000 mer til legene".

30 Source: <http://www.safh.no/saksgang/informasjon-eu.htm>.

31 "Forskning i allmenntjenesten" TDNLF no. 12 2006 (volume 126) page 1647.

2.28 By august 2006 it was evident that hospitals have employed more physicians than permitted by HD, under the legal regulation of the physician market established in 1999<sup>32</sup> (see paragraph 2.17).

Figure 1 is an overview over this chapter. I would like to point out the major development trends.

2.29 The beginning of the 1990s saw a reversal of the policy from the 80s of reducing the number of medical students, domestically and abroad. By 1997 the government was buying education capacity at foreign universities, and was also recruiting physicians directly from abroad. From 1998 the government has had an explicit policy for planning the future supply and demand for health personnel. In chapter 4 I discuss how the recruitment situation in rural areas is likely to be affected by the aggregate level of supply and demand of physicians.

2.30 Immigration and labor market regulations have been liberalized. In the 1980s, private companies could not act as intermediaries between employee and employers in the labor market. After 2003 such activities are not restricted by any regulations. Any non-Nordic physician that wished to relocate to Norway prior to the EEA agreement would have faced difficulties in getting a work permit. After the immigration law liberalization in 2001, it is possible for physicians (and other professionals in demand) to move to Norway and work here regardless of their country of origin. With the EU enlargement, physicians from the 25 EU countries (plus Switzerland<sup>33</sup> and EEA-members Liechtenstein and Iceland) are able to move freely to Norway and obtain Norwegian physician authorizations and work permits relatively easily. Foreign physicians have since 1992 played an increasingly important role in the Norwegian health care system, particularly in rural areas. I will discuss this further in chapter 5.

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32 Dagens Medisin August 17 2006 "Ansetter årlig 200 leger ulovlig".

33 Source on Swiss physicians - quote from SAFH's web page <http://www.safh.no/regelverk/eos.html> (as per september 2006): "Personer med utdanning eller autorisasjon/ lisens fra Sveits har samme rettigheter som EØS-borgere fra 2002, i henhold til "avtale med tilhørende vedlegg om endring av Konvensjon om opprettelse av Det europeiske frihandelsforbund (EFTA) av 4. januar 1960, undertegnet i Vaduz 21. juni 2001", se St.prp. nr. 10 (2001-2002) om ratifisering for Norge."

2.31 The development in regulations regarding publicly financed physician positions has gone in the opposite direction - towards being more restrictive and involving more government control. Physicians and other healthcare professionals have always been allowed to run privately financed health services in Norway. What has changed is to what extent these receive government funding. Prior to 1992 any physician could establish a private practice and receive FFS payments. After 2001, with the introduction of FLO, only physicians with a government contract are eligible for the FFS funding. This change limits the number of physicians in central parts of the country by imposing greater government control over the public money flow to physicians.

2.32 From 1984 to 1988 the demand side of the physician market was unregulated, and all hospitals and municipalities could unfetteredly hire physicians. There was an agreement based regulation of demand for physicians in effect from 1989 to 1998 - which was not effective (see paragraph 2.17). Since 1999 the government has in principle (but not in practice - see paragraph 2.28) been in complete control of the entire publicly financed physician market, as any new physician position within the public health service now require a permit from HD. The regulation of physician positions is meant to be a tool for the government for improving the recruitment situation in rural areas.

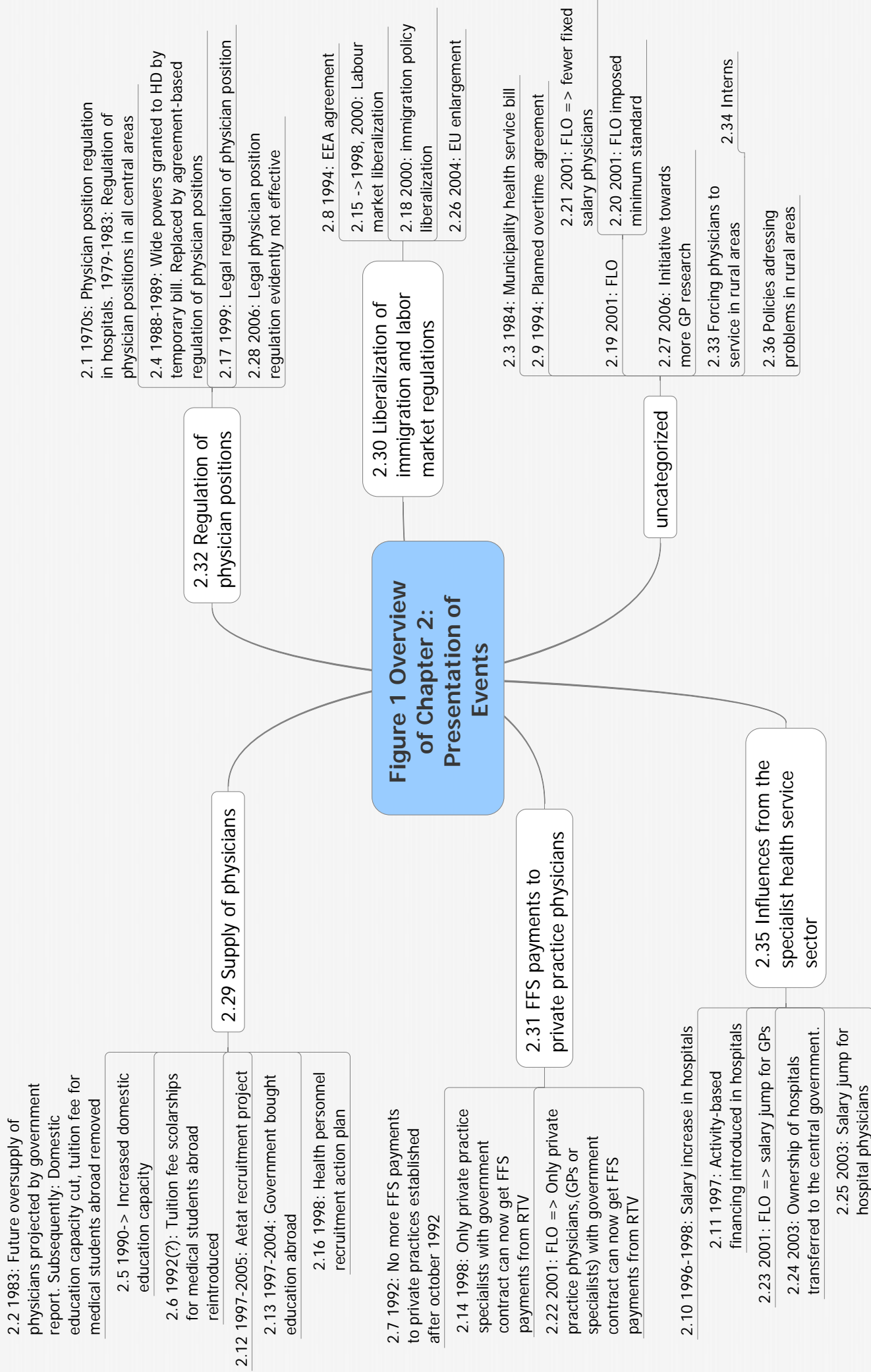
2.33 From 1988 to 1989 there was a law in effect that permitted the government to forcibly order physicians to specific positions. I have not read anywhere about these powers actually being used. Similar measures have been suggested by politicians and others at several occasions<sup>34</sup>.

2.34 All domestically educated physicians, and to a various extent physicians educated abroad, are required to take the intern duty service prior to receiving their Norwegian physician authorization. This includes six months in general practice. Traditionally the GP intern service has been extensively used to supply physicians to municipalities with recruitment problems. The

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34 See for example "Nei til plikttjeneste i samiske strøk" TDNLF no. 1 2005 (volume 126) page 125.





interns can only state preferences regarding at what location they wish to have this practice – ultimately they are required to go where assigned.

2.35 During the years from 1996 to 1998 physicians working at hospitals received large salary increases. GPs got a jump in salary when FLO was introduced in 2001. Hospital physicians seem to have received a jump in salary again around 2002. As I discuss under paragraph 4.4, the recruitment situation in the primary health service can be affected by the relative salary between the primary and specialist health service. The salary increases in the hospitals coincide with reforms in the hospital sector. This may or may not be coincidental, but it is outside the scope of this thesis to discuss that question.

2.36 One area that I have chosen not to refer to in detail, are measures specifically addressing recruitment problems faced by rural municipalities. The government has in the time period covered to an increasing extent used such policy measures. Examples are the establishment of a telemedicine center<sup>35</sup> in 1993, the focus on establishing larger health care units in the municipalities to generate stronger professional environments for health personnel<sup>36</sup>, and initiatives taken to promote inter-municipality cooperation in emergency physician services in order to reduce the workload on physicians outside office hours<sup>37</sup>.

In this chapter I have presented the most important institutional and political developments affecting the geographical distribution of physicians since the 1980s: The education capacity was reduced in the 1980s and increased in the 1990s. Immigration and labor market regulations have been liberalized since the mid-1990s. Physician positions have, at least partly in futility, been attempted regulated since 1989 and more strictly since 1999. The public funding for GPs have become put under stricter control. The relative salary between GPs and hospital physicians

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35 The Norwegian Centre for Telemedicine at the University Hospital in Tromsø, which is also a WHO collaboration center. Web site: [www.telemed.no](http://www.telemed.no).

36 See for example "Distriktsmedisin - ny giv for allmennleger i Utkant-Norge" by Tom Sundar. TDNLF no. 2 2002 (volume 122) page 221.

37 See for example "Vil ha økt vekt på interkommunal legevakt" TDNLF no. 13-14 2006 page 126.

has been in development. Policy measures targeted at rural areas has to an increasing extent been used.

## Chapter 3: LITERATURE REVIEW

Here I present selected literature that is suitable for shedding light over the aspects of the Norwegian physician market related to the geographical distribution of physicians and how the government has tried to achieve its targets on that area.

3.1 Buhaug (1997) is the only study I have found of the regulation of physician positions, which has been an important part of the Norwegian physician market policy (although more intentionally than effectively). Buhaug (1997) evaluates the agreement-based regulation of the physician market that lasted from 1989 to 1999 (see paragraph 2.4). The agreement was renegotiated in 1995, and merged with a similar agreement that had as purpose to regulate positions related to the education in the different physician specialities. The motivation for the merge was mainly practical, to get one administration concerned with physician positions instead of two.

Under the agreement a council<sup>38</sup> with representatives from the agreement partners (KS, DNLF, HD and the municipality of Oslo) processed applications from hospitals or municipalities for new physician positions. The council had a small secretariat that were also supposed to keep track of all physician positions. Buhaug (1997) writes that the administration did not have the necessary resources to monitor the physician market as intended. His impression, after informal conversations and a rudimentary survey of health managers at county level (the counties owned most hospitals at that time), was that the agreement was not taken seriously. The health managers expressed low confidence in and little loyalty to the regulation

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<sup>38</sup> From 1989 to 1995 the council was called "Legefordelingsutvalget", abbreviated LFU. In English, "The physician distribution council". With the renegotiation in 1995 the council changed name to "Utvalg for legestillinger og stillingsstruktur", abbreviated ULS. In English, "Council for physician positions and position structure." (Buhaug (1997))

regime. Buhaug (1997) compares figures on physicians from the council's secretariat to work year data from SSB, and shows that there was substantially larger growth in the number of actually employed physicians than what the growth in permits given from the physician distribution council implied. His conclusion is that the regulation was not effective, because the agreement partners commonly ignored the agreement and employed physicians without having the required permits from the council.

Buhaug (1997) is important because he documents that one of the chief political instruments used to promote equity in the geographical distribution of physicians from 1989 to 1998, the agreement-based regulation of the physician market, failed to accomplish its goals.

3.2 Kjekshus and Tjora (1998) is a qualitative study of the physician shortage situation in one county (Møre og Romsdal). The report was made on commission from KS. Their primary source is interviews with physicians and health managers at hospitals and in the municipality health service.

Some of their findings are: When recruiting physicians, employment opportunities for spouses as well as kindergarten and schooling facilities could be important factors. Interns were an important resource in municipalities with recruitment problems. Many municipalities had particular problems with recruiting physicians to physician positions with administrative or community medicine duties. The chief physicians in the municipalities carried larger responsibilities and earned less than regular GPs with FFS contracts commonly did.

Kjekshus and Tjora (1998) emphasize the importance stability of physicians had in the municipality health service. Physicians in long-term employment made it possible to develop more professionally interesting work environments. Municipalities that had succeeded in creating such work environments for their physicians could more easily recruit new physicians. Municipalities with an unstable physician workforce typically had a professionally less interesting work environment, making recruitment harder.

3.3 The use of short-term substitutes, often foreigners, were by the municipalities viewed as a last-resort solution to fulfill their obligation to provide their inhabitants with physician services. According to Kjekshus and Tjora (1998), short term GP substitutes were usually more monetarily motivated than GPs staying in their positions for longer durations. The remuneration scheme for emergency physician services at the time of the study consisted of FFS payments going directly from RTV into the physician's pocket. (This was changed to a per-hour salary system in 2000.) Given the incentives provided to them with the FFS system, physicians on short-term contracts would commonly work as much as possible, also outside the normal office hours. This could over time make the patient population get used to being able to see the doctor at evenings and nights even when swift consultations were not medically required. Municipalities with a history of using short-term substitutes as GPs, would typically have a patients that expecting GPs to respond at any time during the day - or night. This increased the recruitment difficulties, since physicians looking for long-term employment were less inclined to appreciate work calls at evenings and nights.

Municipalities with a stable GP workforce could teach their patients to seek treatment during office hours, and in that way reduce the work load at evenings and nights. This would make recruiting GPs easier and increase the stability of the GPs in the municipality.

3.4 Thus Kjekshus and Tjora found two mechanisms that potentially can create self-reinforcing spirals in the GP recruitment conditions in municipalities: A history of unstable physicians and use of short term substitutes can lead to a weak professional work environment, and high work load outside office hours. This will again contribute to recruitment difficulties. Conversely a municipality that have had stable GPs for some time, may have a more interesting professional work environment and less workload on evenings, weekends and nights - making it easier to recruit new GPs.

Cooperation between municipalities on emergency physician services may make recruitment easier by contributing to reducing the workload on GPs outside office hours by having one GP cover more

than one municipality while on duty. The study points out that in the political landscape of rural municipalities such arrangements can be interpreted as a step toward centralization, and therefore be viewed as undesirable by the political leadership.

3.5 Kjekshus and Tjora also discuss possible explanations for the physician shortage as it can be observed in terms of unoccupied positions. They write that there are additional explanations behind the vacant positions to what they call traditional physician shortage, caused by lack of physicians willing to accept positions. Overtime can be an important source of income for some physicians, which may make them less interested in having all positions filled. Positions may also be held vacant in order to have the necessary flexibility to recruit promising candidates, if any should turn up.

3.6 A very important conclusion from Kjekshus and Tjora (1998) is that quantitative data on the number of work years for physicians have poor validity particularly for municipalities with recruitment problems. A large number of observed work years does not necessarily imply that the patients in that municipality receives high quality GP services. On the contrary, it can mean that the municipality have a history of unstable physicians and of being reliant on short term substitutes. Because of discontinuity in the GP-patient relations and excessive workload from emergency GP services, such municipalities can in fact have an expensive, ineffective and low quality GP health service.

Thus Kjekshus and Tjora (1998) de-validifies the use of GP work years to measure GP service quality for rural municipalities. I discuss this issue further in chapter 5. The other important message from Kjekshus and Tjora (1998) is the importance of stability in the GP population for having an effective high-quality GP service

3.7 Abelsen and Bæck (2005) is a report commissioned by HD as part of the evaluation of FLO. They look at challenges related to GP stability in the municipality health service in two rural counties, Finnmark and Nord-Trøndelag, in conjunction with the list patient reform. They start with discretionarily constructing a dichotomous indicator variable for physician stability, based on

data from RTV on patient lists. They point out that there were no absolute pattern between municipalities classified as stable or unstable in for example demographics and rurality. Their primary information source is surveys of health managers, physicians and patients. They find that municipalities with unstable GPs have lower proximity to specialist health service resources than municipalities with stable physicians. Workload from emergency physician services are higher in municipalities with unstable physicians. Municipalities with unstable physicians have longer patient lists, and they have more physicians on regular fixed salary employment than municipalities with stable physicians.

Abelsen and Bæck (2005) end up attributing much of the difference in physician stability between municipalities to local organizational differences. They write that the most important reason for wanting to quit stated by GPs in municipalities with instability in the GP work force was the lack of a climate of cooperation between the GPs and the municipality leadership. The authors are inconclusive concerning the direction of causality on that matter. Abelsen and Bæck (2005) leave the impression that administrative craftsmanship in the municipality administration is of importance for the physician recruitment situation in the municipality health service.

Kjekshus and Tjora (1998) and Abelsen and Bæck (2005) are two major studies using several different data collection methods, with an overall qualitative focus. I have presented them here mainly because they provide valuable contextual information on the challenges regarding physician distribution. Both underpin the importance of stability as opposed to raw physician work year density. They also document the relation between vacancies and instability. Kjekshus and Tjora (1998) is important for the empirical chapter for their discussion of the validity of work year data.

The next two references I present are less extensive more quantitative studies. They also address the situation in rural municipalities, using survey data.

3.8 Grytten et al. (1999) use data from a survey of GPs in 1998. They try to find factors related to what

extent GPs plan to relocate. Considerations to the family regarding work load and choice of place of residence were most important. Factors related to possibilities for professional development and autonomy were also important.

3.9 Andersen et al. (2001) is based on data from a survey of chief physicians in municipalities in Northern Norway in 1999. They report that professional isolation and workload from emergency physician services contribute negatively to the stability of GPs. The authors write that inter-municipality cooperation can provide solutions that address both of these factors.

3.10 I have chosen not to go into detail regarding what municipalities and the central government can do to make physician positions in rural municipalities more attractive. What is important is that the government has an action space when it comes to shaping rural GP positions into becoming more attractive for physicians. This is illustrated by the two latter references and the references given in paragraph 2.36. This notion is of importance to the discussion in chapter 4.

3.11 With the introduction of FLO, funding for research to evaluate the reform was included in the budgets. FLO has been thoroughly evaluated. I present some studies that compares the situation before and after the introduction of FLO.

3.12 Sørensen og Grytten (2003) look at differences in productivity between GPs on FFS contracts and GPs employed directly by municipalities. The following quote is from the abstract:

*"We find that physicians with a fee-for-service contract produce a higher number of consultations and other patient contacts than physicians with a fixed salary. This difference is mostly due to longer working hours, but time efficiency is greater as well. Moreover, a part of the difference is due to a selection effect: salaried physicians prefer shorter working hours and prefer to work less intensively. When these and other effects are taken into account, we find that a change from a salary contract to a fee-for-service contract will increase service production by 20-40%."*

After the introduction of FLO, the number of GPs on fixed salary employment has been reduced (see paragraph 2.21). GPs on fixed salary contracts have been most common in rural and small municipalities. The result quoted above might imply that productivity in the GP service in many rural municipalities increased with the introduction of FLO because of the changed incentives in the GP work contracts. In the empirical chapter I discuss the possibility that this effect may have contributed to reduced growth rate in physician work years in rural municipalities after 2001, when FLO was introduced.

3.13 Carlsen (2003) is based on group interviews with GPs subsequent to the introduction of FLO. 59 of the 81 informants were positive to FLO. Higher continuity in the patient-GP relation and higher salary were popular consequences of FLO among the GPs. The increased responsibility for the patients on their lists were by some seen as negative. Based on the same interviews, Carlsen, B (2005) mentions informants that emphasized the possibilities under FLO to limit their patient lists, in order to be able to focus on a smaller number of patients. An interpretation could be that FLO gave GPs more control of their work situation, through the patient list mechanism, and that this have contributed to an increase in GPs satisfaction with their job after the introduction of FLO. Both reports indicate that FLO increased the overall attractiveness of GP positions. This is likely to have led to increased stability of GPs in general.

3.14 HELSEMOD is a model framework developed by SSB for estimating future supply and demand for health personnel. Two reports with HELSEMOD-estimates have been published – Stølen et al. (2002) and Texmon and Stølen (2005). The reports are quite similar, the biggest difference being the time period covered. In the discussion below I only refer to the 2005 report. The authors emphasize that the figures they provide should not be interpreted as prognoses, but rather calculations of what may happen if certain assumptions are met.

Some of the assumptions behind the supply-side in the model are:

- a constant number of Norwegian medical students abroad

- a constant number of foreign physicians in Norway
- constant mix between the different health professions in the work force
- constant completion rate among medical students, abroad (80%) and domestically (97%)
- balance between supply and demand in the base year, 2004.

They have 4 different scenarios for the demand side, with growth in health expenditures based on population growth as the first scenario, and three others with 1.5%, 2 %, and 2,5% growth. The assumption regarding expected annual GNP growth behind the calculations is 2%. They take into account future changes in the demographical structure. Table 2 shows key figures from their calculations.

**Table 2 HELSEMOD: Future scenarios for supply and demand for physicians (from Texmon and Stølen (2005)).**

year	supply	oversupply alt. 1 (exp.growth = pop. growth)	oversupply alt. 2 (exp. growth = 1.5%)	oversupply alt. 3 (exp. growth = 2%)	oversupply alt. 4 (exp. growth = 2.5%)
2 004	18541	0	0	0	0
2 010	21617	2401	1267	654	27
2 015	23553	3544	1536	307	-984
2 020	25062	4059	1441	-501	-2593
2 025	26371	4297	1397	-1333	-4346

In the theory chapter I argue that securing an adequate supply of physicians should be a central element of the government's physician market policy. The HELSEMOD estimates is SHDir's main instrument in their planning of health personnel education and recruitment policies. In the final chapter I discuss to what extent the HELSEMOD-estimates are suitable for that purpose.

The next three references I present discuss the geographical distribution of GPs in Norway. They are concerned with equity directly and compare the distribution of GPs or reported satisfaction with the

GP service to variables indicating need or health status.

3.15 Elstad (1991) attempts to find explanations for inequalities in the use of GP services. He uses data from 1985 to 1989. He finds that variables related to socio-economic deprivation (specifically divorce rate, share of workers employed in industry and average taxable income), GP density and location in northern Norway contribute positively to the use of GP services -- while location in Western Norway, Oslo and cities in general contribute to lower use of GP services. He discusses the trend with increased demand for GP services. He suggests that supplier-induced demand, increased need for GP services or behavioral changes in the patient population may be feasible causes behind the growing demand for GP services.

3.16 Grytten et al. (1995) use individual level data from SSB's 1985 national health survey. These cross-section surveys take place every decade and have around 10 000 respondents. The authors combine survey data on GP visits with municipality characteristics. They find little correspondence between variables indicating access to GPs (e.g. GP density, travel time and income) and use of GP services. They conclude that GP services are to a considerable degree equitably distributed in Norway.

3.17 The authors of Grytten et al. (1995) are behind Sørensen et al. (1997), where they also use the same data. Here they develop a microeconomic decision-based model of municipality and individual behavior. They conclude that *"a decentralized system of primary physician services does seem to be fairly effective in securing equity in access to services for the municipal population. Local governments do take the healthcare needs of their inhabitants into account when deciding on the level of supply, and variation in revenue between the municipalities does not lead to any major inequalities in supply of physicians."*

3.18 Carlsen (2006) uses data on self assessed health from a survey with 75 000 respondents aged 40 to 42 that took place between 1995 and 1999. He combines this with data on satisfaction with the GP service from other surveys, also with 5-digit number of respondents, carried out in the years 1998-2000 and

Supplier-induced demand, increased need for physician services or behavioral changes in the patient population possible causes behind growth in demand for GP services.

3.14 Elstad (1991)

Conclude that GP services are to a considerable degree equitable distributed in Norway.

3.15 Grytten et al. (1995)

*"a decentralized system of primary physician services does seem to be fairly effective in securing equity in access to services for the municipal population."*

3.16 Sørensen et al. (1997)

Use multiple high-quality data sets, most comprehensive equity-oriented study of GP distribution.

3.17 Carlsen (2006)

Finds correspondence between quality in GP services and health status

Large OECD study

3.18 van Doorslaer and Masseria (2004)

Documents inequity in health service provision. International study of health personnel policies in 10 countries.

3.19 Rechel et al. (2006)

Stølen et al. (2002) and Texmon/Stølen (2005)

Assumes no undersupply in the base year and inelasticity regarding students abroad, foreign physicians, health prof. mix and student completion rate.

Table 2 Future scenarios for supply and demand for physicians

Group interviews

GPs happy with changes in working conditions brought by FLO

*"...a change from a salary contract to a fee-for-service contract will increase service production by 20-40%."*

More FFS contracts with FLO => increased productivity with FLO

3.12 Carlsen (2003)

3.11 Sørensen and Grytten 2003

## Physician distribution and equity

## Figure 2 Overview of Chapter 3: Literature Review

### Focus on rural areas

#### 3.1 Buhaug (1997)

Physician positions at hospitals was regulated in the 70s. The regulation was not effective.

Evaluates the agreement-based physician position regulation in effect from 1989-1999, and concludes that it was not effective.

Study one county: Møre og Romsdal

3.4 Good/bad spirals in stability  
Professional environments important for recruitment.

3.3 Workload from emergency physician service of detriment to physician stability

#### 3.2 Kjekshus and Tjøra (1998)

3.5 Vacancies also caused by desire for overtime and flexibility

3.6 Validity breakdown of physician work year data in unstable municipalities, as instability may coincide with high work year density.

Study Finnmark and Nord-Trøndelag only administrative handicraft

Find no absolute pattern separating municipalities with unstable physicians from those with stable physicians

Lower proximity to specialist health service resources.

Higher workload from emergency physician service.

More physicians in fixed salary employment.

Bad cooperation climate between physicians and the administration

#### 3.7 Abelsen and Bæck (2005)

Characteristics of municipalities with instability

Factors important for GPs planning to relocate: Family, work load, professional development, autonomy.

#### 3.8 Grytten et al. (1999)

Survey in Northern Norway.

Professional isolation, workload from emergency physician service of detriment to physician stability

Remedy: Intermunicipality cooperation

#### 3.10 FLO

#### 3.13 HELSEMOD

Table 2 Future scenarios for supply and demand for physicians

Group interviews

GPs happy with changes in working conditions brought by FLO

*"...a change from a salary contract to a fee-for-service contract will increase service production by 20-40%."*

More FFS contracts with FLO => increased productivity with FLO

2003-2004. He controls for individual specific variance in the variable for reported satisfaction. His conclusion is that there is a clear positive relationship between the population health status and quality of the GP health service, and that this relationship was reduced somewhat from the period 1998-2000 to the period 2003-2004. He relates the reduction to the introduction of the list patient reform. Similar to in Carlsen, F (2005) he finds that variables associated with recruitment problems (GP turnover, GPs on fixed salary) are negatively correlated with population health status. I quote from his conclusion:

*"When satisfaction with the GP service as reported by the inhabitants is used as indicator of the quality of the GP service, I find that the GP service is distributed in favor municipalities where the population is in good health." ... "Geographical variations in the recruitment situation for GPs and the size of the GP market [ie municipality size] contribute to the skewness in the quality of GP treatment. Variations in turnover also contribute to a distribution in accessibility to GPs in favor of areas where the population is in healthy."*<sup>39</sup>.

The articles mentioned in paragraphs 3.15 to 3.17 all use data from the 1980s, while Carlsen (2006) uses relatively fresh data. An important advantage of the method Carlsen (2006) uses, is that he does not operationalize GP service quality to the number of GP-patient contacts or GP work years. By using reported satisfaction with GP services he can capture variation in quality that originates in recruitment problems, as for example low stability and communication problems with foreign physicians.

These studies of the geographical distribution of GPs ask whether differences in GP density are a source of inequity or not. That question is of great importance for how the physician market policy should be. Of the three studies Carlsen (2006) is by far the most comprehensive study, and he concludes that GPs are not equitably distributed. Thus it seems apparent that the physician market policy should be

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39 Original Norwegian text: "Når befolkningens oppfatning av allmennlegetjenesten brukes som mål på allmennlegetilbudet, finner jeg at tilbudet er skjevfordelt i favør av kommuner der befolkningen har god helse." ... "Geografiske variasjoner i rekrutteringssituasjonen for fastleger og størrelsen på fastlegemarkedet bidrar til at kvaliteten på allmennlegenes behandling av pasientene er skjevt fordelt. Variasjoner i turnover bidrar også til at tilgjengeligheten er skjevfordelt i favør av områder der befolkningen har god helse"

concerned with the distribution of GPs in order to promote equity and social justice.

3.19 Van Doorslaer and Masseria (2004) include measures on inequality in the use of GP services in Norway and 20 other OECD countries. They decompose the inequality indices to relate it to different factors as need, geography and socio-economic status. This study underpins the existence of inequity related to distribution of health services in Norway.

3.20 Rechel et al. (2006) discuss the health personnel policies of 10 European countries including Norway in a broad perspective<sup>40</sup>. It is beyond the scope of this thesis to discuss Norwegian physician market policies in an international context.

Figure 2 is an overview of the literature chapter.

## Chapter 4: THEORETICAL DISCUSSION

The purpose of this chapter is to develop a theoretical framework for the physician market, and use it to analyze policy measures the government can use to reach its policy goals. I choose not to call it a model since models in the social science of economics are usually clearer defined and more mathematically elaborate than what I present here.

Physicians enter the labor market seeking employment. They will look for the positions that can give them highest utility and apply for them. As well as physicians seeking employment, there are employers seeking physicians. Employers have physician positions with specific characteristics that physicians evaluate – they enter the physicians' utility function. What determines the utility physicians get from different positions?

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<sup>40</sup> The chapter on Norway in Rechel et al. (2006) is written by the same author as this thesis.



4.1 Here are some examples of factors that are important for physicians when they evaluate available positions:

- Physicians will prefer earning more money compared to less, everything else being equal. Physicians will work more given higher marginal salary (see for example Baltagi et al. 2003).
- Having the opportunity to work overtime may contribute positive to physicians' utility (see paragraph 3.5).
- Professional isolation and work load from work outside office hours may contribute negatively to utility (see under paragraphs 3.2, 3.7, 3.8 and 3.9).
- Physicians can have preferences for different types of work contract (see for example Scott (2000), p. 1190: "*Payment systems are major determinants of professional job satisfaction and morale, and can therefore influence supply and labor market behavior.*")

Grytten et al. (1999) gives an overview of various perspectives in economic theory of what type of preferences physicians may have. I will assume that the preferences can be different between physicians: Some may prefer GP positions over hospital positions and others may even prefer to have positions in rural municipalities deemed as unattractive by most physicians.

Let the attributes of a physician position that enters the physicians' utility function be  $x_1, x_2, \dots, x_n$ . This can be defined as a vector  $\mathbf{x}$ . Each individual physician has a utility function into which  $\mathbf{x}$  enters,  $u(\mathbf{x})$ . I define the *attractiveness* of a position to be a function of  $\mathbf{x}$  denominated  $A$  or  $A(\mathbf{x})$ . The attractiveness describes how much utility physicians in general, on an aggregate level, receives from a position with the specified  $\mathbf{x}$  attribute vector.

4.2 Given individual differences in position preferences ( $u(-)$ ) between physicians, positions that are generally unattractive (low  $A$ ) will have fewer physicians applying to them than more attractive positions (high  $A$ ). Because physicians are individuals with different preferences, there will be physicians that prefer to work in positions that most

other physicians find unattractive. The less attractive the position is, the fewer physicians will prefer to work there.

Without individual differences between physicians (and with zero cost of changing positions for physicians), the most unattractive positions will always be vacant, and the  $m$  most attractive positions, where  $m$  = the total number of physicians, will always be occupied. This is not what can be observed for physician positions in the primary health service. All municipalities have GPs employed, though with varying vacancy rates, as I show in the empirical chapter. But there might be physician positions outside the municipality health service that are so unattractive that they, given the current and historical levels of supply in the physician market, have had no applicants or even available positions, for example in the market for privately financed health services.

Since municipalities with unattractive GP positions have higher vacancy rates than municipalities with attractive GP positions and since the affected municipalities tends to be in rural areas, as I show in the empirical chapter, or have a population with low health status, as Carlsen (2006) finds (see paragraph 3.13) – if there are too few physicians for all GP positions to have applicants, there will be inequity. Such inequity will exist until the supply of physicians is sufficiently high for the physician market to be saturated to such an extent that so many physicians find employment in rural and deprived municipalities more attractive than other employment opportunities, that all GP positions are occupied (to the extent possible given the normal friction in the labor market).

Thus an important policy tool for the government in its physician market policy should be to make sure an adequate number of physicians is available for employment. If there are fewer physicians than GP positions, there will be vacancies. Those vacancies will be predominantly in the least attractive positions. If the physician supply is increased, eventually some physicians that prefer attractive positions in central areas will be forced to accept employment in unattractive position in rural areas, since there will be more physicians seeking attractive positions than available. A different mechanism with

similar effect is that increasing the supply of physicians will (not unconditionally, see paragraph 4.3) also increase the number of physicians of the type that prefers to work in more unattractive positions, and in that way reduce the number of vacant unattractive positions and the level of inequity directly.

Most likely the number of physician positions available in the market, also as vacant positions, is dependant on the number of physicians available for employment. Based on common economical sense, it should be safe to assume that the price elasticity of demand for physicians is likely to be higher in the long run than in the short run. In addition, there are probably employment opportunities already in existence for physicians in the market for privately financed health services that are so unattractive that they do not show up as unoccupied in any statistics, that may absorb physicians if the supply were to increase. Hence, if the government should desire to eliminate all vacancies, it will be necessary to increase the supply of physicians beyond the currently observed level of demand for physicians.

Above I argue that increased supply of physicians is a vital policy instrument for the government for combating inequity in the distribution of GP services. Below I continue with expanding the theoretical framework.

The physician market is dynamic over time: New positions are being added to the market, both attractive and unattractive ones, because of growing demand. Old physicians retire and freshly educated physicians (or immigrant physicians) enter the market. Physicians relocate and switch jobs, also due to causes not related to the positions themselves, such as family considerations. I assume changing jobs impose a cost in the form of a loss of utility for physicians, mainly based on the rationale that abandoning a social setting often involves a loss. This cost is likely to increase over time, as people tend to get more settled when they live at the same location for a long period of time. I also assume that employers prefer physicians with work experience. It could be interesting to differentiate physicians according to skill level or quality as well, but I will leave that factor out in order to keep it simple.

New attractive positions will be applied to by physicians that are new on the market. In addition, physicians in existing unattractive positions will apply for the new position and wish to relocate, if the difference in the future discounted utility flows of their existing position and the new position make up for the relocation cost. What will happen, given the existence of moderate relocation costs, is that experienced physicians will get the attractive positions, and the new inexperienced physicians will be left with the unattractive positions. The higher the difference between physician positions in terms of attractiveness is, the less important the relocation costs will be, and the more likely it is that physicians in the unattractive positions will try to relocate when they get the opportunity.

This implies that differences in attractiveness between physician positions are a source for inequitable instability, and therefore a political problem that the government should address with their physician market policy, as discussed in the introduction. Rural municipalities with unattractive positions get inexperienced physicians that will tend to move away when they have enough experience to get more attractive positions in more central parts of the country. How can the government remedy this?

In paragraph 4.2 I wrote about the effect of increased supply of physicians: Increasing the supply of physicians may increase the number of physicians of the type that prefers to work in more unattractive positions. These will not try to relocate, but stay in their jobs. Thus in addition to leading to a reduction in the vacancy rate, increased supply of physicians is likely to also increase the stability in areas with unattractive physician positions, thereby promoting equity.

The government can also force physicians to take specific positions, as is done with interns (see paragraph 2.34), or by commanding physicians (as discussed in paragraph 2.33). It should be safe to assume that involuntarily labor will have low stability, since most of the concerned physicians will look for an attractive job elsewhere when the forced period is up in order to get higher utility. But the policy used when distributing interns have an effect - Sørensen et al. (1997) writes that "*central policies in the*

*distribution of junior physicians are effective in equalizing supply [of physicians] among municipalities” (p. 715).*

4.3 A better measure can be to educate more physicians at the medical schools located closer to the municipalities with recruitment problems. I quote the conclusion from Alexandersen et al. (2004): *“The University of Tromsø is still important in recruiting doctors to the northern regions of Norway, primarily because this university educates students who come from these regions.”* That conclusion is an argument for educating physicians as far away from Oslo as possible.

4.4 Below I discuss a different set of policy measures – policies targeted at changing the attractiveness of positions by changing the attributes, the  $x$ -vector, of the physician positions. Not all factors  $x$  consists of are easy or even possible to change – but some are (see paragraph 3.10). It is the relative attractiveness between the different positions available for physicians that matters. There are policies that make GP positions in rural areas more attractive by reducing the availability (or even attractiveness) of positions in other segments of the physician market. The policies intended to regulate the number of physician positions referred to in paragraph 2.32 fit this description. The salary increases in the specialist health service referred to in paragraph 2.23 and 2.25 may have reduced the relative attractiveness of GP positions, by making positions in hospitals more absolutely attractive.

Paragraph 2.36 and the paragraphs pointed to in paragraph 4.1 contains information about policy measures targeted at improving the physician recruitment situation in rural municipalities – policy measures that within this theoretical framework can be understood as having effect through changing  $x$ . Most of what I mention in those paragraphs concerns municipal policies – the central government enters as accommodator. I have chosen not to go into further into this area in order to keep the scope limited.

With relocation costs physicians will only move if their utility gain exceeds the relocation cost. If the difference in attractiveness between positions decrease the utility gain from relocating decreases, and it becomes more likely that physicians will stay in their positions. Thus given the presence of

relocation costs increasing the attractiveness of unattractive positions will increase the stability of the physicians in less attractive positions, and therefore reduce the stability-related inequity.

Positions in municipalities only constitute a small part of the physician market. Some policies might opt for increasing the attractiveness of GP positions in general, compared to other employment opportunities available for physicians. FLO can serve as an example. GPs are reportedly satisfied with FLO (see paragraph 3.13). FLO can therefore within this framework be interpreted as a measure that brought a positive change in  $x$  for GP positions in general, increasing the general stability. Paragraph 2.27 concerns policy measures that may have similar effects.

In this chapter I present a theoretical framework for analyzing the physician market and the geographical distribution of physicians. I distinguish between four types of policy measures: Those that increase the number of physician available for employment, those that are specifically targeted at increasing the attractiveness of unattractive positions, those that change physicians’ preferences for positions, and those that increase the general attractiveness of GP positions compared to positions in other physician market segments. I have discussed how each of these types of policy measures can have effect. In this thesis I have chosen to focus on those policies that affect the overall supply and demand for physicians.

In the introduction I specified the policy targets for the government to be to minimize the number of vacant physician positions, to avoid inequitable distribution in vacant GP positions and in the instability of GPs and to maximize the stability of GPs. How do the policy measure categories I have established in this chapter relate to these policy targets?

Limiting the number of physician positions in central areas might reduce the vacancy rate in rural areas, but will also cause physician positions to be vacant (or keep the positions from being established) in central areas. Promoting equity by reducing the quality of the GP service in central areas is probably not politically feasible. The regulation of physician positions has historically been targeted at limiting

positions at hospitals in central areas. None of the regulation regimes for physician positions have been effective (see paragraph 2.32). If they had been effective, denying hospitals access to physicians could very likely be of detriment to the specialist health service. Thus increased supply of physicians is apparently the only realistic method for reducing the number of vacancies.

Increased supply of physicians can in addition to reducing the number of vacancies, increase stability in GP positions. Particularly if more physicians are educated at the medical faculties close to the rural areas with recruitment problems, there will be more of the type of physician that prefers to work in rural municipalities.

Policy measures that can make GP positions in general more attractive compared to other employment opportunities for physicians, can lead to better overall quality in the GP health service by making physicians stay longer in GP positions, thereby promoting stability in the GP-patient relation.

To reduce the inequitable patterns in vacancies and instability of GPs, the government can use policy measures that change the properties of unattractive physician positions, so that physicians find them more attractive. Or they may use policy measures that change the way physicians evaluate those positions, for example by giving them the choice of accepting the position or losing their physician authorization.

For increased supply of physicians to lead to a reduction of vacancies in rural areas, one of two conditions needs to be fulfilled: The increased supply needs to include physicians of the type that prefers to work in rural municipalities. Or, if the supply of physicians increases sufficiently for existing employment opportunities in central areas to become saturated with physicians, positions in rural areas needs to be relatively attractive enough compared to other employment opportunities for physicians, for example abroad or in the market for privately financed health services. To what extent any or both of these are valid will determine the effectiveness of using increased supply of physicians as a policy measure to promote equity in GP services.

The government should make sure that the supply of physicians are at the least sufficient to cover the public sector's demand. Otherwise there will be geographical inequity, since rural positions are more unattractive than central ones, and systematic differences in vacancy rates between central and rural areas is not politically deemed socially just. (Inadequate supply of physicians is also likely to impair the production of health services.) If the supply of physicians is sufficient, physician positions in rural areas need to be seen as more attractive for a sufficient number of physicians than employment opportunities outside the public health care system in central parts of the country and abroad, in order to ensure recruitment.

Above I mention four types of policy measures, which can be further aggregated into two types: Increasing the supply of physicians as one type, and measures working through changing the attractiveness of positions as the other type. If the aggregate market situation regarding supply and demand for physicians is the decisive factor behind the recruitment situation in rural areas, the vacancy rates in rural areas can be expected to be changing in correspondence to the market situation in the rest of the physician market over time. If increased supply of physicians is an unsuitable tool for improving the GP recruitment situation in rural areas, vacancy rates in rural areas should change independently of vacancy rates in the remaining physician market.

Policies that make rural positions relatively more attractive becomes more efficient the more saturated the physician market is. This is because higher physician market saturation implies that inexperienced physicians seeking employment will have less attractive positions as alternatives to accepting employment in rural municipalities. Likewise, increased supply of physicians will work better at improving the recruitment situation in rural areas the more attractive those positions are. Based on this reasoning, both policies should be adopted.

An underlying assumption here is that the employment opportunities in non-rural areas are limited, and at the margin increasingly unattractive with increased supply of physicians. If that is not the case, the recruitment situation in rural areas can only be improved by educating physicians of the type that

prefers to work there, or by increasing the attractiveness of positions in those areas.

One prediction presented above is that vacancy rates in rural municipalities should follow those in the aggregate physician market, where the hospital-sector is dominant. If vacancy rates in rural areas predominantly depend on the attractiveness of those positions, movements in vacancy rates in rural areas and in the hospital sector should be unrelated. But if the recruitment situation in rural areas is strongly influenced by the aggregate situation in the physician market, vacancy rates at hospitals and in rural municipalities should follow each other over time. But this argument cannot be reversed, hence it is not possible to draw an absolute conclusion solely based on this hypothesis.

## Chapter 5: EMPIRICS

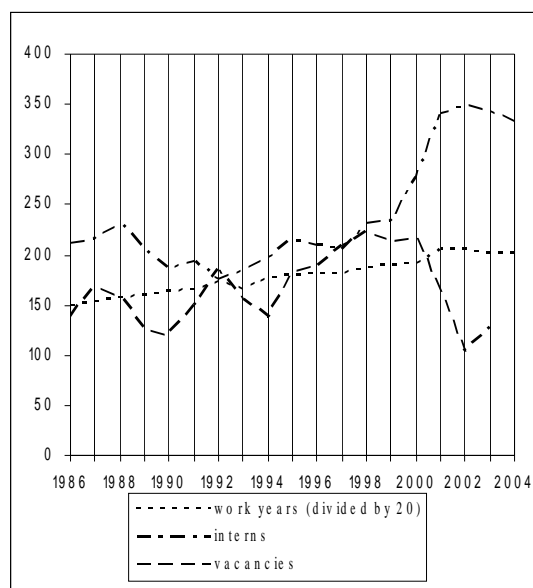
This chapter starts with a focus on the development of supply and demand in the physician market over time. Afterwards I will discuss validity-related limitations of the SSB work year data I have, and then use those data to look at the geographical pattern of vacancies and interns in the primary health service over time – mainly to search for trends along the center-periphery axis, but also to look for a possible minimum standard effect from FLO.

I will now present time trends in variables from different sources that can shed light on developments in the overall physician market situation. The validity of the different data is variable – my focus has been to find variables that are consistent over time, rather than accurate at certain points in time. Some of the graphs are deflated with figures on population growth using 2001 as reference year. The population growth in Norway from 1986 to 2004 was steady and ca 10% for the entire period.

The first graph is based on work-year data from SSB on the municipality health service. I present these data and discuss their validity starting in paragraph 5.4. Figure 3 shows time trends in physician work years, intern work years and unoccupied positions in the municipality health service.

The figures behind the work year curve have been divided by 20, and is therefore on a different scale than the two other curves. The vacancies curve is approximately concave from 1994 to 2002 with top point in 1998. The movements in the curve for interns relates to changes in the education capacity (see the paragraphs 2.5 and 2.6). The number of interns increased dramatically particularly from 1999 to 2001. From 2000 to 2002 there is an almost equally

**Figure 3 Physician work years, interns and vacancies in the primary health service 1986-2004 (population deflated)**



**Table 3 Work years in the municipality health service 1999-2004**

Year	Work years, including interns.	Work year growth from preceding year	Interns	Growth in interns from preceding year	Vacant Positions	Growth in vacant positions from preceding year
1999	3676	61	228	7	207	-8
2000	3733	57	271	43	210	3
2001	4033	300	335	64	159	-51
2002	4070	37	346	11	103	-56
2003	4054	-16	347	1	128	25
2004	4073	19	338	-9	-41	-

41 Not included in the data set – see paragraph 5.5.

large drop in vacancies. Table 3 shows the exact figures for the years 1999-2004, not adjusted for population growth. Four municipalities with missing values for each of the years 2002 and 2003 were deleted from the data set prior to extracting the figures in table 3. Interns are at the last stage of the physician education and receive their authorization when the intern service is completed. The table shows that there is a match between the reduction in vacancies and the growth in interns one year earlier. But at municipality level there is little correspondence between the increase in interns and reduction in vacancies, hence the conclusion that the increase in interns caused the reduction in vacancies is not supported by the data.

Because of the increase in domestic education capacity for physicians in the 1990s (see paragraphs 2.5 and 2.6), I expected the intern figures to be in steady increase. The decline in interns from 2001 may have to do with a reduced influx of foreign physicians from countries from which physicians are required by SAFH to do a Norwegian intern service prior to acquiring a Norwegian physician authorization, or changes in regulations regarding these requirements.

The most striking features of the work year time series, is the jump between 2000 and 2001, and the reduction between 2002 and 2003. The jump from 2000 to 2001 must be seen in relation with the introduction of FLO. A contributing factor behind the jump may have been private practice GPs that until then did not have a government contract, and accepted a FLO type contract with the government when FLO was introduced (see paragraph 2.22). Most of these were located in Oslo. Increased student classes emerging as interns and physicians, the improved working conditions physicians got with FLO (see paragraph 3.13) may have created the supply of physicians seeking GP positions in 2001. The minimum standard imposed by FLO (see paragraph 2.20) may have created the demand from the municipalities. These factors are probable contributing factors behind the jump in work years and reduction in vacancies from 2000 to 2001.

The growth rate of GP work years in the municipality health service seems to have been reduced after 2001 when FLO was introduced.

Possible contributing factors can be that GPs have gotten more efficient with the introduction of the FLO contracts, reducing the number of needed positions (see paragraph 3.12). The changes between 2000-2001 in vacancies and GP position attractiveness may have pushed more rural municipalities out of bad recruitment spirals or into good recruitment spirals, as discussed in paragraph 3.4. Increased stability may have lead to increased efficiency and quality, reducing the need for physician work year as counted in the SSB data.

The municipality health service is only a small part of the total physician market – the specialist health service, particularly hospitals, employs a larger share of the physician work force. Figure 4 contains data on work years and vacancies in the municipality and the specialist health services. The work year data is from SSB for both sectors. The figures on vacancies in the specialist health services are from SHDir<sup>42</sup>, and may be less reliable than the others. (The physician position regulation regime has been ineffective (see paragraph 2.28), and it is therefore not unlikely that the regulators' figures are unreliable. Hopefully the unreliability is time consistent.) The graph for specialist health service work years is based on the sum of work years in psychiatric institutions and somatic hospitals<sup>43</sup>. The figures on private practice specialists are not comparable across the jump from 1997 to 1998, because of the change discussed in paragraph 2.14. The figures on physicians in positions outside the publicly financed health system are from DNLF. Note the different scale for the work year curves – those have been divided by 10 in order to fit the curves into the figure.

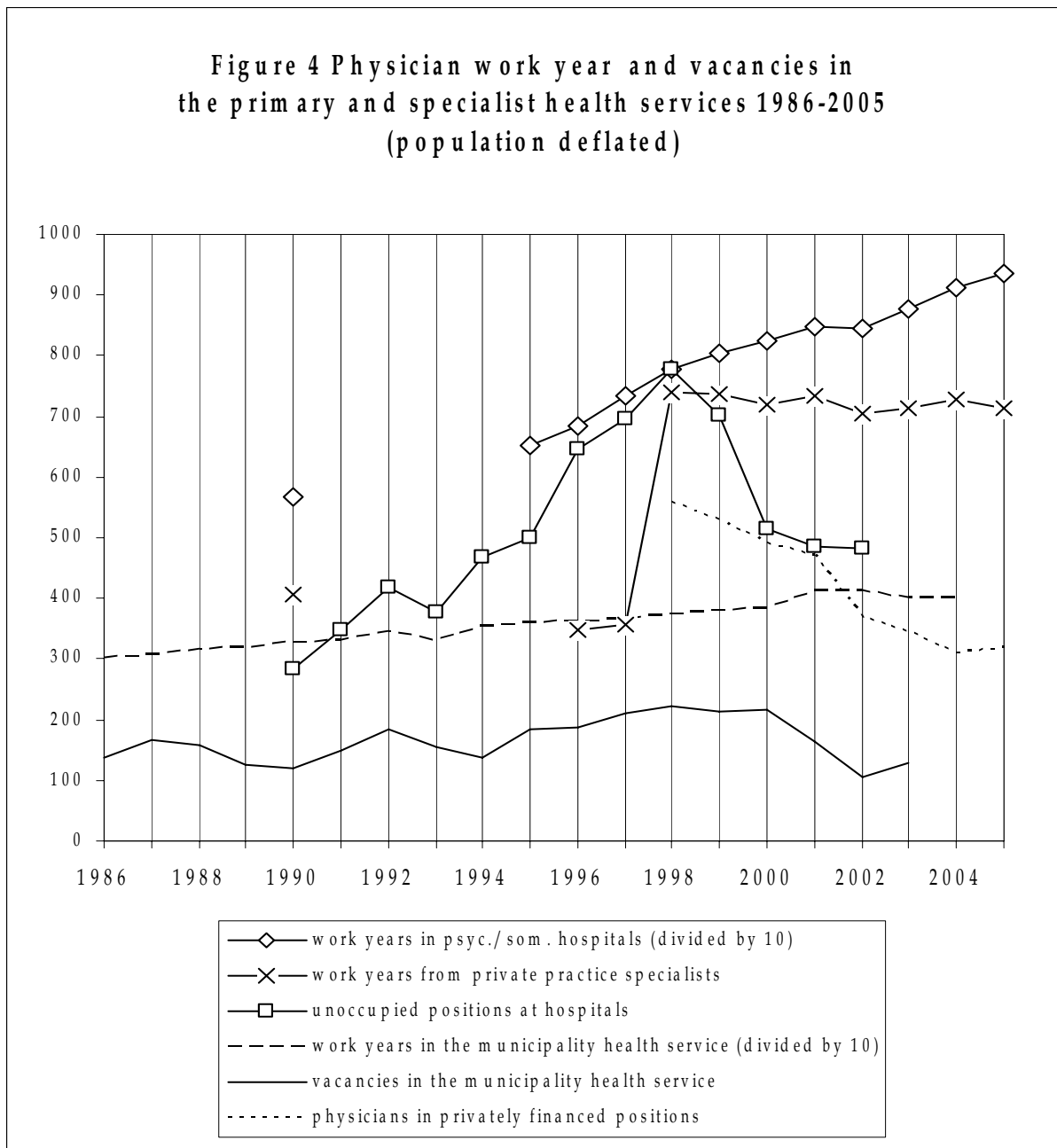
Figure 4 shows that the growth in physician work years in hospitals and psychiatric institutions has been substantial and much higher than the growth in the primary health service. The data indicates that the vacancy rate in the specialist health service has been substantially higher than in the primary health service. The development in the vacancy rates in the specialist and primary health services have similar trends starting in 1994, with growth to a peak in 1998, then decline. It seems that the shortage of

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42 Through the DNLF web site section with physician statistics. See [www.legeforeningen.no](http://www.legeforeningen.no).

43 The figures are taken from Statistics Norway (2002).

**Figure 4 Physician work year and vacancies in the primary and specialist health services 1986-2005 (population deflated)**



physicians have been driven by large growth in demand from the specialist health service sector. The vacancy rate at hospitals was high throughout the 1990s, with a peak of around 10% in 1998. The vacancy rate in the primary health service has overall been lower throughout the entire period, but has followed a similar trend.

The number of physicians in privately financed positions is limited and in decline. The number of physician work years in private specialist practices (with government funding) is stable or in decline. These two data series were included to show that

these segments of the physician market have not contributed to the increased demand for physicians.

5.1 Based on the work year data shown in Figure 4, I have estimated sector-wise growth rates using OLS<sup>44</sup>.

The growth rate of physicians in the specialist health service institutions has been just about twice that of the growth rate of physician positions in the

<sup>44</sup> I have regressed time against the natural logarithm of the work year time series. The growth rate will then be estimated by the slope coefficient.

municipality health service. Population growth is not included here. A 3.4% growth rate in the number of physicians annually translates to about 2.8% annual growth in physicians per inhabitant, since population growth is approximately 0.6% each year. The HELSEMOD-projections behind Table 2 use 2.4% as the growth rate of demand for physician in its scenario with highest growth rate, and 1.7% as projected growth rate in physician supply (also estimated using OLS).

**Table 4 OLS-estimated sector-wise growth rates in physician work years**

	OLS-estimated growth rate	Work years in 2005 (2004)	"Expected" Growth
Municipalities	0.0229	4073	93.1
Psychiatry	0.0453	1411	63.9
Somatic hospitals	0.0462	8199	378.9
Private specialists	0.0012	731	0.9
Privately financed	-0.0881	328	-28.9
Sum	0.034 (weighted)	14742	507.9

Thus the historical growth rate of physician positions has been higher than the figures used in even the high-growth scenario from the HELSEMOD-calculations. This makes it natural to question the realism of the HELSEMOD estimates.

I have acquired data directly from SAFH on the number of physicians receiving Norwegian physician authorization, for each year 1986-2005 and by the country of the physicians' basic medical education. The data set only include physicians that are alive today. It should be reasonable to assume that most physicians relocate or finalize their education well within the life segments where mortality is low, hence this should not be too large a problem. The data does not include entries on citizenship, nor does it say anything about for how long, if at all, the physician has stayed or worked in Norway. Physicians can also function in Norway by having licenses, which are more limited in time or in terms of type of practice than authorizations. I have not investigated the relationship between the authorization and licence institutes closely.

Thus the SAFH data presented below have poor validity. But they are time consistent in terms of being an indicator for the total influx of physician to the supply side of the Norwegian physician market, assuming the time horizon mix of these physicians has not changed over time – which might not be the case, so I should be careful when interpreting findings based on these data.

Figure 5 has population-deflated curves. It has a graph showing the sum of the variables for vacant positions in the primary and specialist health service, as they are shown in Figure 4. The two vacancy variables are not directly comparable since they are derived through different means – the graph for vacant positions in Figure 5 should be interpreted as an indicator only.

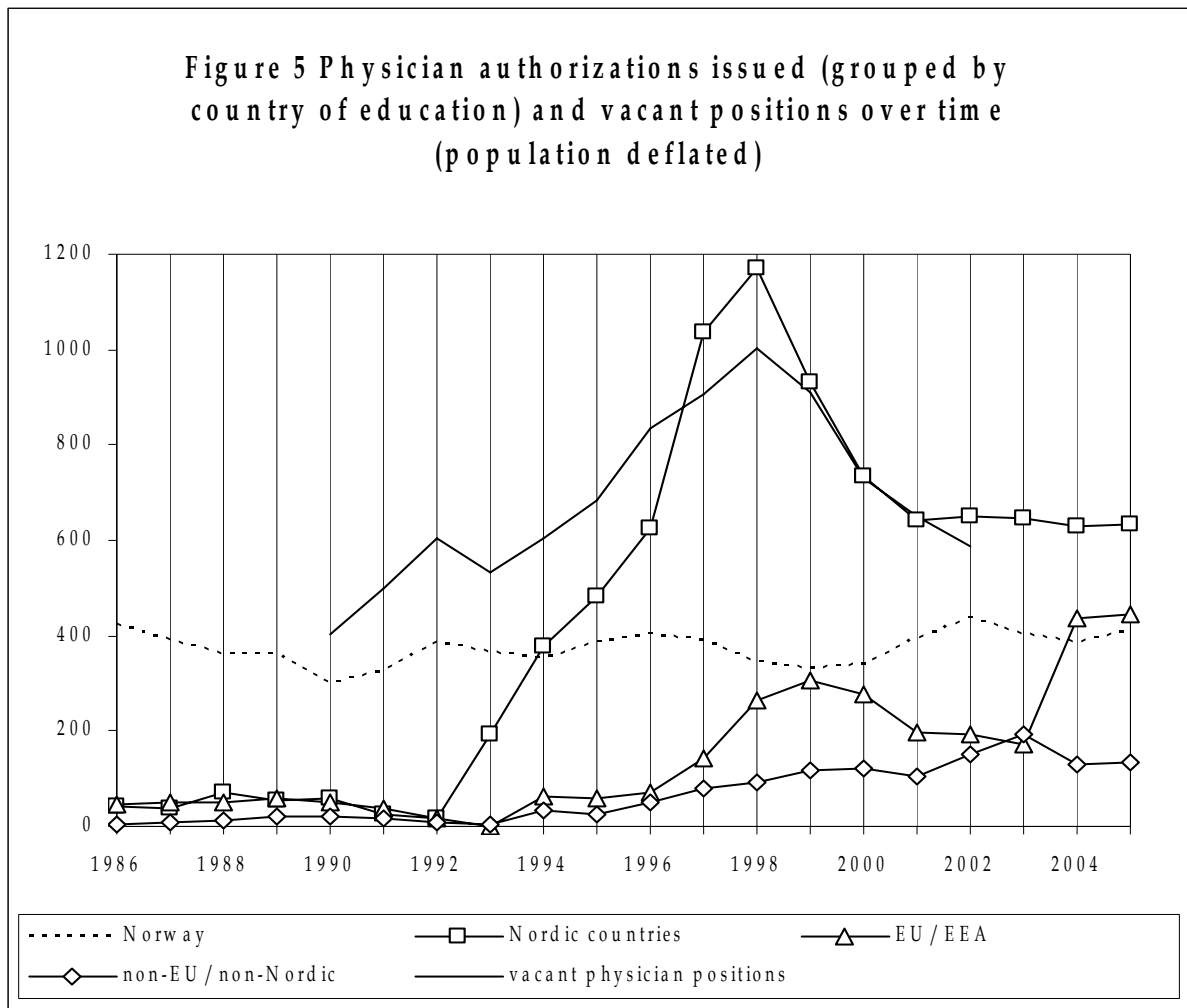
Physicians from non-European OECD countries are almost non-existent in the data set from SAFH. Prior to 2004 Poland and Hungary are important countries behind the non-EU/non-Nordic figures. These have become popular countries for Norwegian medical students. The jump from 2003 to 2004 in the EU/EEA graph can mainly be attributed to increased influx of German physicians (from 116 in 2003 to 191 in 2004) as well as the reclassification of eastern European countries to EU countries (also behind the drop in the non-EU/non-Nordic curve between 2003 and 2004) – but there was only a small increase in the number of authorizations given to physicians with their education from the countries that joined the EU in 2004.

The curve for Norway in Figure 5 is remarkably stable. The drop from 2002 to 2004 is surprising, as the domestic education capacity was increased throughout the 1990s. This raises a question – is the completion rate for students at Norwegian medical schools fluctuating, or even declining? Can the completion rate be dependant on the domestic physician market situation?

Figure 5 should include everything from Norwegian and foreign physicians permanently establishing themselves in Norway, to foreign physicians that planned to work in Norway for a shorter period, acquired an authorization but reversed their plans and never entered Norway. It is likely that physicians stay for a longer period the harder it is for



Figure 5 Physician authorizations by education country group and vacant positions over time (population deflated)



them to acquire the authorization and relocate. Cultural and language barriers can be seen as costs for physicians and could reinforce the same pattern. Thus there are probably more short-term substitutes behind the Nordic curve than the non-EU/non-Nordic curve. Though making conclusions about the relative quantitative contribution in terms of work years from physicians from the different country groups should not be made based on these data.

5.2 What is important in Figure 5 is the shape of the curves – from almost zero in 1992, to a peak around 1998-1999, then a decline to 2001, and stability after that. The decline does not imply fewer foreign physicians in Norway, since authorizations issued earlier years do not expire, but it indicates reduced influx. Specifically, if the mix of foreign physicians given authorization in terms of how long they stay in Norway for work is constant over the years, the reduction in the Nordic and EU curves shows a decline in the growth rate of the foreign physician

workforce in Norway, possibly to a negative number. The influx of foreign physicians seems to be in accordance with the undersupply situation of physicians in Norway. This gives support to the point of view that net physician migration to Norway depends on the Norwegian physician market situation.

Figure 5 supports the notion that the undersupply of physicians in Norway created by strong growth in the hospital sector and insufficient education capacity of Norwegian physicians during the 1990 lead to foreign physicians becoming an important part of the Norwegian health care system.

On their web pages DNLF has statistics on the number of Norwegian medical students abroad per country back to 1994/1995, shown in Table 5. Their source is the State Educational Loan Fund. Since 1994 Poland, Hungary, the Czech Republic and (since 2002) Slovakia have become important education

countries for Norwegian physicians. Norwegians studying abroad are important contributors to the growth in the non-EU/non-Nordic curve in Figure 5. Denmark and Germany are two other important education countries for Norwegian medical students.

**Table 5 Norwegian medical students abroad**

School year	Number of students
1994-1995	579
1996-1997	963
1998-1999	1423
2000-2001	1817
2001-2002	1880
2002-2003	1934
2003-2004	2008
2004-2005	2093
2005-2006	2212

Most of the increase from 2004/2005 to 2005/2006 came in Eastern European countries – as an example, the figure for Poland went from 533 to 667. The figures in Table 5 show a strong growth in the number of students during the 2<sup>nd</sup> half of the 1990s, and then reduced growth from 2000. The completion rate for Norwegian medical students abroad has historically been lower than for the domestic medical students. The HELSEMOD reports (see paragraph 3.14) assumes a completion rate for Norwegian medical students abroad at 80%, while Bertelsen (1998) operates with 60%.

5.3 The figures in Table 5 does not separate students according to how long they have studied. The reduced growth rate from 1994-2000 to 2001-2005 might imply a reduction in the number of first-year students. This is consistent with the view that the number of students undertaking medical studies abroad is elastic to the domestic physician market situation: According to these figures it is possible or even likely that the number of first year students were highest from 1995-1998 when the undersupply of physicians were at its peak and reduced when the vacancy rates later dropped.

Bertelsen (1998) has some historical data on medical students. From 1956 to 1991, 3572 physicians with foreign education received a Norwegian authorization. During the same time period 9951 physicians educated by Norwegian institutions received an authorization. Most of these were

Norwegian. Historically a large proportion of Norwegian physicians have received their education abroad.

From the aggregate physician market situation I move over to the geographical distribution of GPs. First I present the data I have on GP distribution and discuss validity issues.

5.4 When the municipality health service bill was introduced in 1984, statistics Norway started to make routines to collect statistical data on the municipality health service. They have made available annual data starting from 1986. I have accessed the data through Norwegian Social Science Data Services (NSD), which at the time of analysis had data available for the years from 1986 to 2004. I have used 2001 as reference year regarding municipality borders. The data describes the situation on the 31<sup>st</sup> of December of the respective year. The unit of measurement is hours per week, which is recalculated into work years, with one work year being equivalent to 37.5 hours per week, except for 1986 when the standard workweek for physicians was 38 hours. Overtime is not included (except planned overtime, see paragraph 2.9), and neither is work hours from emergency physician services. There are few municipalities with missing values, and the number of missing values is declining over time. There is no center-periphery pattern in the municipalities with missing values, hence the missing values do not produce a bias in this context.

The variables for the years prior to 1994 are not 100% consistent with the variables from 1994 and later. For 1986, 1987 and 1993 figures from institutions for the elderly and disabled are not included, while it is included for the rest of the years. For 1988-1993 the prison health service is included, but it is not included from 1994 and onwards. It is possible to do corrections to the data material and get more consistent time series, but the discrepancies are so small that they should not constitute a significant problem. Therefore I have not prioritized to make these corrections.

I use three variable types – the number of physician work years in the municipality health service in total, the number of intern work years in the municipality service in total, and the number of unoccupied

physician positions in the municipality health service.

5.5 For these three variables I have consistent time series from 1994 to 2004, the only exception being that there is no data on the number of unoccupied physician positions from 2004, as SSB has decided to stop collecting that information. Selecting these three variables includes a choice to use the municipality health service as the analytical unit, instead of separating out physicians working in general practice. This is in accordance with what I specify in the introduction. This choice is made partly in order to get consistent time series, and partly in order to not make judgements on how the municipalities dispose their physician resources between clinical work and other duties.

Another data source that could have been practical to use is the FLO database ("Fastlegedatabasen"). Its disadvantage is that it does not go further back in time than 2001, when FLO was introduced.

The Norwegian center-periphery axis is a theoretical construct that involves ranking geographical units according to how rural or central they are. It is commonly used in political science, as the center-periphery dimension in Norwegian politics always has been a source for political conflict. I will use a prefabricated indicator variable to depict the centrality and rurality of the municipalities. The most commonly used centrality indicator variable is constructed by SSB. I will, however, use the centrality indicator variable developed by the Norwegian Institute for Urban and Regional Research (NIBR)<sup>45</sup>. The NIBR indicator is more in terms with my perception of Norwegian geography than the SSB indicator, and produce larger and more consistent statistical differences between central and rural municipalities. The NIBR variable comes in two variants, NIBR5 and NIBR11, the figure in the name representing the number of discrete levels. The NIBR11 divides each of the NIBR5 categories into two depending on the size of the regional labor market, and adds a category for Oslo. Otherwise the two variants are equivalent. I will use NIBR5 to keep the number of categories to a manageable and presentable level.

Next I turn to the data and look for patterns across the center-periphery dimension. The most striking feature of the physician work year data is the distributional pattern of physician work years per inhabitant across municipality size or the center-periphery axis. This is illustrated in figure 6. The left hand axis is physicians per inhabitant and the horizontal axis is the natural logarithm of the number of inhabitants. Municipalities are the units. Each character in the plot in figure 6 accounts for one or more observations - an asterisk is one observation, a figure represents that number of observations, except for 0, which is 10 observations. An A is 11 observations, and a Z indicates 37 or more observations. The other letters represent a number of observations between 11 and 37 according to the letter's position in the alphabet. The plot is based on a data set with observations from all years 1986-2004. The cluster to the right is the observations for Oslo.

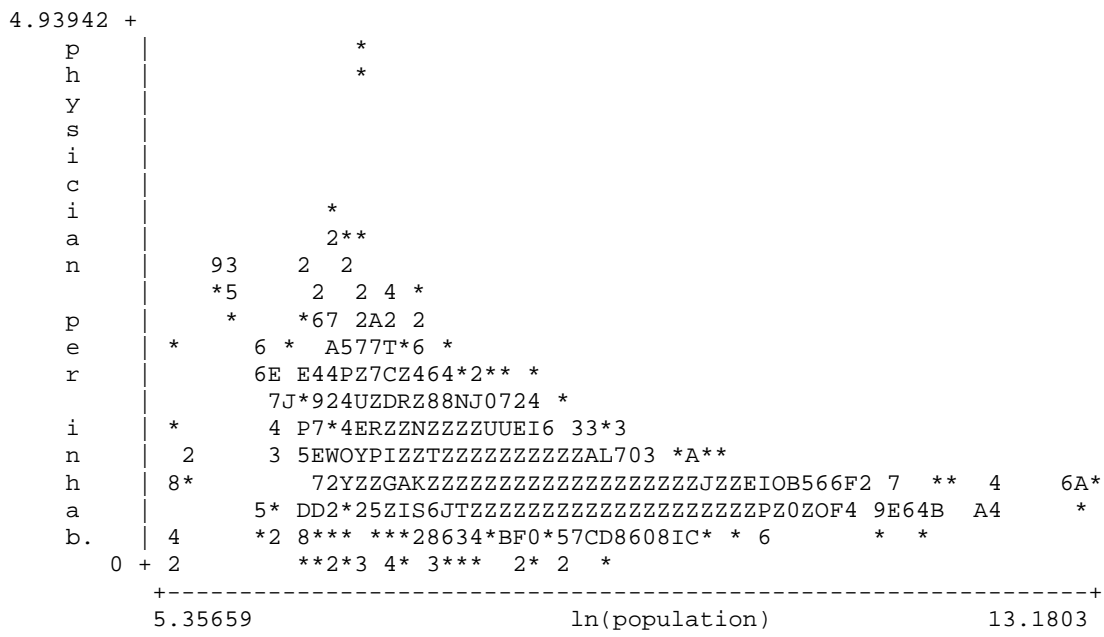
With its banana-shape of points, figure 6 clearly shows that the measured physician density on average is higher in small municipalities than in larger municipalities. How can this be, when the literature (and many other sources) says smaller municipalities are the ones with recruitment problems? Below I discuss different explanations behind the observed pattern in Figure 6.

The work year data does not include work from emergency GP services, nor does it include overtime. This is intended (see paragraph 5.4). Though from the patient's view, GP services received outside standard work hours counts. If the quantity of these services varies systematically geographically and not randomly, this becomes problematic. Kjekshus and Tjora (1998) wrote that many rural municipalities with recruitment problems use short term substitutes with strong monetary objectives, and implies that these were inclined to provide more services outside office hours (see paragraph 3.3). This effect could mean that actual work hours used in the production of GP services in smaller municipalities are, relative to larger municipalities, even higher than indicated in Figure 6.

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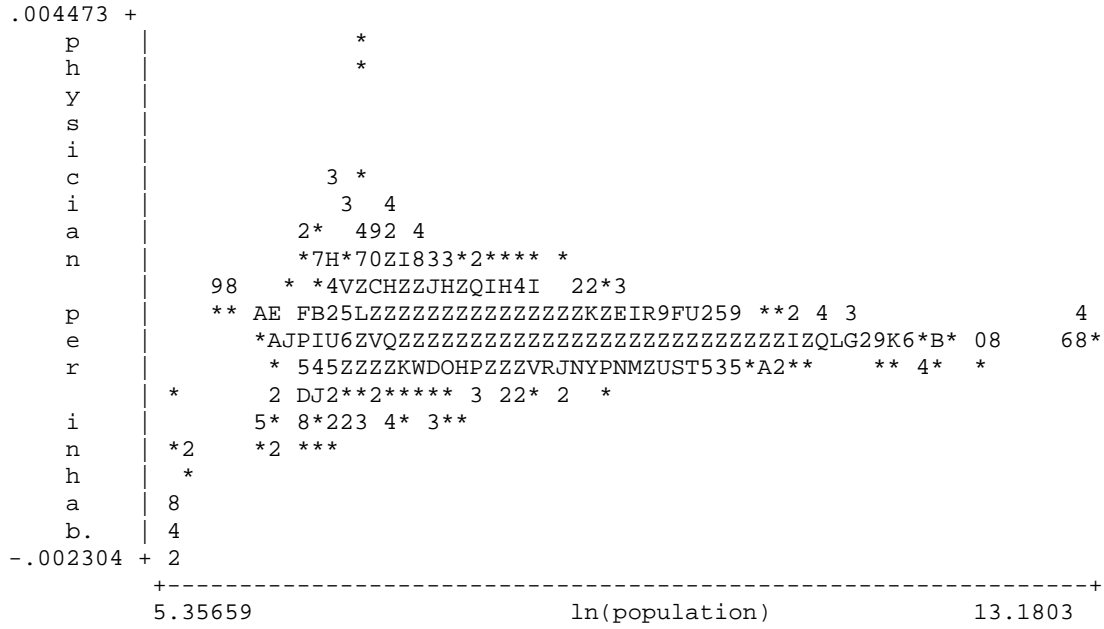
45 From Foss and Selstad (1997).

**Figure 6 Scatterplot of physician work years in municipalities per inhabitant, against ln(population) (1986-2004)**



The scatterplot below is made the exact same way as the one above, except that 0,5 has been deducted from the work year figures prior to dividing them by the number of inhabitants to calculate the municipality physician density.

**Figure 7 Scatterplot of (physician work years - 0.5) per inhabitant in the municipality, against ln(population) (1986-2004)**



There may be scale benefits in the production of GP services in the municipality health service. These might arise from for example administrative and community health medicine duties, which varies less with municipality size than clinical work. Smaller (and more rural) municipalities usually have higher workload from emergency GP services than larger

municipalities. The productivity of the GP the day following a night with sleep deprivation and unrest might be considerably lower than normal. The GP may even be absent. Distance to specialist health service resources and the geographical population pattern within the municipality may also affect the relationship between how much time the GP spend

at work and the total quality of physician services received by the population.

The scatterplot below is made the exact same way as the one above, except that 0.5 has been deducted from the work year figures prior to dividing them by the number of inhabitants to calculate the municipality physician density.

The difference between these two scatterplots is consistent with the presence of scale benefits in the production of GP services in municipalities.

However, the decisive factor that renders comparison of the total quality of the GP service between municipalities of different population size or different centrality-periphery status impossible with the work year data from statistics Norway, is the breakdown of validity of the data found by Kjekshus and Tjora (1998) in municipalities with instability in the GP workforce. As I wrote in paragraph 3.6, they found that municipalities which according to the work year data had high physician density, in some cases had a high degree of instability in their GP workforce, relied on short term substitutes, and had an expensive and inefficient GP service, which due to the instability of the physicians might even have been of poorer quality than the GP service of municipalities with a lower observed physician work year figure.

The relationship between GP work years and GP services received by the population is unknown, and the work year data does not tell anything about stability (directly), which is vital for the quality of GP services. Thus I cannot draw any conclusions concerning the distribution of total GP services quality along the center periphery or municipality size dimension for municipalities based on the SSB work year data. Carlsen (2006) avoids these fundamental methodological problems by instead using survey data on patient reported satisfaction with the GP service.

The most interesting variables among the GP data from SSB therefore becomes those that describe the number of unoccupied positions. As Kjekshus and Tjora point out (see paragraph 3.5), a vacant position in the data does not necessarily describe an actual

shortage of physicians. Although there is no fixed relationship, vacancies correlates with recruitment problems, instability and physician shortage (see paragraph 3.18). I will use vacancy rates, calculated as the number of vacant positions divided by the sum of physician work years and vacant positions. An important quality of the SSB data is that it is time-consistently available for each year over a long period.

Figure 8 describes the geographical distribution of vacancies over time by NIBR5 ranking.

**Figure 8 Vacancy rates in municipality physician positions per centrality over time**

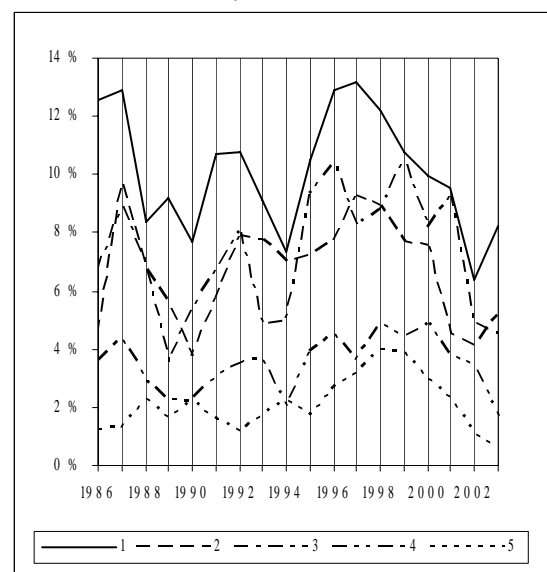
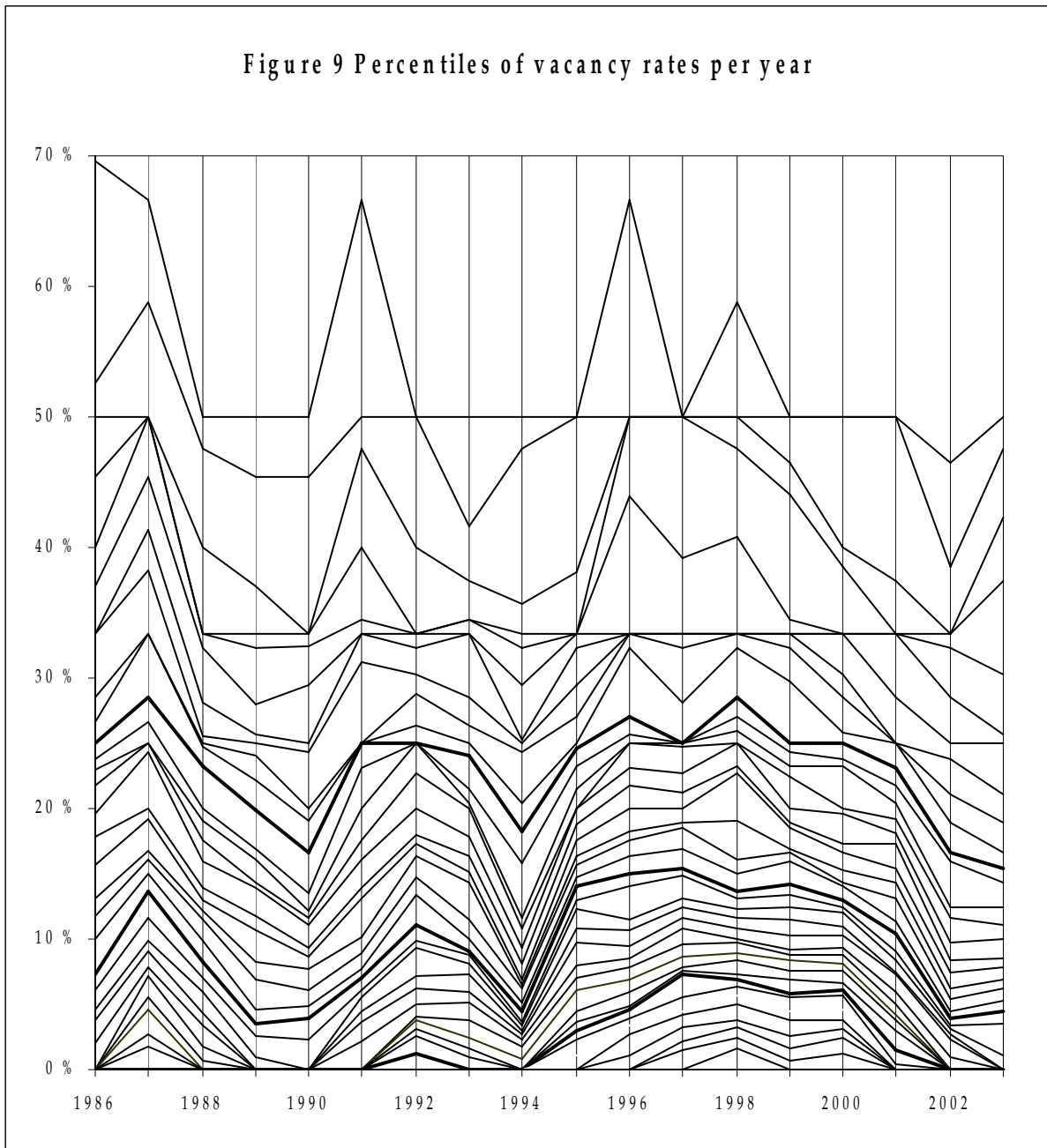


Figure 8 shows that vacancy rates are generally substantially higher in rural than central municipalities. The difference is large over the entire time period. The policies that have been used have not been sufficient to reach the government's policy targets regarding equity in the GP health service. The concavity in the vacancy rate seen in Figure 3 between 1994 and 2003 is recognizable in all NIBR5 centrality categories. The relative difference between rural and central municipalities is larger when the overall vacancy rate is low, and vice versa for the absolute difference. The jump in vacancy rates from 2002 to 2003 seen in Figure 3 seems to only have affected the most rural municipalities.

5.6 Figure 9 can be harder to interpret. The left hand axis is for vacancy rate. The municipalities are for each year sorted by vacancy rate. The topmost line describes the vacancy rate in the municipality that is 1% down from the municipality with the

Figure 9 Percentiles of vacancy rates per year



highest vacancy rate, for each year. Since there are 435 municipalities, this will be the municipality with the 4<sup>th</sup> highest vacancy rate. This may be a different municipality each year. The 2<sup>nd</sup> topmost line represents the municipality with the  $(100-98) \times 435 = 8.7$ , which rounds off to 9) 9<sup>th</sup> highest vacancy rate that year. And so on further down - each line represents one percentile in the municipality vacancy rate ranking. All percentiles with vacancy rate larger than zero are included in the figure.

Figure 9 shows that the 10% of the municipalities with highest vacancy rate have had a vacancy rate

around 20% or higher throughout the entire period. In the peak year 1998, 168 of the 435 municipalities (39%) had vacant physician positions. In 2003 23% of the municipalities had vacancies. From this figure it might seem as the concave trend, as seen in Figure 3, Figure 4, Figure 5 and Figure 8 started at the end of the 1980s, had a disturbance in 1993-1994, and continued to 2002. There also seems to be a reversal in the trend towards a reduction in vacancies between 2002 and 2003.

We have now seen that the vacancy rates in the most rural municipalities have a concave trend from 1994

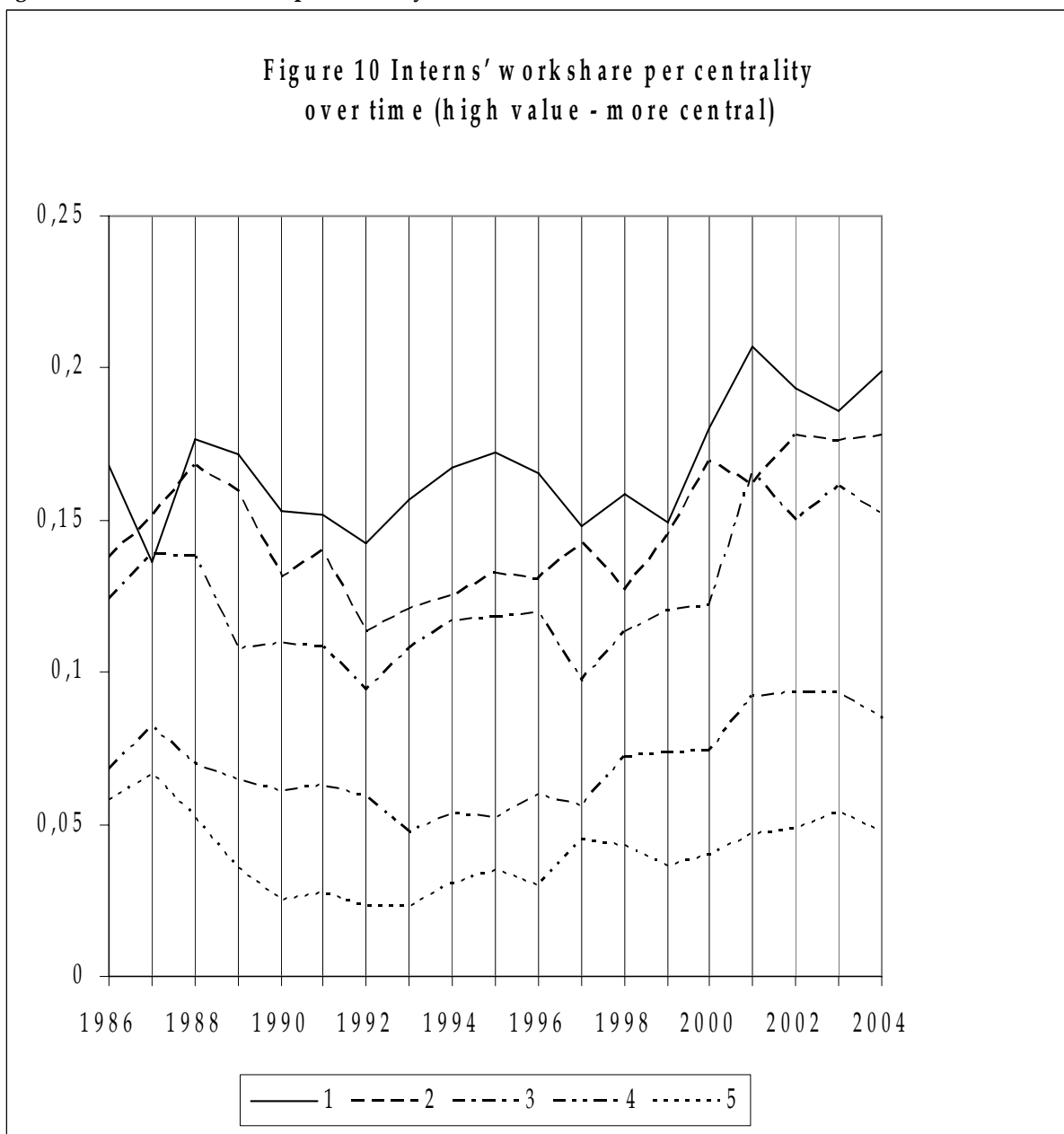
to 2002 with a peak in 1998 (figure 8), the vacancy rates in the municipality health service as a whole follow the same trend (figure 3 and 9). The vacancy rates at hospitals and the influx of foreign physicians follow almost the same trend in this time period. The difference is that the two latter have a large drop between 1998 and 2000, with 2000 being the end point of the concave trend, whereas the curves for the municipality health service stay concave to 2002 with a decline between 2000 and 2002. This discrepancy can be seen in relation to the large increase in salaries at hospitals prior to 1998 (see paragraph 2.10), which reduced the relative attractiveness of GP positions, and that the subsequent changes brought by FLO (see paragraph

2.23 and 3.13) may have offset that by making GP positions more attractive. What I find here is consistent with the prediction at the end of chapter 4, and in support of the theoretical framework in that chapter.

Next I look at the center-periphery dimension of intern distribution over time, shown in figure 10.

The work-year contribution from interns is relatively higher the more rural the municipality. There were relatively larger growth of work years from interns in rural than in central municipalities around 1999-2001. But there is minimal correspondence between

**Figure 10 Interns' Work-share per centrality over time**



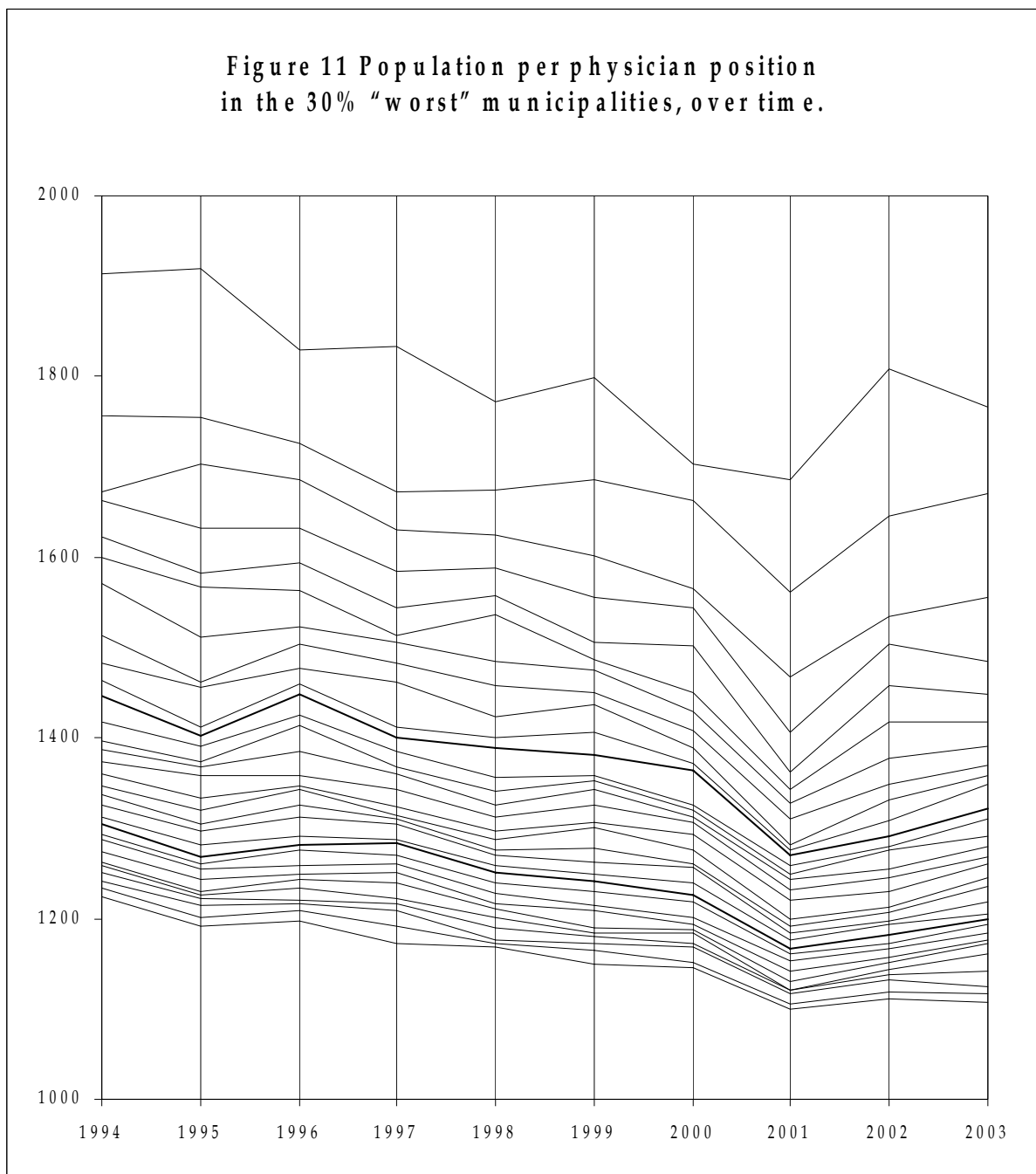
more interns and less vacancies in the data on municipality level. Thus there is no direct link between the drop in vacancies and the increase in interns.

5.7 Now I turn to discussing FLO. As I wrote in paragraph 2.20 the list patient reform may have had a distributional effect through imposing a minimum standard. To look for this effect in the data I use the number of physician positions, equal to the number of physician work years plus the number of vacancies. Municipalities can have established new

physician positions to comply with the minimum standard without having been successful in recruiting physicians to them.

Figure 11 shows percentile graphs (similar to figure 9) of the number of inhabitants per physician position, occupied or not, of the 30% of the municipalities with highest population to physician ratio - over time. Note that a high population per physician figure implies low physician density. See paragraph 5.6 for an explanation of the percentile graph concept.

**Figure 11 Population per physician position in the 30% "worst" municipalities, over time.**





Some municipalities may have a low physician per population ratio because many inhabitants choose to use GPs in other municipalities, because of for example regional commuting patterns. It is not shown here, but it is important to note that most of the municipalities with low physician to population ratio are not rural, but central, and therefore should have few recruitment problems compared to more rural municipalities. Figure 11 shows that the physician position density took a jump up from 2000 (pre-FLO) to 2001 (post-FLO<sup>46</sup>), and that the jump generally was higher for the municipalities with lowest physician position density. But 2001 seems to be an exception – in 2002 and 2003 the physician position density in most of these municipalities decrease, seen as upward-sloping curves in those years.

I suggest two explanations: When FLO was introduced municipalities adhered to the minimum standard and created more GP positions. Because people are free to choose in which municipality they want to have their regular GP, people's choices where in accordance with their old habits and regional commuting patterns. In 2002 the municipalities had had time to adjust the number of GP work years in accordance with this. The second explanation concerns the overall decrease in physician density. Since these municipalities in general are central and do not have recruitment problems, the decrease is unlikely to be there because of vacancies. Rather, it might have to do with a productivity increase following FLO (see paragraph 3.12). These explanations are only suggestions, and not conclusions.

## Chapter 6: POLICY RECOMMENDATIONS

In 1983 a report predicted a future oversupply of physicians in Norway. The education capacity was reduced. The physician market situation in the 1990 was dominated by a serious undersupply of physicians, mainly driven by strong growth in

demand from the hospital sector. The education capacity reduction in the 1980s did not contribute positively to the situation. Physicians started to work longer hours (paragraph 2.9) and were rewarded (paragraph 2.10). But the most important answer to the problem came from abroad – the use of foreign physicians on longer or shorter work visits became crucial for the Norwegian health service throughout the 1990s. The education capacity for Norwegian medical students was increased and this gave results in the form of more physicians starting around 2000, but the increase has so far been insufficient to supply enough physicians to meet the demand.

As I write in the introduction, the government should have policies that maximizes the stability of GPs, minimize GP position vacancy rates and promotes equity in both in order to secure an efficient and equitable GP health service. In chapter 4 I argue that the government can use two types of policy measures to reach its policy goals regarding the geographical physician distribution – securing a high level of supply of physicians, and increasing the relative attractiveness of physician positions particularly in rural areas. Based on my discussion both policies should be adopted, as they both increase the efficacy of the other.

Since the period in the 1990s with highest physician position vacancy rates, there has been a focus on measures targeted at improving the physician recruitment situation in rural areas. I have referred to a few of these measures in the background and literature chapter. The data on vacancy rates I use in the empirical chapter does not seem to indicate any dramatic change between rural and central municipalities over the last years. It is difficult to draw conclusions regarding the possible effectiveness of these policies based on the data I have. An in-detail evaluation of the effectiveness of these is beyond the scope of this thesis. Though what is evident is that current policies have not been sufficient to even out inequities in vacancy rates and stability in GP positions between central and rural parts of the country.

Regarding the other type of policy measure, increased supply of physicians, I am more able to draw conclusions. As written in chapter 4, a critical question here is whether the vacancy rate in rural

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<sup>46</sup> The data describe the situation at the end of each year. See paragraph 5.4.

municipalities is affected by the overall supply situation on the physician market. The developments I find in the data support that notion: Increasing the supply of physicians seems to be an efficacious policy measure for reaching the government's policy goals for the physician distribution. Though this policy tool has not been used sufficiently - throughout the entire period, the vacancy rates in both hospitals and the primary health service has been sustainably at high levels. The Norwegian education capacity for physicians has not been sufficiently high for the supply of physicians to meet demand. What can be said about the future?

The government's main tool for planning supply and demand for physicians, the HELSEMOD reports (paragraph 3.14), are based on dubious assumptions: The number of Norwegians undertaking medical studies abroad is likely to be dependent on the physician market situation in Norway (paragraph 5.3), as is the net influx of physician from abroad - it is likely that fewer foreign physicians will come if it gets harder to find employment, and vice versa (paragraph 5.2). Also, more Norwegian physicians might seek employment abroad instead of accepting positions in rural municipalities if the physician market becomes more saturated. The HELSEMOD reports assume absolute inelasticity in the number of medical students and net migration of physicians. They also assume that the demand for physicians was met by the supply in 2004, and there is absolutely nothing in the data material I have looked at that supports that notion. Their high-growth scenario points towards future undersupply of physicians, and use a growth rate in physician work years *below* what it has been over the past 10-20 years (Table 2). The figures for medical student completion rates that the HELSEMOD-calculations use are questionable (see below Table 5 and the discussion of Figure 5). Given the state of the assumptions the HELSEMOD calculations rely on, the conclusion must be that the validity of the estimates are low. The calculations are biased towards underestimating the need for increased supply of physicians in Norway.

The HELSEMOD-estimates could probably be improved, but predicting the future 10-15 years ahead is bound to be difficult. Given the inevitable uncertainty of the future, a prudent perspective

when deciding the education capacity for physicians could be risk-averseness, and the adoption of a goal of prevention of physician shortage to avoid conditions similar to how it has been in Norway over the last 20 years. Such a policy could involve a dramatic increase in domestic education capacity for physicians. Educating physicians costs money, but paying physicians to work overtime or hiring substitutes from abroad costs money too, and not having physicians available for employment at all is most likely of detriment to the health services (not received by the population). A feature article in TDNLF in 2000<sup>47</sup> says that the price of one medical school student for one year to be around NOK 200 000 - 300 000. That points towards a total cost of educating a physician in the vicinity of NOK 2 million. Given the salaries physicians earn and the value of the services they carry out, it will be surprising if costs of this magnitude will be prohibitive. Increased supply of physicians can have long-term effects on the salary level and on the demand for physicians from hospitals and municipalities as well, leading to cheaper and more (in terms of both quality and quantity) health services being produced.

My policy recommendation is for the government to commission cost-benefit-oriented research with a risk-averseness perspective on the question regarding how much the education capacity for physicians should be increased.

The government has a long history of trying to restrict the number of physician positions in central areas. Policies that have tried to limit growth in positions at hospitals in central parts of the country, have at least partially failed every time they have been in effect - in the 1970s and 1990s (paragraph 3.1), and also the legal regulation in effect from 1999 has not had the intended effect (paragraph 2.28). An interesting research question is to look at what consequences these measures would have had for the targeted hospitals when it comes to health service production, pressure on physicians to work overtime and physician salaries and budgets if such a regulation actually had been effective. A commonly held argument against increased education capacity

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<sup>47</sup> "Vårt femte fakultet" by Geir Jacobsen. TDNLF no. 8 2000 (volume 120) page 2326.

for physicians is that this will lead to increased costs for hospitals. Economically, limiting the supply of physicians as a part of cost control at hospitals seems senseless – the view should rather be that the production of health services in hospitals cannot be detrimented by giving the hospitals the choice to employ more physicians, and that a higher supply of physicians will lead to lower physician salaries over time.

Prior to 1992 any physician could open up a general practice anywhere and receive FFS payments from RTV. If the FFS payments had not later been restricted to physicians with government contract only, the physician density in central parts of the country would probably have been higher. Giving any physician the eligibility to trigger FFS payments for the physician's own treatment could also have caused strong incentives for supplier-induced demand. The current policy of limiting FFS payments to physicians with a government contract seems very wise.

Since 1992 it has been impossible for physicians in a private practice without a government contract or without employment at a hospital to trigger payments to themselves from the public health system. There are no mechanisms that allow an unemployed physician to induce supply for their services and have the government pay for them. Thus the commonly held argument against increasing the education capacity for physicians that this will lead to problems with supplier induced demand is voided.

Regardless of whether the direct regulation of the physician market is continued or not, it might be desirable for the government to monitor and perhaps limit the number of private practice physicians receiving FFS payments, in particular GPs in municipalities. Municipalities pay GPs per capita, and their expenditures are not directly affected by the number of GPs in the municipality. Hence municipalities may wish to give contracts to a large number of GPs, in order to increase the amount of GP services received by their population. RTV will take the bill if increased use of GP services is the consequence. In this light perhaps it can be better to have RTV issue permits to municipalities for GP

positions instead of HD or SHDir - especially if the current regulation regime is abandoned.

I have given FLO limited attention, because FLO seems to have had limited impact on the physician distribution, at least compared to the aggregate supply and demand situation, which I have focused on. FLO imposed a minimum standard, but this had little impact in the work year data (paragrap 5.7). FLO might have given a productivity boost in some rural municipalities because of change to more incentive-oriented contracts, but such an effect will most likely take some time to appear in the data to an extent that makes conclusions possible.

As discussed in the theory chapter, an important effect from FLO may be on the overall stability of GPs, by increasing the attractiveness of GP positions compared to other employment opportunities physicians have. The salary increased, but more important in the long run may be the effect of the changes in the organisational working conditions (paragraph 3.13). Many non-monetary concerns are relevant for physicians when they choose position, as I point out at the start of chapter 4. It could be interesting to look into how GP positions can be made more attractive for physicians through other ways than raising the salary. In 2006 the government has set aside money for GP oriented research (paragraph 2.27) – that can be a step in the right direction.

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