

DOES THE WAGE STRUCTURE DEPEND ON THE WAGE CONTRACT?
A STUDY OF PUBLIC SECTOR WAGE CONTRACTS IN ICELAND

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It is widely accepted within the field of labor economics that centralization of collective bargaining leads to lower wage dispersion. But is it possible to change the wage structure through changes in the collective bargaining agreement and decentralization of the bargaining process? A unique opportunity to explore this question presented itself when changes were made to collective bargaining contracts in the public sector in Iceland.

In the first chapter I look at the Icelandic labor market. The Icelandic labor force is often described as being flexible. But is it really? Using definitions of labor-market flexibility, I explore whether the Icelandic labor market can be classified as such and find that on most measures of flexibility the Icelandic labor market can be described as flexible.

In the second chapter I explore the effects of the changes in the bargaining structure and decentralization in the public sector in Iceland on the wage structure. Did wage dispersion increase with decentralization, as theory would predict? I find that wage levels rose significantly, and that the wage structure for total wages did not change but that the dispersion of daytime wages increased.

In the third and final chapter I develop a model of collective bargaining as a two-stage process in the manner of Manning (1987). The resulting two-equation nonlinear structural model is then applied to the central government in Iceland in order to determine whether the collective bargaining structure changed along with the changes in the collective bargaining agreements.

The decentralization of bargaining and the change in the collective bargaining agreements has changed the bargaining structure in the public sector in Iceland. I find that the unions have a greater bargaining power over employment than over wages, whereas their bargaining power over wages currently seems to be much greater for daytime wages than for total wages. Based on the means of the estimates of the bargaining power of unions over wages and employment, respectively, I can reject the monopoly union and right-to-manage bargaining models.

BIOGRAPHICAL SKETCH

Katrin Olafsdottir was born in New Britain, Connecticut, in 1965 to Icelandic parents. She moved to Iceland in 1969, where she grew up, and she finished her matriculation examination in 1984. After a year studying Computer Science at the University of Iceland, she transferred to Occidental College in 1985 and graduated with an A.B. in Economics and a minor in Mathematics in December of 1987. In the fall of 1988 she enrolled at Cornell University, where she finished her A-exams and received an M.A. in the spring of 1991.

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Katrin has served the government as an advisor on fiscal policy. She has also served on various committees, many of them government-appointed. Currently, she is on the board of the commercial bank Islandsbanki. Furthermore, Katrin was a columnist at Iceland's leading newspaper, *Frettabladid*, from 2004 to 2005, writing a weekly column on current economic issues. She has also given many public talks on various economics-related topics in Iceland as well as occasional commentary in the Icelandic media as well as the foreign media.

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CHAPTER ONE: THE ICELANDIC LABOR MARKET—IS IT REALLY FLEXIBLE?

Abstract

The Icelandic labor force is often described as being flexible. But is it really? Several studies have discussed the flexibility of labor markets and macroeconomic performance, such as those by the Organization of Economic Cooperation and Development (OECD; 1997, 2004), Solow (1998), Flanagan (1999), and Nickell (2003). These papers look at, for example, the strictness of labor market institutions as well as unions and bargaining structures. Other factors they examine include the general state of the economy and how wages and unemployment respond to changes in the labor market.

The Icelandic wage-bargaining system is classified as centralized and coordinated, whereas the legal framework related to the labor market does not imply strictness. The country's labor force participation rate is high, yet variable, and migration plays an important part; immigration occurs in times of robust economic growth, and outmigration occurs in times of downturn. The tax wedge on labor is relatively low and thus should not affect the decision to work. Furthermore, the unemployment rate is lower than in most other countries, and there is constant flow in and out of unemployment. Thus, on the most common measures of flexibility, the Icelandic labor market falls within the "flexible" category.

1. Introduction

Iceland is a small country with a population of 315,000 people; thus its labor market is quite small, at around 180,000 people in 2007 (Statistics Iceland). The Icelandic labor

market differs from others in that it has the highest labor market participation rate and the highest level of union density among the member countries of the OECD.

In addition, Iceland's per capita income is quite high, or fifth among the 30 OECD countries in 2006, measured using GDP per capita based on purchasing power parities (OECD, 2007a). This high level of income is partly due to the high labor force participation rate and to long work hours: the labor force participation rate is over 85% (OECD, 2007b), while average work hours exceed 40 per week (Statistics Iceland). Participants in the Icelandic labor market also retire at a later date than those in most other OECD countries.

Trade union density in 2000 was 84%, and wage bargaining is generally centralized (OECD, 2004). In most cases wage bargaining takes place between the Icelandic Federation of Labor (ASI) and the Confederation of Icelandic Employers (SA).

Iceland's high unionization rate and the dominant role of labor unions there reflect a tradition of treating organized labor as the social equal of employers and government, a tradition shared by the other Nordic countries. Other factors, however, are also involved. Many contracts specify that priority in hiring must go to union members. The first priority clause (Icel: forgangsrettur) was established between the union Dagsbrun and the company Landsverslun during World War I, and was intended to prevent "free riders" from underbidding in times of unemployment, as they did not pay union fees or have to endure strikes. Iceland's unions are mostly organized around sectors or skills, either for the whole country or through localized unions, as opposed to being organized by industry. This is similar to the systems found in the United Kingdom and Denmark. Also, many pension funds are organized around labor unions

(Snaevarr, 1993), and Icelandic law gives collective bargaining the legal status of law (Act No. 55/1980).

The Icelandic labor force is often described as being flexible and is perceived to be much more flexible than the labor markets of the European Union (EU) member countries. For instance, the agenda for the Confederation of Icelandic Employers (SA) states: “SA stresses the maintenance of flexibility and agility in the Icelandic labor market” (SA, 2006). This flexibility is perhaps derived from the fact that the economy has historically been subject to large external shocks, mainly as a result of its dependence on the fishing industry. Although economists have not agreed on a simple definition of labor market flexibility, most indicators in Iceland point to flexibility.

The question remains as to how flexible the Icelandic labor market is in terms of labor, on the one hand, and wages, on the other. The aim of the analysis in this chapter is to seek answers to these questions in order to throw light on the Icelandic labor market’s main characteristics.

1.1. A flexible labor market

In a perfectly flexible labor market, market forces work to ensure that there is low unemployment at all times and that labor moves to where it is needed. Thus, wages constantly change to maintain full employment. Several studies have discussed the flexibility of labor markets and macroeconomic performance, such as those by the OECD (1997, 2004), Solow (1998), Flanagan (1999), and Nickell (2003).

Several indicators fall under the heading of flexibility. One is the strictness of a country’s labor market institutions, specifically, the system of laws that regulate the

labor market and the ease of hiring and firing; as well as taxes on labor, social security, and unemployment insurance; the system of education and training; and barriers to mobility. Unions and bargaining structures also fall under this heading. According to Nickell and Layard (1999), labor market institutions appear to have a strong relationship with unemployment. Any institution that reduces exogenous job separations, increases search effectiveness, reduces the level of benefits, or lowers the strength of workers is expected to lead to lower equilibrium unemployment. Labor market institutions that could be expected to increase growth rates are those that increase savings or human capital.

One reason given for labor market regulation is to correct market failures, such as those related to job security, wage-setting, and job search. Increased job security could make workers more willing to participate in firm-specific training, thus enhancing productivity.

Another item that influences flexibility is the general state of the economy, and with its low unemployment rate, the Icelandic economy has generally been robust. But labor market flexibility also refers to how wages and unemployment respond to changes in the labor market. Unions and bargaining structures play a large role in this respect. These items will be discussed in turn in this chapter.

1.2. Sectors

Looking at the evolution of the workforce share in different sectors of the economy, we see a development similar to that in most other industrialized countries, in which labor is moving away from the primary sector and into the service sector.

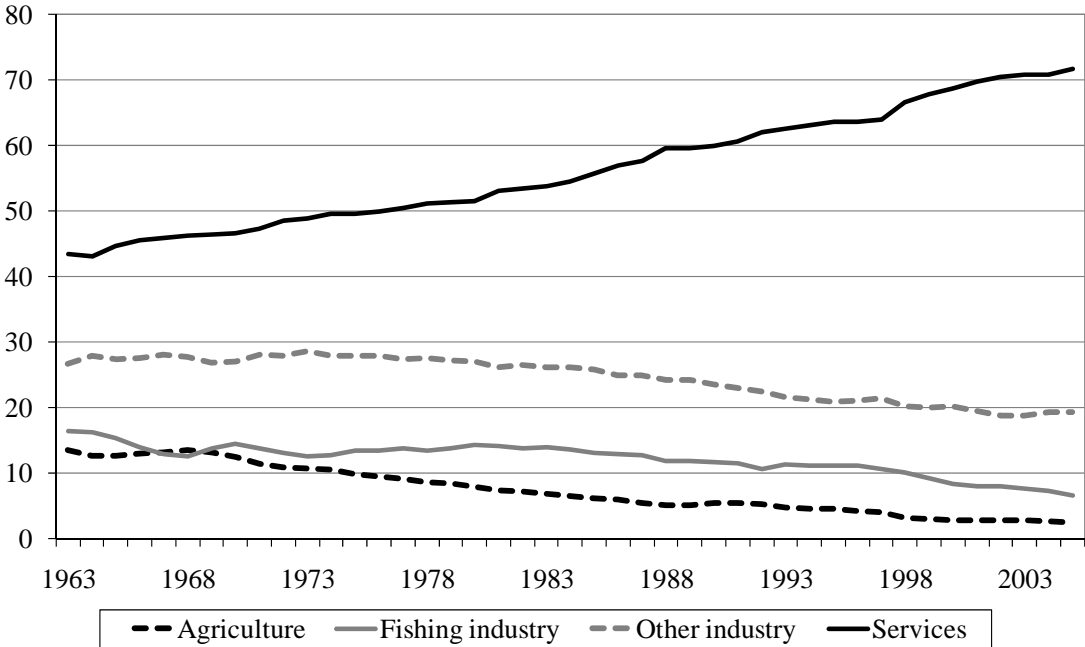
The main trend in Iceland has been away from fisheries and agriculture and into the service sector, as seen in Figure 1.1. In 1970 roughly 12% of the nation's workforce worked in agriculture, and a similar portion, or 14%, was involved in the fisheries sector, fishing, and fish processing. Around 27% of the workforce worked in industries other than fish processing, and the remainder, or nearly half of the workforce, was employed in the service sector. Since then the share of the workforce involved in the primary sector, agriculture, fishing, and fish processing, has declined steadily, as has the share working in industry. Thus, the share of the workforce employed in the service sector has risen steadily. In 2005 the share of the workforce working in agriculture had declined to 2.4%, while 6.6% of the workforce worked in the fisheries sector. The decline is not as great in industry; still, its share of the workforce was 19.3% in 2005, down from 27% in 1970. However, the share of the workforce in the service sector had risen to 71.7% in 2005, up from 50% in 1970.

The share of each sector in terms of manpower is similar in the other Nordic countries, as shown in Table 1.1. However, in Iceland a higher share of the population works in agriculture and fishing. On the other hand, a smaller share is employed in manufacturing in Iceland than in the other countries.

1.3. Recent developments

One of the main objectives of economic policy in Iceland after World War II and up to 1990 was to ensure peace in the labor market as well as ample employment. Collective agreements with high wage increases were made, and shortly after, the government stepped in and devalued the national currency, the krona, in order to adjust real wages. This often led to high inflation rates, and as a result real wages have historically fluctuated widely. Furthermore, wage drift was the norm because of a chronic lack of

manpower. The last devaluation of the krona took place in 1993, and since 2001 the exchange rate has floated freely and, thus, the earlier norm has been abandoned.



Source: Statistics Iceland

Figure 1.1. Division of labor force by industry.
 Man-years, percent of total.

In 1990 the labor market partners entered into the National Pact Agreement (Icel: thjodarsattarsamningur), a unique contract intended to lower the inflation rate permanently. The partners agreed on low wage increases provided the economic environment remained favorable. The agreement stipulated certain trigger clauses: if items such as inflation and terms of trade exceeded a certain limit, the termination of the collective agreements was at risk, while the government agreed to do its share to ensure that the agreements would hold. Inflation declined rapidly, and the agreements were extended several times with either low, nominal wage increases or no increase. As can be seen in Figure 1.2, the agreements were signed during a period of stagnation

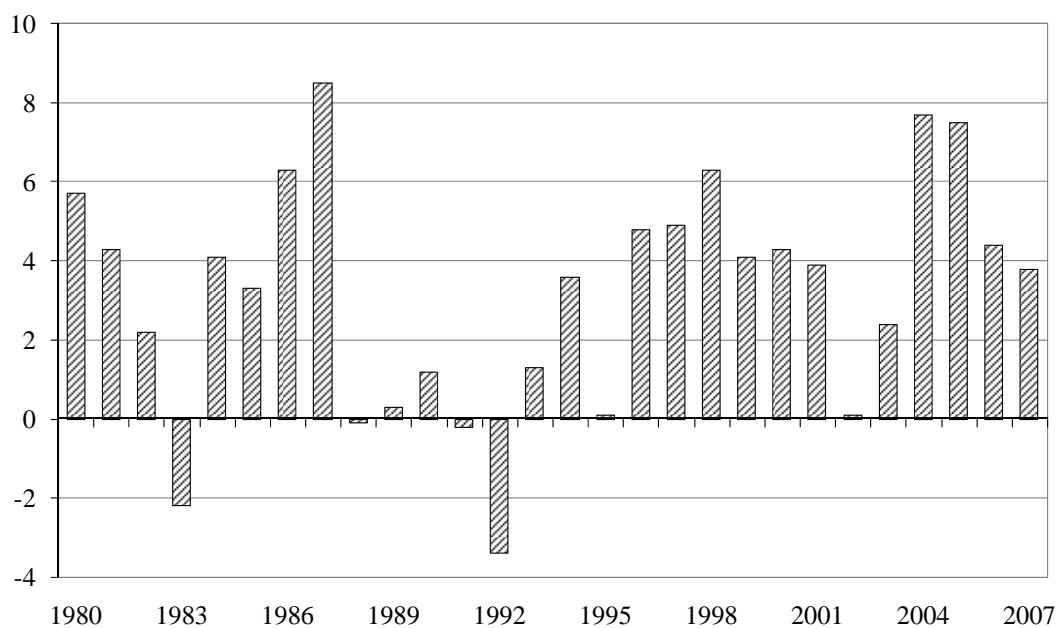
in the Icelandic economy, while inflation decreased significantly, as shown in Figure 1.3.

Table 1.1. Employment by industry, 2002.

Percent of total.

	Denmark	Finland	Iceland	Norway	Sweden
Agriculture and fishing	3.0	5.1	7.1	3.8	2.1
Manufacturing	16.9	20.8	15.0	14.8	17.6
Construction	6.3	6.2	7.9	6.9	5.5
Trade	17.6	15.4	17.4	17.5	14.8
Transport and communication	6.5	7.1	6.2	7.0	6.7
Business services	13.4	13.0	12.7	11.9	15.4
Other services	35.7	32.1	33.6	38.0	37.7
Other	0.6	0.3	0.1	0.1	0.2
Total	100.0	100.0	100.0	100.0	100.0

Source: Wolf (2005) and Statistics Iceland

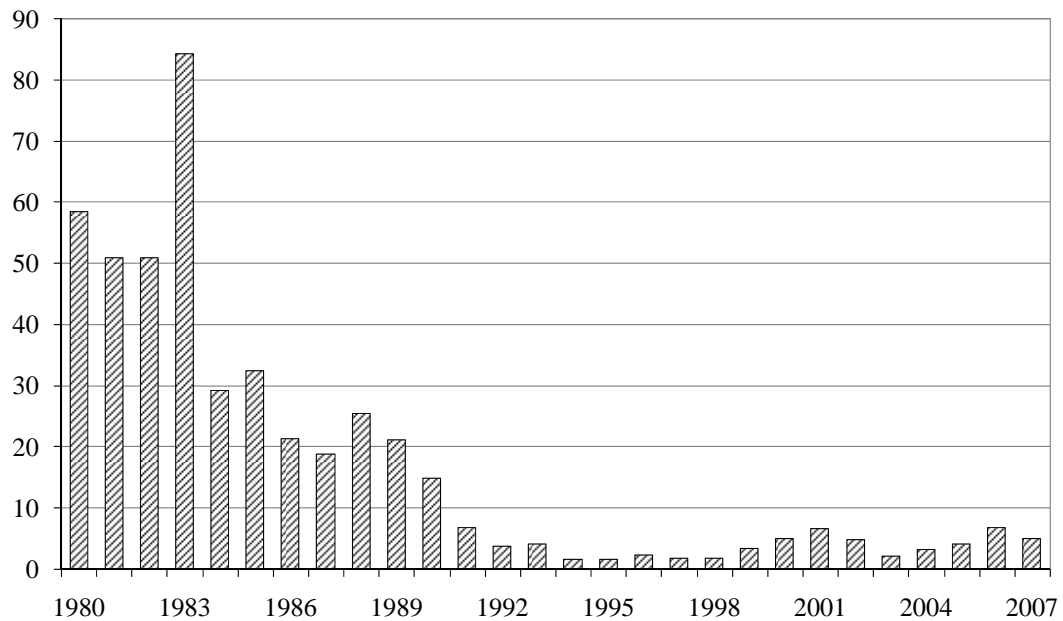


Source: Statistics Iceland

Figure 1.2. Economic growth.

Real annual changes in GDP, in percentages.

Among other achievements of this contract was that it changed the attitude of the unions from demanding ever-larger nominal wage increases to focusing on real wage increases. Furthermore, the length of the contracts has increased substantially, from 1 year or less to around 3 years.



Source: Statistics Iceland

Figure 1.3. Inflation rate.

Annual percentage changes in the consumer price index.

Tripartite agreements, in which the government steps in to facilitate the signing of new agreements between labor unions and employers, have been the norm in recent years. As economic growth picked up in the second half of the 1990s, the negotiations again became more fragmented, although they were never very decentralized.

2. The wage determination system

Compared with other countries, the strictness of Iceland's employment protection is very low. This section describes the legal framework in the Icelandic labor market and

the bargaining structure. It also discusses the main union and employer federations and shows the contents of the collective agreement that has the largest coverage.

2.1. Laws and regulations regarding the labor market

Laws and regulations that add directly to labor costs, such as mandatory sick pay, have little effect on unemployment, as wages appear to adjust to compensate. Furthermore, they do not seem to have any effect on productivity (Nickell and Layard, 1999). Rules and regulations aimed at employment protection, such as severance pay, tend to affect hiring and firing decisions. These tend to reduce short-term unemployment and lengthen long-term unemployment, by reducing the flow in and out of unemployment, as well as by affecting labor force participation rates, especially for women (Lazear, 1990).

Regulating minimum wages affects the labor market in two different ways. Minimum wages increase overall productivity, first, by eliminating low-paying and low-productivity jobs, thereby increasing the probability of higher unemployment rates; and second, by reducing skill differentials, thereby reducing the incentive to invest in human capital. Empirically, the minimum wages in most countries seem to be set at such low levels that the effects are generally minimal (Nickell and Layard, 1999).

Similar to those of the other Nordic countries and unlike those of many European countries and the United States, Icelandic law stipulates few rights concerning the labor market. Instead, the protection of employees in the labor market is stipulated through labor contracts. Thus, there are no laws on minimum wages, but because each contract stipulates the minimum wages under that contract, it is the equivalent of having minimum wages.

Iceland is not a member of the EU. It is, however, a member of the European Economic Area (EEA), which extends the four freedoms of the EU to Iceland, Norway, and Lichtenstein. Since the EEA was formed in 1994, Icelandic labor legislation and collective agreements have been altered in accordance with EU regulations and directives. The most notable changes relate to the protection of children and adolescents in employment and restrictions on maximum working hours (on average, 48 hours per week). Thus, the number of rules governing the Icelandic labor market has increased in recent years, either through legislation or through collective agreements.

Rules for hiring and firing are much less restrictive in Iceland than in most other European countries. Most collective bargaining contracts stipulate 1–6 months' notice, depending on tenure, and usually 3 months. Firing is generally done without awarding severance pay. To dismiss an employee, one must present him or her with a written notice before the end of the month prior to the notice taking effect (Juliusdottir, 1993). Shop stewards, pregnant women, and employees on parental leave enjoy greater protection from dismissal. Employers in the private labor market do not need to demonstrate reason for dismissal; however, the rules for dismissal in the public sector are more stringent. Severance-pay agreements are rare, except for high-ranking personnel, in both the private and the public sector and are bound in individual contracts. There are also no restrictions on part-time work.

Iceland's current system of parental leave took effect in 2003. In the event of the birth of a child the mother receives 3 months' leave; the father receives another 3 months' leave, and an additional 3 months can be used by either parent (Act No. 95/2000).

During the parental-leave period, the parent receives 80% of his or her former wages, up to a certain limit.

Active labor market policies have been used in many countries to facilitate the move from unemployment to employment. With the historically low unemployment rate in Iceland, there is little demand for active labor market policies. However, public employment agencies, which list local jobs as well as those in other EEA countries, operate in each part of the country. They also offer assistance to job-seekers in the form of various kinds of instruction, such as computer courses, self-enhancement courses, and courses in operating heavy machinery, to name a few.

The OECD estimated the strictness of employment protection for regular employment in its member countries as well as in a number of nonmember countries in 2008 (Venn, 2009). The study looks at 21 items and gives each country a score depending on the strictness of its employment protection; higher values represent stricter regulations. The scores for each of the 21 items are combined into a single score on which countries can be ranked by strictness of employment protection. The total score is made up of three sub-indicators: protection of permanent workers against individual dismissal, regulation on temporary forms of employment, and specific requirements for collective dismissal.

On overall strictness of employment protection for regular employment, the United States ranks number one with the least strictness, followed closely by Canada and the United Kingdom (see Table 1.2). On the other end of the scale are Portugal, Luxembourg, and Turkey. On this scale, Iceland ranks 11th with a score of 2.11, on a par with Hungary and below the OECD average of 2.23. Iceland ranks close to the

OECD average on protection of permanent workers against dismissal. It ranks below the OECD average for regulations on temporary work and above the OECD average when it comes to specific requirements for collective dismissal.

Table 1.2. Employment protection indicator.

Scored on a scale from 0 for least strict to 6 for most strict. Rank is from lowest to highest value.

	Score	Rank		Score	Rank
Australia	1.38	5	Korea	2.13	13-14
Austria	2.41	18-19	Luxembourg	3.39	29
Belgium	2.61	21	Mexico	3.23	28
Canada	1.02	2	Netherlands	2.23	15
Czech Republic	2.32	17	New Zealand	1.16	4
Denmark	1.91	9	Norway	2.65	23
Finland	2.29	16	Poland	2.41	18-19
France	2.90	25	Portugal	2.84	24
Germany	2.63	22	Slovak Republic	2.13	13-14
Greece	2.97	26	Spain	3.11	27
Hungary	2.11	11-12	Sweden	2.06	10
Iceland	2.11	11-12	Switzerland	1.77	8
Ireland	1.39	6	Turkey	3.46	30
Italy	2.58	20	United Kingdom	1.09	3
Japan	1.73	7	United States	0.85	1
OECD average	2.23	-			

Source: Venn (2009)

2.2. The bargaining system

In the literature on the macroeconomic effects of collective bargaining structures, a distinction is usually made between centralization of bargaining, on the one hand, and coordination of bargaining, on the other (Aidt and Tzannakos, 2002). Whereas centralization describes the locus of the formal structure of bargaining, that is, in terms

of bargaining at the national, industry or firm levels, coordination of bargaining focuses on the degree of consensus between the collective bargaining partners.

As discussed in textbook economics, unions increase wage pressure and therefore increase unemployment. However, a centralized union will internalize the negative externalities of the wage-bargaining process, as wages are lifted above the competitive level, taking into consideration the welfare of all of its members in the economy. This relates to Calmfors and Driffill's (1988) idea of the hump-shaped relationship between centralization of bargaining and macroeconomic outcome.

There does not appear to be a strong link between economic performance and collective bargaining. The OECD (1997) found no significant relationship between most measures of economic performance and collective bargaining. Several studies done in the United States and the United Kingdom have found negative effects of unions on productivity and productivity growth. Cross-country growth regressions, on the other hand, reveal no evidence of union effects.

The OECD (2004) defines centralization of bargaining on a scale from 1 to 5 as follows:

1. Company- and plant-level predominant.
2. Combination of industry- and company-/plant-level, with an important share of employees covered by company bargains.
3. Industry-level predominant.
4. Predominantly industrial bargaining, but also recurrent central-level agreements.

5. Central-level agreements of overriding importance.

During a period in which the Icelandic economy is experiencing a downturn, central-level agreements are the norm. However, during an upswing period it is more common to see a more fragmented bargaining environment, one closer to that of industrial bargaining. Thus, on this scale, Iceland would rate somewhere between 4 and 5.

The OECD (2004) defines coordination on a scale from 1 to 5 as follows:

1. Fragmented company/plant bargaining, little or no coordination by upper-level associations.
2. Fragmented industry- and company-level bargaining, with little or no pattern-setting.
3. Industry-level bargaining with irregular pattern-setting and moderate coordination among major bargaining actors.
4. a) Informal coordination of industry- and firm-level bargaining by (multiple) peak associations.
4. b) Coordinated bargaining by peak confederations, including government-sponsored negotiations (tripartite agreements, social pacts), or government imposition of wage schedules.
4. c) Regular pattern-setting coupled with high union concentration and/or bargaining coordination by large firms.
4. d) Government wage arbitration.
5. a) Informal coordination of industry-level bargaining by an encompassing union confederation.
5. b) Coordinated bargaining by peak confederations or government imposition of a wage schedule/freeze, with a peace obligation.

Here, again, Iceland rates somewhere between 4 and 5; 4b) and 4c) are most common, but 5 also takes place.

Table 1.3. Trade union density, 2000.

Percentage of the workforce who belong to a union. Rank is from highest to lowest value.

	%	Rank		%	Rank
Australia	25	18	Korea	11	29
Austria	37	8	Luxembourg	34	11
Belgium	56	5	Mexico	18	24
Canada	28	14	Netherlands	23	20
Czech Republic	27	15	New Zealand	23	21
Denmark	74	4	Norway	54	6
Finland	76	3	Poland	15	27
France	10	30	Portugal	24	19
Germany	25	17	Slovak Republic	36	9
Greece	27	16	Spain	15	26
Hungary	20	23	Sweden	79	2
Iceland	84	1	Switzerland	18	25
Ireland	38	7	Turkey	33	12
Italy	35	10	United Kingdom	31	13
Japan	22	22	United States	13	28
OECD			OECD		
Unweighted average	34		Weighted average	21	

Source: OECD, 2004

The structure of the Icelandic collective bargaining system thus ranks high in terms of both centralization and coordination, more so during recessions than in boom periods. Bargaining occurs most often at the national or sometimes at the industry level, and there is generally a large degree of coordination among the collective bargaining partners. Although bargaining power is formally in the hands of individual unions, member unions generally give bargaining power either to the Icelandic Federation of Labor (ASI), to individual associations within ASI, or to a few large unions that join together and bargain with the Confederation of Icelandic Employers (SA) to make a

general wage agreement, and the other unions follow suit, usually making a similar agreement.

Trade union density in 2000 was 84% (Table 1.3), the highest among the OECD countries, followed by Sweden with 79% (OECD, 2004). Furthermore, the union density for women is higher than that for men in Iceland. Official figures on bargaining coverage do not exist, but have been estimated to be 95%, or almost complete coverage (Zoega and Herbertsson, 2005).

2.2.1. Union federations

The union movement is dominated by a few labor federations. The Icelandic Federation of Labor (ASI) was founded in 1916 and is by far the largest, with 94,000 active members in 2004, while the estimated total number of active union members was 147,000 (Table 1.4). Private-sector employers are also represented by a bargaining organization, the Confederation of Icelandic Employers (SA), which represents about 2,000 firms. SA was founded in 1999 with the merger of two confederations, the older of which dates from 1934.

Employees in the public sector are represented by public-sector unions organized into three main federations, BSRB, KI, and BHM. The public sector is represented by the central government, which is by far the largest single employer in the country, and by the municipal governments. About 24% of employees in Iceland work in the public sector (Mosesdottir et al, 2006).

The existence of large umbrella organizations for both workers and employers in the general labor market has made nationwide labor bargains possible, typically with the

active participation of the central government. Underlying this centralization of wage agreements, however, is a fragmented system of labor unions, as individual unions have the right to negotiate independently of the federations. The federation officially acts only on behalf of the unions, whereas agreements must be voted on within each union. Although the labor federations are large, individual labor unions are quite small, as their membership is often determined by both type of work and geographical location. As a result, there are over 200 separate unions operating in Iceland.

Table 1.4. Active members of labor federations, 2004.

Estimate	Number	Percentage
Icelandic Federation of Labor (ASI)	93,562	63.5%
Federation of State and Municipal Employees (BSRB)	18,589	12.6%
Teachers' Association of Iceland (KI)	8,623	5.9%
Association of Academics (BHM)	8,141	5.5%
Union of Icelandic Bank Employees (SIB)	3,850	2.6%
Icelandic Union of Foremen and Supervisors (VSSI)	2,317	1.6%
Apprentices' Association of Iceland (INSI)	2,419	1.6%
Merchant Navy and Fishing Vessel Officers' Guild (FFSI)	1,809	1.2%
Masons' Association of Iceland	343	0.2%
Independent unions	7,587	5.2%
Total active members of labor unions	147,240	100.0%

Source: Statistics Iceland

When it comes to bargaining, ASI, individual associations, or some member unions of ASI bargain with SA and usually lead the negotiations and set the stage on which other agreements are based. In times of slow economic growth and increased unemployment, when expectations for higher purchasing power through wage negotiations are low, unions generally delegate the negotiation to the federation to which they belong, to ensure that of the possible wage increases, every member gets the same increase. On the other hand, when economic growth is on the rise and

expectations are running high, unions may decide to negotiate on their own behalf, without the cooperation of other unions. Even though such negotiations sometimes become more fragmented, they remain synchronized, that is, the wage agreements in Iceland all cover the same period and all expire on approximately the same date.

Negotiated wages and wage increases are always considered to be minimums. There is no upper limit to the wage or wage increase that union members can receive. Thus, actual wage increases can easily deviate from the negotiated minimum. The extension of contracts, however, is generally not practiced in Iceland.

The Icelandic Federation of Labor (ASI) is divided into 5 countrywide associations and 7 unions that have direct membership. In total 64 unions are members of ASI. The 5 associations are (ASI, 2007) the following:

- The Commercial Federation of Iceland (Landssamband islenskra verslunarmanna), with 32,000 members in 10 unions.
- The Union of Icelandic Electrical Workers (Rafidnadersamband Islands), with 5,300 members in 10 unions.
- The Federation of Skilled Construction Workers and Industrial Workers (Samidn), with 6,100 members in 9 unions.
- The Icelandic Seamen's Federation (Sjomannasamband Islands), with 3,000 members in 5 unions.
- The Federation of General and Special Workers (Starfsgreinasamband Islands), with 53,000 members in 24 unions.

The Confederation of Icelandic Employers is divided into 8 associations (SA, 2008):

- The Federation of Icelandic Fishing Vessel Owners, (LIU).
- Samorka—Icelandic Energy and Utilities.

- The Icelandic Travel Industry Association (SAF).
- The Federation of Icelandic Electrical and Computer Employers (SART).
- The Federation of Icelandic Fish-Processing Plants (SF).
- The Association of Financial Institutions in Iceland (SFF).
- The Federation of Icelandic Industries (SI).
- The Federation of Trade and Services (SVTH).

SA and its member associations include about 2,000 businesses. The organization employs about 50% of all salaried employees in the Icelandic labor market.

2.2.2. Structure of collective bargaining contracts

The structure of labor contracts varies according to union and employer, but certain items are common to most of them. They stipulate wages and wage increases during the term of the contract. The wages are generally considered minimum wages, allowing for wage drift and for wages paid in the private sector to be generally higher than the wages stipulated in the wage contract. The contracts also discuss working hours and breaks during working hours. The contracts define what constitutes overtime and payments for overtime, as well as holidays and paid vacation. Many contracts have priority clauses, as discussed earlier, while some stipulate when an employer is allowed to deviate from the contract. The contracts also discuss workplace conditions and insurance, such as accident insurance and sickness insurance; some even include life insurance. Some contracts discuss the tools needed for the job at hand, protective clothing, and so forth. Also, some specify the termination of work, conditions for termination, and advance notice. Increasingly, contracts discuss continuing education and financing of advanced degrees. Most contracts also discuss the general goal of the contract as viewed by the contracting parties. Trigger clauses for the contract are often included; for instance, if inflation exceeds a certain limit, the

contract might be terminated or parts of the contract might be eligible for review, especially the chapter on wages and wage increases.

2.2.3. Individual chapters of a general contract

The main contract made in 2004, the one on which most other agreements in the private market are based, is used here as an example of a collective agreement (Collective Bargaining Agreement between SA and Efling, Hlif and VSFK, 2004).

The agreement was in effect from March 1, 2004, to December 31, 2007; is 150 pages long; and is divided into 26 chapters with appendices.

When a new collective bargaining agreement is signed, the new contract stipulates only the changes from the old, underlying contract; thus, it is only a few pages in length. A new contract was signed on February 17, 2008, and is valid through November 30, 2010 (Collective Bargaining Agreement between Efling, Hlif, VSFK and Bodinn and SA, 2008). It stipulates changes from the previous contract and totals almost 40 pages.

The chapters of the original contract will be discussed in turn. The first fourteen chapters of this, the most common collective bargaining agreement in the private sector in Iceland, are general in nature.

Chapter 1. On wages. The first chapter stipulates the wage schedule of monthly wages for daytime work. It specifies the wage for each wage category and increases due to seniority. This is followed by a definition of jobs that fall into each wage category. The chapter also shows the agreed-upon wage increases during the life of the contract, as well as other agreed-upon changes during the contract term. Wage increases usually

take place at the signing of a new contract and at the beginning of each calendar year until the contract expires. This chapter contains a section on minimum wages during the contract term. It also stipulates when an employer should sign an individual hiring contract with an employee and specifies the items to be included in such a contract.

Chapter 2. On work hours. The chapter on work hours discusses what constitutes daytime work and overtime work and defines special holidays. Daytime hours are 37 hours and 5 minutes per week, excluding breaks, to be worked between 8 a.m. and 5 p.m. or 7:30 a.m. and 5:35 p.m. It also contains a section on the minimum rest period between work, based on the EU directive on work hours, and a section on part-time work. Minimum rest is 11 consecutive hours out of every 24, and employee should receive at least 1 day off every 7 days.

Chapter 3. On breaks for lunch, dinner, and coffee, payments for food and transportation. This chapter discusses the right to breaks for lunch and coffee during daytime hours and overtime hours. In general, an employee has a right to a 1-hour break for lunch between 11:30 a.m. and 1:30 p.m., unless there is a cafeteria located on the premises, in which case the lunch break is half an hour. Coffee breaks are 20 minutes each, and there is one before lunch and one after. Furthermore, if an employee is working away from the workplace, the employer should pay for any expenses incurred, that is, travel, food, and accommodation.

Chapter 4. On vacation. This chapter defines the right to paid vacation days, which number 24 to 28 days a year depending on seniority.

Chapter 5. Firm-level agreements. This chapter is relatively new and aims at decentralizing the contract. Under certain circumstances, individual firms can make a special agreement with each union that applies to each workplace, thereby deviating from this collective bargaining agreement. The chapter stipulates which items can be agreed upon in such a contract and emphasizes that employees should receive a share of the additional revenue or profits.

Chapter 6. The priority clause. This is a small but very effective chapter. It plainly states that employers will give members of the union in question priority for all work. If an employer wants to hire someone from outside the union, the individual in question is free to join the union.

Chapter 7. On a healthy work environment. Employees should be given an adequate work environment, and safety rules should be followed.

Chapter 8. On payment of wages in case of illness or accident and sickness insurance. This chapter discusses employees' rights to wages in case of illness. The right depends on seniority, starting with 2 sickdays per month up to a maximum of 4 months' wages after 5 years of work. If an employee is injured on the job, he has, in addition to the rights above, the right to keep his wages for an additional 3-month period. The employer also pays any direct costs that are due to the accident. An individual also has a right to take days off due to the illness of his/her children, from 7 to 10 days during a 12-month period for children under 13 years of age.

Employees are also insured for sickness under the contract. Thus, an employer takes out a collective insurance policy for his employees under the contract, the terms of which are defined in the contract.

Chapter 9. On tools and work clothes. Employees should be supplied with tools with which to work and given work clothes suitable for their job.

Chapter 10. On payments to funds for sickness, vacation, education, and pension. As part of the contract the employer pays a certain amount into various funds. For example, he pays 1% of all wages into a sickness fund run by the union. He also pays 0.25% into a vacation fund, often used to finance the purchase of small vacation homes around the country that union members can rent by the week or weekend through the union. The employer also pays 0.15% into an education fund used to finance continuing education for employees. Finally, there is a compulsory pension fund payment of 8% for employers, while employees contribute 4% to the pension fund.

Chapter 11. On union dues. The employer collects union dues on behalf of the union.

Chapter 12. On resignation and rehiring. The advance notice in case of resignation is 1 month after 3 months on the job, and up to 6 months after 10 years on the job and if the employee is over 63 years old. Resignation should be done in writing and takes effect the first day of the month following the resignation.

Chapter 13. On shop stewards. Employees can elect one shop steward in a workplace with 5 to 50 employees and two if there are more than 50 employees. The shop

steward is allowed access to certain confidential information in case of disagreements with the firm, is allowed to call workplace meetings, and is allowed to attend workshops during work hours that are offered by the union and designed for shop stewards.

Chapter 14. On productivity-enhancing payments. If an agreement can be made, different types of productivity-enhancing payments are allowed under this contract.

Chapters 15 through 23. The next nine chapters cover special provisions for specific groups of employees. In a big union there are different types of employees, not all of whom fall into the same category; thus individual chapters are included in the contract to address the specific needs of each group. These groups typically work outside daytime hours or work under specific conditions or in remote locations. The chapters are as follows:

- Chapter 15. On construction workers.
- Chapter 16. On operators of heavy machinery and large trucks.
- Chapter 17. On bus drivers.
- Chapter 18. On employees in fish processing.
- Chapter 19. On employees in fish farming.
- Chapter 20. On employees in manufacturing.
- Chapter 21. On employees in workplace cafeterias.
- Chapter 22. On cleaning staff.
- Chapter 23. On security guards.

Finally, there are three chapters on the agreement itself:

Chapter 24. On how to resolve disagreements. Before resorting to using the court system, the union and employer should try to solve disagreements between themselves. If this is not possible within a certain time frame, a committee including a third party is formed. The committee should then try to reach an agreement within a certain time frame.

Chapter 25. The premise of the agreement. This chapter contains the negotiating parties' criteria for the agreement to hold, which usually depend on the economic situation at the time of signing the agreement and the length of the contract period. The contract usually tries to at least uphold the purchasing power of wages throughout the contract period. The current contract stipulates conditions for the development of the CPI as well as the development of the purchasing power of wages. The criteria are examined at predetermined dates during the contract period, in February of 2009. If the criteria of the contract do not hold, the contracting parties can make amendments to the contract. If an agreement to amend the contract is not reached, either party can terminate the contract.

Chapter 26. On dates of validity of the agreement; how to terminate the agreement. The current agreement is valid from February 1, 2008, until November 30, 2010.

The agreement also includes appendices containing various agreements between the contracting parties on various issues. These include an agreement on education, an agreement on foreign citizens in the Icelandic labor market, and an agreement on working hours in line with the EU directives, to name a few.

2.2.4. *Strikes*

Strike activity in Iceland has often been very high, and Iceland is still close to the top of the list, having the highest strike rate among the OECD countries. This is the case even though strikes are illegal while a contract is valid.

Table 1.5. Strikes in Iceland, 1990–2006.

Number of strikes and lockouts and number of working days lost.

	Strikes and lockouts	Working days lost
1990	1	231
1991	7	3,413
1992	4	385
1993	2	90
1994	11	97,343
1995	16	217,186
1996	-	-
1997	16	34,093
1998	3	67,640
1999	-	-
2000	7	47,093
2001	14	207,663
2002	-	-
2003	-	-
2004	1	140,448
2005	-	-
2006	-	-

Source: Statistics Iceland

The average number of working days lost to strikes and lockouts per year from 1990 to 2006 was 48,000 days. Half of those days, or 25,000 per year, are due to strikes among fishermen and other seamen. Furthermore, teachers in Iceland have gone on few, but long, strikes throughout the years. For instance, elementary teachers all over the country were on strike for over a month in 2004. Excluding these two groups,

fishermen and teachers, the average number of working days lost to strikes falls from 48,000 days per year to 5,200 a year, thus significantly lowering the average. There were, however, no strikes in 1996, 1999, 2002, 2003, 2005, or 2006, as general agreements were in effect (Table 1.5).

Although in some years no strike activity has occurred, Iceland still holds the record when one compares average strike incidence over the 10-year period from 1994 to 2004, as shown in Table 1.6. Iceland has by far the highest number of days lost to strikes, or 581 per 1,000 employees. Spain ranks second, with 200 days lost to strikes. If we exclude seamen and teachers, however, Iceland's number falls to 35 days, which renders the country's rank ninth instead of first.

Table 1.6. Labor disputes, 1995–2004.

Working days not worked per 1,000 employees, average per year. Rank is from highest to lowest value.

	Days	Rank		Days	Rank
Australia	68	8	Netherlands	18	16
Austria	41	10	New Zealand	21	14
Canada	193	3	Norway	83	7
Denmark	172	4	Portugal	19	15
Finland	85	6	Spain	200	2
Germany	3	19	Sweden	39	12
Iceland	581	1	Switzerland	4	18
Ireland	68	9	United Kingdom	25	13
Italy	100	5	United States	40	11
Luxembourg	6	17			

Source: Beardsmore, 2006

2.3. Outcome and patterns

Having described the wage determination system, we now examine the wage outcome in terms of average income, income distribution, wage growth, and flexibility as well as the gender gap in wages.

2.3.1. Income and income distribution

The average income of individuals in a country is one indicator of that country's overall welfare. National income per capita in Iceland is among the highest in the world. It ranked fifth among the OECD countries in 2006, having a gross domestic product per capita of 39,600 USD using current purchasing power parities (OECD, 2007a). Only Luxembourg, Norway, the United States, and Ireland ranked higher than Iceland, as seen in Table 1.7.

Although GDP per capita is relatively high in Iceland, this is due more to long work hours than to high productivity. Indeed, looking at GDP per hour worked, Iceland ranks much lower, as seen in Table 1.8.

Average income, however, does not convey any information about the distribution of income or wages. Many studies have shown higher rates of unionization to be related to less wage inequality (Aidt and Tzannakos, 2002, OECD, 1997 and 2004, Blau and Kahn, 1999). In countries with centralized wage bargaining, wage contracts are often made across industries. Thus we would expect interindustry differences in wages to be smaller in countries with centralized bargaining (Blau and Kahn, 1999). Sweden and New Zealand both experienced increased wage dispersion when their collective bargaining systems were decentralized in the 1980s (Sweden) and 1990s (New

Zealand), while the wage dispersion narrowed in Norway after the collective bargaining system became more centralized in the 1980s (Flanagan, 1999).

Table 1.7. Gross domestic product per capita, 2006.

USD using current purchasing power parities. Rank is from highest to lowest value.

	USD	Rank		USD	Rank
Australia	34,700	12	Korea	23,400	23
Austria	36,200	8	Luxembourg	77,800	1
Belgium	34,800	11	Mexico	11,600	29
Canada	35,900	10	Netherlands	37,300	7
Czech Republic	22,100	24	New Zealand	26,300	22
Denmark	36,000	9	Norway	53,100	2
Finland	33,300	15	Poland	15,000	28
France	31,700	18	Portugal	21,000	25
Germany	32,000	16	Slovak Republic	17,600	27
Greece	31,600	19	Spain	28,800	21
Hungary	18,300	26	Sweden	34,100	14
Iceland	39,600	5	Switzerland	37,500	6
Ireland	41,300	4	Turkey	8,700	30
Italy	29,300	20	United Kingdom	34,400	13
Japan	31,900	17	United States	44,000	3
Euro area	31,300				
G7	37,100		OECD Total	30,900	

Source: OECD, 2007a

Minimum wages in contracts, if binding, will tend to raise the wage floor and thus reduce the distribution of wages by cutting off the lower end of the distribution.

Unemployment insurance can have a similar effect, by setting a wage floor. Given the high rate of union membership in Iceland, the existence of minimum wages in each contract, and a narrow difference between unemployment insurance and minimum wages, we would a priori expect wage inequality to be low in Iceland.

Table 1.8. Output and productivity, 1995–2003.

GDP figures are index, with Iceland = 100. Productivity growth in percentages.

	Productivity growth	GDP per capita	GDP per hour
Denmark	1.4	104	134
Finland	2.6	94	117
Iceland	2.5	100	100
Norway	2.4	126	179
Sweden	2.3	96	123
EU	1.5	91	131
USA	2.2	128	143

Source: OECD, 2005a

The most common measure of income distribution is the gini coefficient, whose values range from 0 to 1; numbers close to 0 represent a narrow distribution of income, and values close to 1 represent a wide distribution of income. Table 1.9 shows that the gini coefficient for Iceland is 0.26, which is the fifth-lowest value among the European countries. Only Sweden, Denmark, the Czech Republic, and Austria have lower gini coefficients. The average for the EU countries is 0.30 for 2006, close to the average value of 0.31 for the OECD countries in 2000. The gini coefficient for the United States is larger, at 0.36, close to the value for the United Kingdom of 0.32, indicating a greater wage distribution than in the Nordic countries (OECD Data Base).

Another measure of income distribution looks at deciles, that is, dividing the sample into 10 equal-sized groups and looking at the average for each group. Thus, comparing the income of the 20% of people who have the highest income and the 20% of people who have the lowest income gives us a measure of wage dispersion. The higher the ratio, the wider the wage distribution. This ratio (S20/S80) gives a value of 3.7 for Iceland, which is the seventh-lowest ratio. Thus, the 20% of the population with the

highest income have on average 3.7 times the income of the 20% with the lowest income.

Table 1.9. The gini coefficient and S20/S80 in 2006.

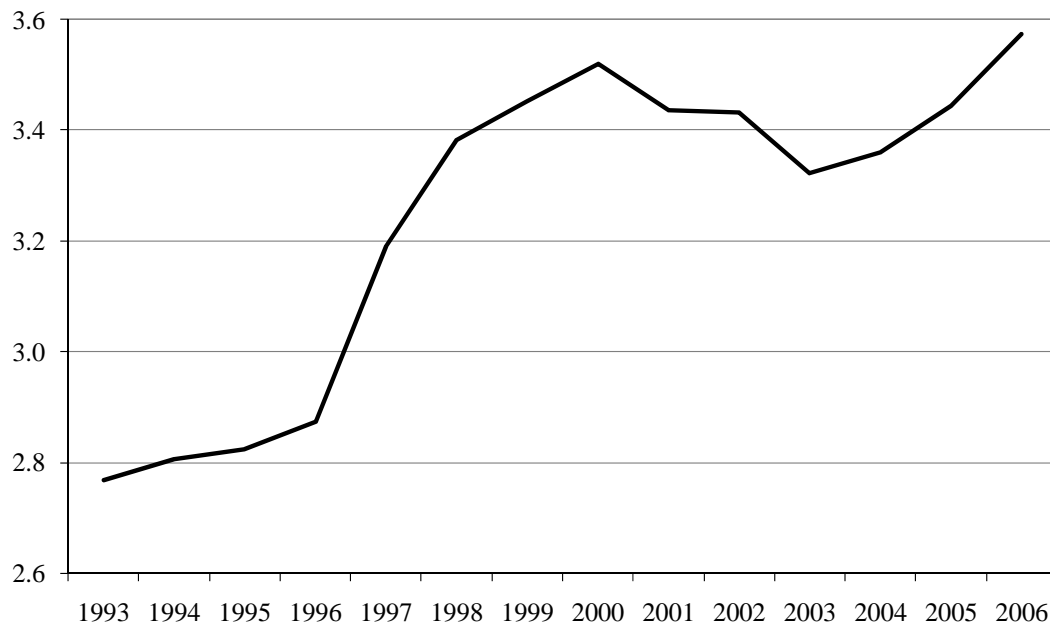
Eurostat Survey of Income and Living Conditions (EU-SILC). Rank is from lowest to highest value.

	Gini coefficient		S20/S80	
	Value	Rank	Value	Rank
Austria	0.25	3	3.4	1
Belgium	0.28	10	4.2	10
Czech Republic	0.25	3	3.5	3
Denmark	0.24	1	3.4	1
Finland	0.26	5	3.6	5
France	0.27	8	3.6	5
Germany	0.27	8	4.1	9
Greece	0.34	18	6.1	18
Iceland	0.26	5	3.7	7
Ireland	0.32	14	4.9	13
Italy	0.32	14	5.5	15
Luxembourg	0.28	10	4.2	10
Netherlands	0.26	5	3.8	8
Norway	0.30	11	4.6	12
Poland	0.33	17	5.6	16
Portugal	0.38	19	6.8	19
Spain	0.31	13	5.3	14
Sweden	0.24	1	3.5	3
United Kingdom	0.32	14	5.6	16
EU (25)	0.30	-	4.8	-

Source: Eurostat

A similar measure of income distribution compares the 90th centile with the 10th centile. Looking at the 90/10 centile differential for disposable income of married couples in Iceland over the period 1993–2005, as shown in Figure 1.4, we see that the ratio rose over the period from 2.8 to 3.4. The data are from tax returns without correcting for part-time jobs. The path is relatively stable over the period except for a

jump in the ratio from 1996 to 1998, which coincides with a strong upswing in the economy accompanied by a generous increase in real wages after a long period of stagnation. Furthermore, the income tax was cut in 1998, and a tax on interest income was introduced with a rate lower than the income tax rate. Revenue, which was formerly taxed as income tax, is now taxed as interest income at the lower rate.



Source: Statistics Iceland

Figure 1.4. The ratio of the 90th to the 10th centile in income distribution.

Data for disposable income of married couples from tax returns.

One of the objectives of collective bargaining agreements in recent years has been to increase the wages of those at the bottom end of the wage distribution relative to other wages. Looking at the distribution of wages from 2002 to 2007, that is, wages of those at the top of the bottom quarter of the wage distribution as a percentage of median wages, it can be seen that the distribution is relatively stable over time (Table 1.10). Thus, special arrangements to give a larger wage increase to those at the bottom of the wage distribution do not appear to have changed the wage distribution; rather, wage

increases appear to have crept up the wage scale. The exception seems to be among clerks, where the ratio has climbed from 80% in 2004 to 86% in 2007.

Table 1.10. Distribution of wages.

Ratio of wages in the bottom quarter to median wages.

	2002	2003	2004	2005	2006	2007
Managers	84	83	82	82	76	75
Professionals	75	78	79	81	78	79
Technicians	78	82	82	81	84	82
Clerks	81	81	80	82	86	86
Service workers and sales people	80	80	80	78	80	79
Craft workers	80	82	83	78	82	82
General and machine workers	81	79	79	79	79	80

Source: Statistics Iceland

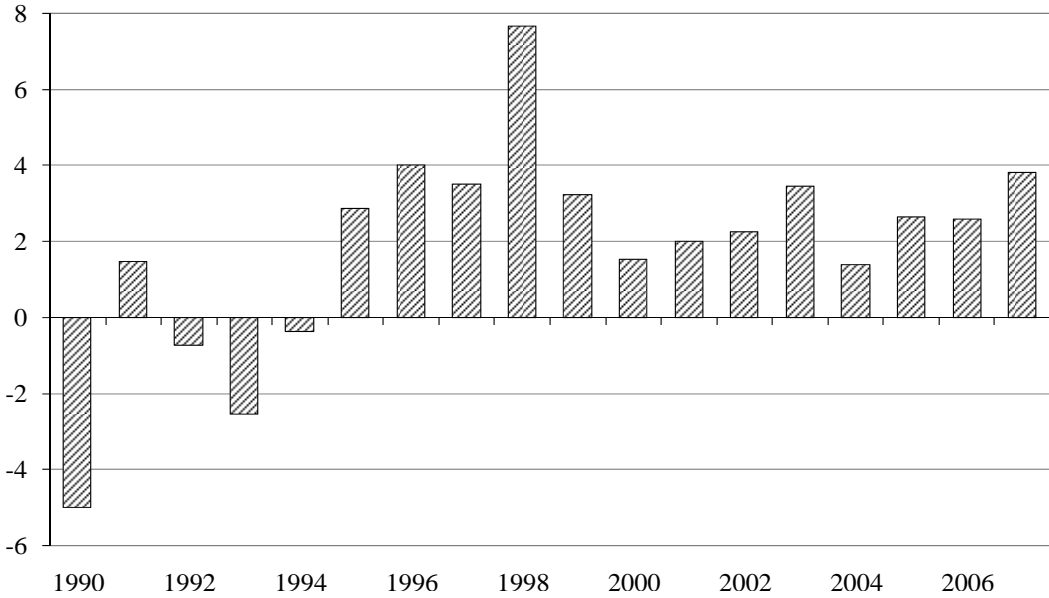
A study by Johannesson (2001) supports this, as it shows that the ratio of minimum wages to average wages is relatively constant over time, or around 55 to 60%. The study shows that 80% of a specific increase in the minimum wages shows up as a general increase in wages over 4 years.

2.3.2. Real wage growth

If a centralized collective bargaining arrangement internalizes the externalities of wage bargaining, then a moderate wage demand should be pursued (Flanagan, 1999). However, collective bargaining coverage exhibits a positive relationship with real earnings growth, according to the OECD (1997, 2004).

Real earnings growth in Iceland has been very high in recent years, as shown in Figure 1.5. From 1995 to 2007, the growth in real wages as measured by the official wage index was 45.3%, or 3.2% per year on average. Although the last decade has shown significant growth, this has not always been the case. Real wage growth from 1990 to

1995 measured 0.6% in total. Thus, real wage growth varies with the economic cycle. The simple correlation coefficient between real wage growth and growth in GDP from 1990 to 2007 is 0.44.



Source: Statistics Iceland

Figure 1.5. Changes in real wage growth.

Changes in the wage index deflated by changes in the CPI.

2.3.3. Wage flexibility

One measure of a flexible labor market has to be the flexibility of wages, or how easily wages respond to changes in labor market conditions. In countries where wage determination is coordinated, average wages are more responsive to the state of the labor market (Layard et al, 1991).

In 1991, the OECD measured wage flexibility in its member countries and found wages to be more flexible in Iceland than in the other OECD countries, except Portugal (OECD, 1991). This was measured by the standard deviation of changes in

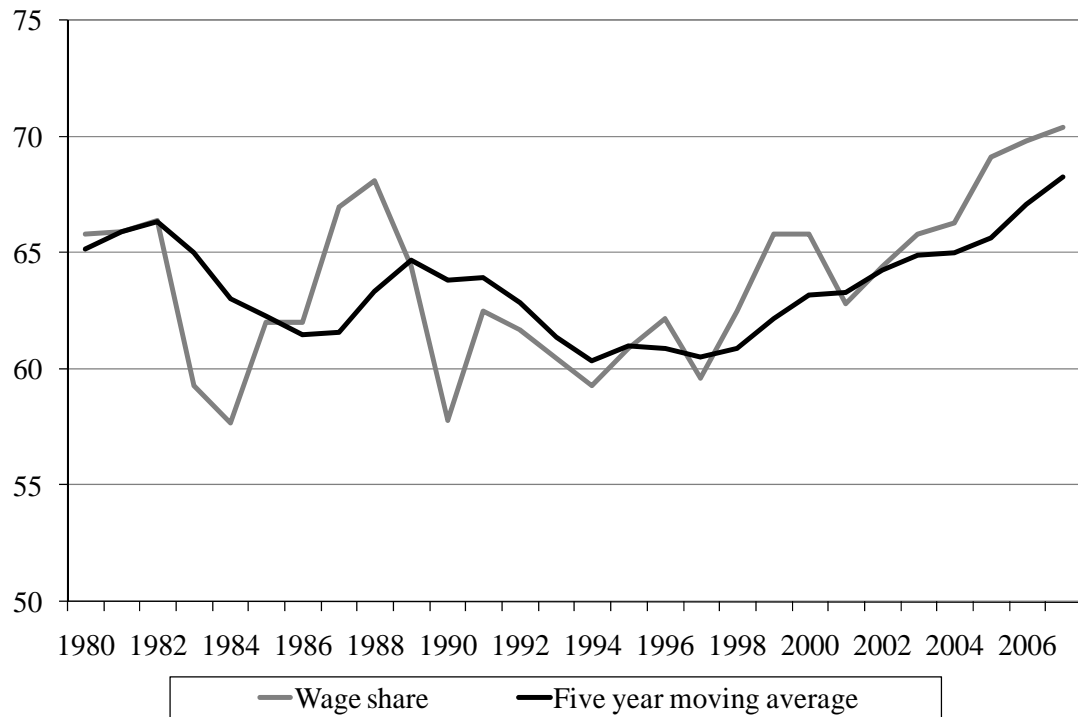
real wages from 1970 to 1987 divided by economic growth, and smoothed using the Hodrick-Prescott filter. The value for Iceland was 2.14 compared with the average of 19 other OECD countries of 1.10. With the lowering of the inflation rate in the early 1990s, the flexibility of real wages has fallen, and from 1990 to 2004 measured 1.13.

Wage flexibility can also be measured in terms of employee compensation as a share of gross factor income. If the labor market is perfectly flexible, the wage share should be constant over time. In Iceland, the wage share has historically fluctuated between 60% and 70% of gross factor income, reaching a low of 58% in 1984 and a high of 70% in 2007 (Figure 1.6). Thus, the wage share fluctuates significantly, with larger fluctuations seen only in Ireland, Mexico, and Turkey when comparing the OECD countries (OECD Data Base). The wage share was 58% in the EU-15 and 61% in the United States in 2005 (OECD, 2007b).

2.3.4. The gender wage gap

Blau and Kahn (1996) find that centralized wage-setting lowers the gender pay gap, and the OECD (2004) found a significant positive relationship between collective bargaining coverage and the relative earnings of women. Based on these findings, we would expect the gender wage gap in Iceland to be relatively small.

The Act on Equal Status and Equal Rights of Men and Women has been in effect since 1975, Iceland being the first Nordic country to institute such law. Also, union density for women in Iceland is greater than that for men. Still, there is a significant difference in the wages men and women receive, as Table 1.11 reveals.



Source: Statistics Iceland

Figure 1.6. Wages as a share of gross factor income.

A survey comparing the Nordic countries with their European counterparts found the gender pay gap, in terms of women’s average gross hourly earnings as a percentage of men’s average gross hourly earnings, to range from 6% in Italy to 30% in Iceland in 2001. The figure for Iceland is for the private sector only. The other Nordic countries showed a significantly smaller gender wage gap than Iceland, ranging from 14% in Norway to 18% in Sweden (Mosesdottir et al, 2006).

Surprisingly, while the gender wage gap is quite large in Iceland, it is significantly smaller in Italy. The explanation for this difference lies in the labor force participation rate for women in these two countries. In Italy, where the labor force participation rate for women is low, child care is mostly the responsibility of the family or is in the hands of women outside the formal economy. The opportunity cost of women entering

the labor force is thus relatively high. On the other hand, unskilled women in Iceland are in the labor force, working at low-paying jobs in the care sector, because subsidized daycare for children is widely available.

Table 1.11. The gender wage gap, 2001.

Difference between men's and women's average gross hourly earnings as a percentage of men's average earnings. Rank is from lowest to highest value.

	Difference	Rank		Difference	Rank
Austria	20	19	Latvia	16	11
Belgium	12	5	Lithuania	16	12
Cyprus	26	26	Luxembourg	16	10
Czech Republic	20	20	Malta	9	2
Denmark	15	9	Netherlands	19	18
Estonia	24	25	Norway	14	8
Finland	17	13	Poland	12	6
France	14	7	Portugal	10	3
Germany	21	22	Slovak Republic	23	24
Greece	18	16	Slovenia	11	4
Hungary	20	21	Spain	17	15
Iceland	30	27	Sweden	18	17
Ireland	17	14	United Kingdom	21	23
Italy	6	1			

Source: European Commission (2005), Mosesdottir et al (2006)

The figures above show unadjusted differences in male and female wages. Recent studies show that the unexplained gender wage differential in Iceland has been measured to lie between 7% and 18% when controlling for the most common factors, such as work hours, occupation, age, experience, education, and so forth (Mosesdottir et al, 2006).

A recent survey (Capacent Research, 2006) found that of people working full-time, women receive on average 68% of the total earnings of men in Iceland. The largest

difference is among unskilled workers, where women’s wages amount to 55 to 60% of men’s wages. Female managers, however, receive 92% of male manager’s wages, as seen in Table 1.12. The reverse pattern emerges in Denmark, Finland, and Sweden, where the largest gender pay gap can be found among managers and professionals (Mosesdottir et al, 2006).

Table 1.12. Male-female wage differential, 2006.

Female total earnings as a share of male total earnings for full-time work.

	Share
Managers	92
Professionals	73
Technicians	83
Clerks	67
Service workers and sales people	55
General and machine workers	60
Total	68

Source: Capacent Research, 2006

3. The labor force

3.1. Labor force participation

Labor force participation in Iceland is high for both genders. Furthermore, Icelanders work relatively long hours and retire late in life. In this section, we look at these in turn as well as the elasticity of labor and factors that affect the decision to work.

3.1.1. Participation rate

The high labor force participation rate in Iceland has contributed significantly to the country’s high per capita GDP. The labor force participation rate in Iceland was 88.0% in 2006 among people aged 15 to 64, the highest rate among the OECD countries

(OECD, 2007b). Ranking second is Switzerland, with a labor force participation rate of 81.2%, followed by Sweden and Denmark, both with labor force participation rates above 80%. The labor force participation rate in the United States was 75.5%, and for the European Union (EU-15) was 71.7%. The average labor force participation rate in the OECD countries was 70.5% in 2006, as Table 1.13 shows.

The labor force participation rate for men in Iceland was 91.4% in 2006. Again, this is the highest rate among the OECD countries, followed closely by that of Switzerland, with a labor force participation rate for men of 87.8%. The 2006 labor force participation rate for men was 81.9% in the United States and 79.3% in the European Union (EU-15), while the average labor force participation rate for men in the OECD countries measured 80.4%.

When it comes to the labor force participation rate for women, Iceland still leads with 84.2%, the only country with a labor force participation rate for women of over 80%. Sweden is second in line with 77.7%. The labor force participation rate for women in the United States is 69.3%, a little higher than in the European Union (EU-15), where the female labor force participation rate is 64.2%. The average labor force participation rate for women in the OECD countries is 60.8%. The lowest female labor force participation rate in the OECD is 26.7% in Turkey.

Table 1.13. Labor force participation rates, 2006.

People aged 15–64. Rank is from highest to lowest value.

	Total		Men		Women	
	%	Rank	%	Rank	%	Rank
Australia	75.9	9	82.9	8	69.0	12
Austria	73.7	15	80.4	17	67.0	15
Belgium	65.9	25	72.7	28	58.9	22
Canada	77.9	7	82.2	11	73.5	6
Czech Republic	70.3	19	78.2	20	62.3	17
Denmark	80.1	4	83.4	6	76.7	3
Finland	74.7	13	76.2	23	73.2	7
France	69.1	20	74.2	27	63.9	16
Germany	75.0	12	81.4	14	68.5	13
Greece	67.0	22	79.1	19	55.0	26
Hungary	62.0	29	68.7	30	55.5	25
Iceland	88.0	1	91.4	1	84.2	1
Ireland	71.3	18	81.0	16	61.3	18
Italy	62.7	28	74.6	26	50.8	28
Japan	73.1	16	84.8	4	61.3	19
Korea	66.2	24	77.7	21	54.8	27
Luxembourg	66.6	23	76.0	24	57.0	23
Mexico	63.0	27	84.2	5	44.5	29
Netherlands	75.7	10	81.9	12	69.4	10
New Zealand	78.1	6	85.1	3	71.4	8
Norway	78.2	5	81.4	15	74.8	4
Poland	63.4	26	70.1	29	56.8	24
Portugal	73.9	14	79.5	18	68.4	14
Slovak Republic	68.5	21	76.3	22	60.9	21
Spain	71.9	17	82.5	10	61.1	20
Sweden	80.2	3	82.6	9	77.7	2
Switzerland	81.2	2	87.8	2	74.7	5
Turkey	51.1	30	75.5	25	26.7	30
United Kingdom	76.7	8	83.2	7	70.3	9
United States	75.5	11	81.9	13	69.3	11
EU-15	71.7		79.3		64.2	
OECD Total	70.5		80.4		60.8	

Source: OECD, 2007b

In a flexible labor market, the labor force participation rate fluctuates to accommodate the state of the economy at each point in time. From 1991 to 2007, the participation rate for people aged 16 to 74 was, on average, 82.6% in Iceland, with a standard deviation of 1.0%. There is a large variation in participation rates between age groups. The participation rate for people aged 25 to 54 is relatively stable, averaging 91.2%, with a standard deviation of 1.1%. The labor force participation rate for young people aged 16 to 24 varies significantly, however, averaging 76.3%, with a standard deviation of 3.4%. The labor force participation rate for older people (aged 55–74) is 64.6%, on average, with a standard deviation of 1.4% (Statistics Iceland).

Not only do more people of working age participate in the labor market in Iceland than in other countries, they also work longer, as the retirement age there is higher. Looking at persons aged 55 to 64 years old, on average 53% are active in the labor market in the OECD countries, while in Iceland, 85% in that age group are in the labor market, the highest percentage among the OECD countries (OECD, 2008).

Furthermore, the labor force participation rate for people aged 65 to 74 is 37% (Statistics Iceland). Half of all men in that age group participate in the labor market, while one in four women aged 65 to 74 does so. According to the OECD, the effective retirement age of men in Iceland is nearly 70 years, third-highest after Mexico and Japan. The retirement age of women is slightly lower, or 66 years of age, fourth in line among the OECD countries after Mexico, Korea, and Japan (OECD, 2003).

3.1.2. Working hours

In a flexible labor market, working hours should fluctuate according to the economic cycle. The average work week in Iceland is 42 hours. Men work on average 47 hours

per week, while it is more common for women to work part-time; thus, their average working hours were 36 hours per week in 2007. The standard deviation in working hours using annual figures from 1991 to 2007 is 0.7 hours. The standard deviation for women's working hours is 0.8, while the comparable number for men is 1.4. Working hours deviate the most among young men (aged 16–24), with a standard deviation of 2.5 hours (Statistics Iceland).

The average weekly working hours among 25 of the European Union member countries (EU-25) is 36.6 hours per week, ranging from 34.4 hours in Denmark to 41.2 hours in Latvia (European Commission, 2006).

Although the weekly working hours in Iceland seem to be many, the annual hours worked are 1,794, which ranks tenth among the OECD countries (Table 1.14). The dichotomy between the long work week and few hours worked per year can be explained by the many public holidays in Iceland and long vacation time, which generally ranges from 24 to 30 days per year. A total of 16 days are defined in collective agreements as public holidays. Two of these always fall on a Sunday, 7 are always on weekdays, and the remaining 7 can fall either on a weekday or a weekend, with 2 days being half-days. Thus, on average, people in the Icelandic labor market get 11 working days off per year, excluding vacation time.

The longest work year was in Korea and Greece in 2006, both with over 2,000 hours worked, followed by countries of the former eastern bloc, the Czech Republic, Hungary, and Poland. The average annual working hours in the United States were 1,804 in 2006, a little higher than in Iceland. The fewest annual working hours are to be found in Norway (1,407 hours) and the Netherlands (1,391 hours).

Table 1.14. Average annual hours worked, 2006.

Per person in employment. Rank is from highest to lowest value.

	Hours	Rank		Hours	Rank
Australia	1714	17	Korea	2305	1
Austria	1655	21	Luxembourg	1604	23
Belgium	1571	26	Mexico	1883	7
Canada	1738	16	Netherlands	1391	30
Czech Republic	1997	3	New Zealand	1787	11
Denmark	1577	25	Norway	1407	29
Finland	1691	18	Poland	1985	5
France	1564	27	Portugal	1758	14
Germany	1436	28	Slovak Republic	1749	15
Greece	2031	2	Spain	1764	13
Hungary	1989	4	Sweden	1583	24
Iceland	1794	10	Switzerland	1659	20
Ireland	1640	22	Turkey	1918	6
Italy	1800	9	United Kingdom	1669	19
Japan	1784	12	United States	1804	8

Source: OECD, 2007b

A recent study has shown that most women working part-time in Iceland do so of their own volition, not because they are unable to get a full-time job (Gudmundsdottir, 2002). In 2002, 20% of the people in the labor force in Iceland worked part-time. While 10% of men work part-time, 31% of women do. Part-time work is most common among young people between 16 and 24 years of age (OECD, 2005b). On average, part-time employment accounts for 15% of total employment in the OECD countries. The share is 13% in the United States and 16% in the European Union (EU-15). The highest incidence of part-time work can be found in Holland (34%), Australia (28%), Japan and Switzerland (25%), and in the United Kingdom (23%). In all the OECD countries, women's share in part-time employment is over half and, on average, is 72%.

3.1.3. Migration

One measure of flexibility in the labor market is labor force mobility. If the labor force is flexible, it will move with the employment opportunities. Nickell and Layard (1999) found that in the United States, the percentage of the population that moved from one region to another per year from 1980 to 1987 was 2.9%. Regional mobility was also high in Sweden (3.7%) and Norway (2.5%). The comparable number for Iceland for a more recent period, 1990–2007, is 3.2% and was relatively stable throughout the period (Statistics Iceland). It should be mentioned that the size of the regions in these countries varies significantly.

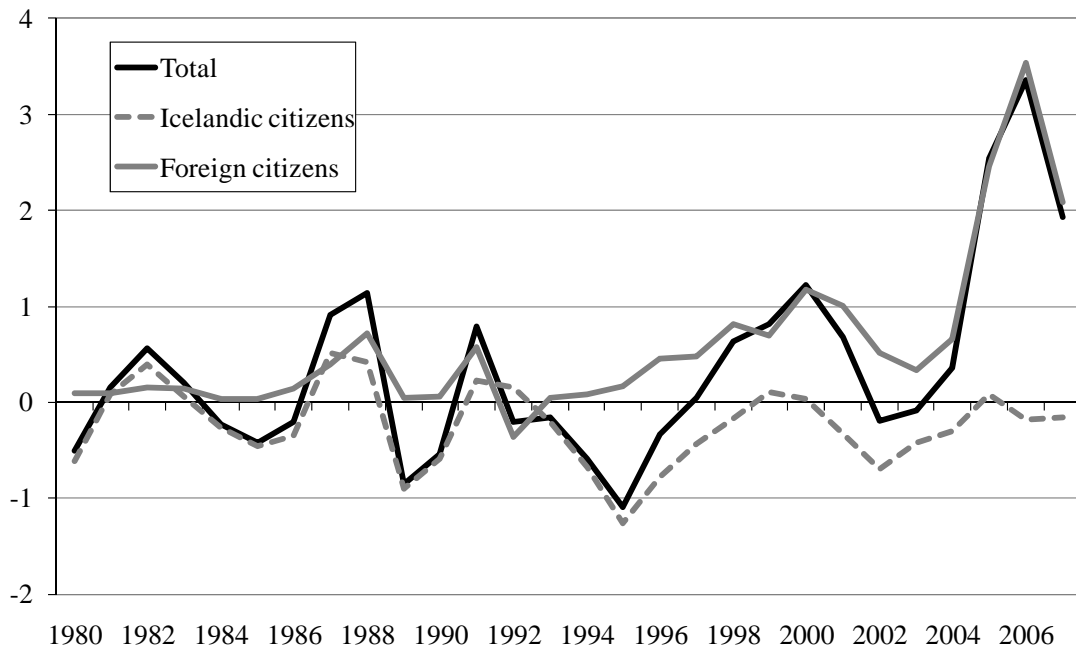
There has been significant internal migration in Iceland in recent years. A study by Zoega and Skuladottir (2002) shows that internal migration has mainly been from the rural areas to the cities. A study from 1997 (Gudmundsson and Zoega) found significant flexibility in internal migration such that if unemployment in a certain part of the country is 1% above the national average, the migration from that area increases by 0.3%. From 2000 to 2006, during each year over 3% of the population of the Reykjavik area moved out of the city at the same time that 4% of the population moved into the Reykjavik area, leaving a net increase in the population of the Reykjavik area of close to 1% (Statistics Iceland).

It has been suggested that owner-occupied housing can act as a significant barrier to mobility, as it is much easier to move if one rents than if one owns (Nickell and Layard, 1999). The share of owner-occupied housing in Iceland is very high, or 81% in the years 2002–2004; thus it has the potential to hamper both internal mobility and mobility across borders. This, however, is not reflected in the Icelandic migration figures.

The Icelandic labor market has been open to citizens of the other Nordic countries (Denmark, Finland, Norway, and Sweden) since 1954. A further opening of the Icelandic labor market took place when Iceland became a member of the European Economic Area (EEA) in 1994 and joined the common market of the European Union. With the enlargement of the European Union in 2004, some limitations were put on the flow of people from the 10 new entrant countries, as they had to apply for work permits. These limitations have now been lifted in Iceland, although employers are still obliged to report the number of workers from these countries to the authorities. People from countries outside the EEA must apply for residency and for a work permit in order to be able to live and work in Iceland.

Net immigration from abroad has been on the rise, especially in the last few years, as seen in Figure 1.7. The development reflects a large increase in the demand for labor coupled with a large growth in GDP. With the increased immigration, the share of people of foreign origin in the Icelandic labor market has risen considerably in recent years, from around 2.3% in 1998, to 4.4% in 2004, and up to 5.5% in 2005. From 1998 to 2003, the share of immigrant women in the labor force was higher than that of immigrant men. However, the shares were equal in 2004, and in 2005 the share of men exceeded that of women by 1.5 percentage points (Statistics Iceland).

The share of people of foreign origin in the population has also risen, from 1.6% through 1987, to 3.5% in 2004, and up to 6.0% in 2007. The comparable numbers for the other Nordic countries are 4.9% in Denmark, 2% in Finland, 4.3% in Norway, and 5.3% in Sweden. The immigrants come from all over the world; however, the largest group of immigrants comes from Poland, as one in five foreign nationals is from there (Statistics Iceland).



Source: Statistics Iceland

Figure 1.7. Net immigration.

Percentage of population.

3.1.4. Elasticity of labor supply

When Iceland changed its personal income-tax system from paying back taxes to a pay-as-you-earn system in 1988, there was one year in which income bore no income tax: in 1987 taxes were paid on income accrued in 1986, and in 1988 taxes were paid on income earned that same year. Thus, no income tax was paid on income earned in 1987. Therefore, a unique opportunity rose to measure labor supply elasticity. In their study, Bianchi et al (2001) found a large variation in the labor supply response in 1987, where some workers decided to work less while others chose to work more. On average, the elasticity of weeks worked to the rise in after-tax wages was 0.42 for all workers, 0.58 for men, and 0.06 for women. The elasticity of earnings was 0.80 for men and 0.40 for women, yielding an average of 0.67. Looking only at workers

employed in 1986, there was a larger response from men than women as they increased their labor supply by 14.3%.

3.1.5. Taxes on labor

Taxes on labor form a wedge between the real cost of a worker for an employer and the real consumption wage of the worker. According to Nickell and Layard (1999), the major impact of labor taxes on unemployment is through the total tax wedge, while the mix of individual taxes does not seem to influence unemployment. There is some evidence that personal income taxes adversely affect productivity growth (Nickell and Layard, 1999).

Authorities in Iceland levy an income tax that is a state and a municipal tax combined, using the same tax base. There is a flat single tax rate of 36.72% (2007) and a basic personal tax credit and tax relief for compulsory pension fund payments. There is also an interest payment relief for interest paid on owner-occupied housing as well as transfers for dependent children. A social security tax is levied on employers with wages as the tax base with a rate of 5.79%.

The tax wedge measures the difference between the total cost to the employer and the corresponding net take-home pay for the worker, taking into account income taxes, the employee's social security contributions, and the employer's social security contributions. In comparison with the other OECD countries, the measured tax wedge in Iceland is small, as Table 1.15 shows; thus we would expect the tax wedge to affect unemployment only minimally. This expectation is supported by Iceland's low unemployment rate.

Table 1.15. Total tax wedge, 2007.

Percentage of labor costs for a single person without children at the income level of the average worker. Rank is from lowest to highest value.

	%	Rank		%	Rank
Australia	27.7	5	Korea	19.6	2
Austria	48.5	26	Luxembourg	37.5	13
Belgium	55.5	30	Mexico	15.3	1
Canada	31.3	10	Netherlands	44.0	23
Czech Republic	42.9	21	New Zealand	21.5	3
Denmark	41.3	17	Norway	37.5	14
Finland	43.7	22	Poland	42.8	20
France	49.2	27	Portugal	37.4	12
Germany	52.2	28	Slovak Republic	38.5	15
Greece	42.3	18	Spain	38.9	16
Hungary	54.4	29	Sweden	45.4	24
Iceland	28.3	6	Switzerland	29.6	8
Ireland	22.3	4	Turkey	42.7	19
Italy	45.9	25	United Kingdom	34.1	11
Japan	29.3	7	United States	30.0	9
EU-15	42.5		OECD Total	37.7	
EU-19	43.0				

Source: OECD, 2007c

3.1.6. Pension funds

Mandatory pension funds can be expected to increase overall savings, as they are unlikely to completely crowd out other types of saving. Thus, the existence of pension funds can be considered to enhance economic growth.

Iceland has a three-tiered pension fund system. First, the social security system secures a minimum pension for everyone. Second, every wage earner is obliged to contribute to a pension fund. The pension fund system is characterized by the operation of occupational pension funds. These funds became general in 1969 and

mandatory in 1974. Every wage earner is obliged to contribute 4% of his or her total earnings to an occupational pension fund, in most cases one predetermined by his or her trade union. This payment is tax-exempt. The payment burden is shared by the employer, who in most cases pays 8% of wages into the pension fund, while the central government pays 11.5%. The third tier of the pension system consists of an optional payment to a pension fund or to an individual retirement account, of up to 4% of wages, which is tax-exempt, with the employer matching that contribution with up to 2% of wages.

3.1.7. Education

The more educated the labor force, the larger the choice set of employment for each individual, and the easier it is to move between jobs. Thus a more educated labor force is a sign of a flexible labor force. Illiteracy is not found in Iceland. However, the average number of years of formal education for those aged 25 to 64 is below the OECD average of 11.9 years, or only 10.5 years. The OECD average does not show a difference in educational attainment between males and females, while in Iceland, the average number of years in formal education is higher for females than for males, or 11.4 years for women compared with 9.7 for men (OECD, 2006a).

The share of the population that has attained at least an upper secondary education is relatively low, or 63% of people aged 25 to 64, compared with an OECD or European average of 68% (Table 1.16). This puts Iceland in 22nd place compared with the other OECD countries (OECD, 2007d). The main reason for the low percentage is not low participation rates in secondary schooling; it is due instead to high dropout rates. In 2003, the dropout rate from upper secondary schools in Iceland was just under 20% (OECD, 2005a).

Although a relatively low percentage of the population finishes upper secondary education, the share of the population that has attained tertiary education is close to the average of the OECD countries, as shown in Table 1.17. Thus, a high proportion of those who finish secondary education continue on to receive tertiary education. Furthermore, tertiary education has increased dramatically in recent years; thus, this share is expected to rise in the coming years.

Table 1.16. Share of population with secondary education, 2005.

Percentage of people aged 25–64. Rank is from highest to lowest value.

	%	Rank		%	Rank
Australia	65	20	Luxembourg	66	19
Austria	81	9	Mexico	21	29
Belgium	66	17	Netherlands	72	15
Canada	85	4	New Zealand	79	11
Czech Republic	90	1	Norway	77	12
Denmark	81	8	Poland	51	24
Finland	79	10	Portugal	26	28
France	66	18	Slovak Republic	86	3
Germany	83	6	Spain	49	26
Greece	57	23	Sweden	84	5
Hungary	76	13	Switzerland	83	7
Iceland	63	22	Turkey	27	27
Ireland	65	21	United Kingdom	67	16
Italy	50	25	United States	88	2
Korea	76	14			
EU19 average	68		OECD average	68	

Source: OECD, 2007d

3.2. Unemployment

More highly coordinated bargaining systems tend to yield lower unemployment and higher employment rates compared with other, less coordinated systems (OECD,

1997). Thus we would a priori expect unemployment in Iceland to be lower than in the other European countries.

Table 1.17. Share of population with tertiary education, 2005.

Percentage of people aged 25–64. Rank is from highest to lowest value.

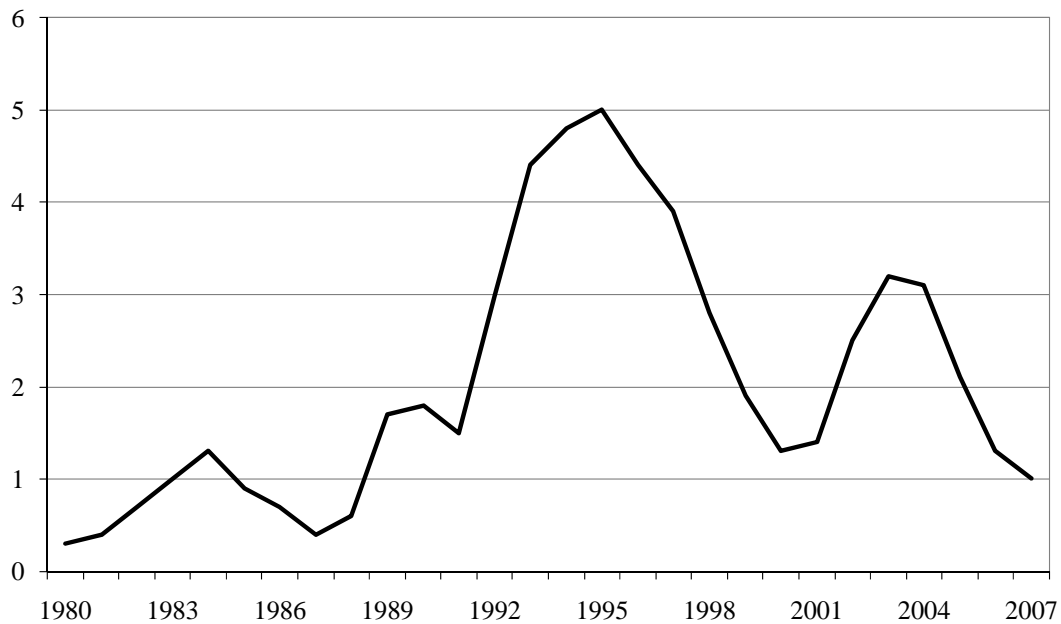
	%	Rank		%	Rank
Australia	32	8	Korea	32	9
Austria	32	10	Luxembourg	27	19
Belgium	31	11	Mexico	15	25
Canada	46	1	Netherlands	30	13
Czech Republic	13	27	New Zealand	27	20
Denmark	34	6	Norway	33	7
Finland	35	5	Poland	17	24
France	25	21	Portugal	13	28
Germany	25	22	Slovak Republic	14	26
Greece	21	23	Spain	28	18
Hungary	39	3	Sweden	30	14
Iceland	31	12	Switzerland	29	17
Ireland	29	16	Turkey	10	30
Italy	12	29	United Kingdom	30	15
Japan	40	2	United States	39	4
EU-19 average	24		OECD average	26	

Source: OECD, 2007d

The existence of minimum wages does not seem to greatly increase unemployment. Abowd et al (1999) found that increases in the French minimum wage significantly lowered the employment rate of workers at the minimum wage level relative to those a little further up the wage scale. However, as the affected group is relatively small, the overall effects on employment are small.

Unemployment in Iceland has historically been low, fluctuating between 0 and 1% until 1990. In the early 1990s it started to rise and reached a high of 5% in 1995, as

Figure 1.8 shows, indicating a change in the pattern from real wage flexibility to employment volatility, as inflation fell dramatically during this time. The unemployment rate fell to 1.3 to 1.4% in 2000 and in 2001 rose again, but in 2007 it measured 1.0% again.



Source: Statistics Iceland

Figure 1.8. Unemployment rate.

Percentage of labor force.

3.2.1. Unemployment benefits

Unemployment benefits affect the labor market through replacement rates, on the one hand, and duration of benefits, on the other. High replacement rates have been shown to lengthen unemployment duration (Ehrenberg and Smith, 2006), and long-term benefit duration has been shown to generate long-term unemployment (Nickell and Layard, 1999).

Thus, Iceland's low unemployment rate might indicate a low replacement ratio. Indeed, unemployment benefits in Iceland are not generous. In 2004 the benefit replacement ratio equaled 35% of the wage of the average employee. The amount was fixed and not related to past wages. In 2006 changes were made that increased the replacement ratio temporarily and shortened the duration of benefits. For the first 3 months of unemployment, the replacement ratio is 70% of former wages, with a ceiling. After 3 months the unemployment benefit is a fixed amount, similar to the amount before the changes. The maximum duration of unemployment benefits has been shortened from 5 to 3 years (Act No. 54/2006). Given the benefit's low rate and limited duration, it is not a viable alternative to employment.

Before the recent changes, Iceland had one of the lowest replacement rates and one of the longest duration periods among the OECD countries, as seen in Table 1.18. Since the changes were made, the initial replacement ratio has risen considerably, while the duration of benefits has shortened.

Although unemployment compensation has until recently been low compared with average wages, it is generous compared with the minimum wage as negotiated in the general wage agreements. In 1991, unemployment compensation was almost equal to the negotiated minimum wage. Since that time, minimum wages have risen faster than unemployment compensation, and in 2004 unemployment compensation equaled 85% of the minimum wage.

Table 1.18. Unemployment insurance, 2004.

Initial net replacement rates as percentage of work earnings and unemployment insurance benefit duration in months.

	Initial net replacement rates	Unemployment insurance benefit duration
Australia	45	0
Austria	63	9
Belgium	61	No limit
Canada	63	9
Czech Republic	56	5
Denmark	70	48
Finland	70	23
France	75	23
Germany	69	12
Greece	55	12
Hungary	49	9
Iceland	35	60
Iceland (2006)	70	36
Ireland	49	15
Italy	54	6
Japan	62	8
Korea	47	7
Netherlands	74	24
New Zealand	56	0
Norway	68	36
Poland	59	12
Portugal	83	24
Slovak Republic	56	8
Spain	67	21
Sweden	75	28
Switzerland	77	24
United Kingdom	54	6
United States	54	6

Source: OECD (2006b), except author's calculations for Iceland

Table 1.19. Long-term unemployment, 2006.

Percentage of total unemployment out of work for 12 months or more. Rank is from lowest to highest value.

	%	Rank		%	Rank
Australia	17.8	9	Korea	1.1	1
Austria	27.3	14	Luxembourg	26.4	13
Belgium	55.6	27	Mexico	2.5	2
Canada	8.7	5	Netherlands	45.2	21
Czech Republic	55.2	26	New Zealand	7.1	3
Denmark	20.4	10	Norway	14.1	7
Finland	24.8	12	Poland	50.4	23
France	44.0	20	Portugal	51.8	24
Germany	57.2	29	Slovak Republic	73.1	30
Greece	55.6	28	Spain	29.5	15
Hungary	46.1	22	Sweden	14.2	8
Iceland	7.3	4	Switzerland	39.1	19
Ireland	34.3	17	Turkey	35.8	18
Italy	52.9	25	United Kingdom	22.1	11
Japan	33.0	16	United States	10.0	6
EU-15	44.2		OECD Europe	44.5	
EU-19	45.9		OECD Total	32.2	

Source: OECD, 2007b

3.2.2. Long-term unemployment

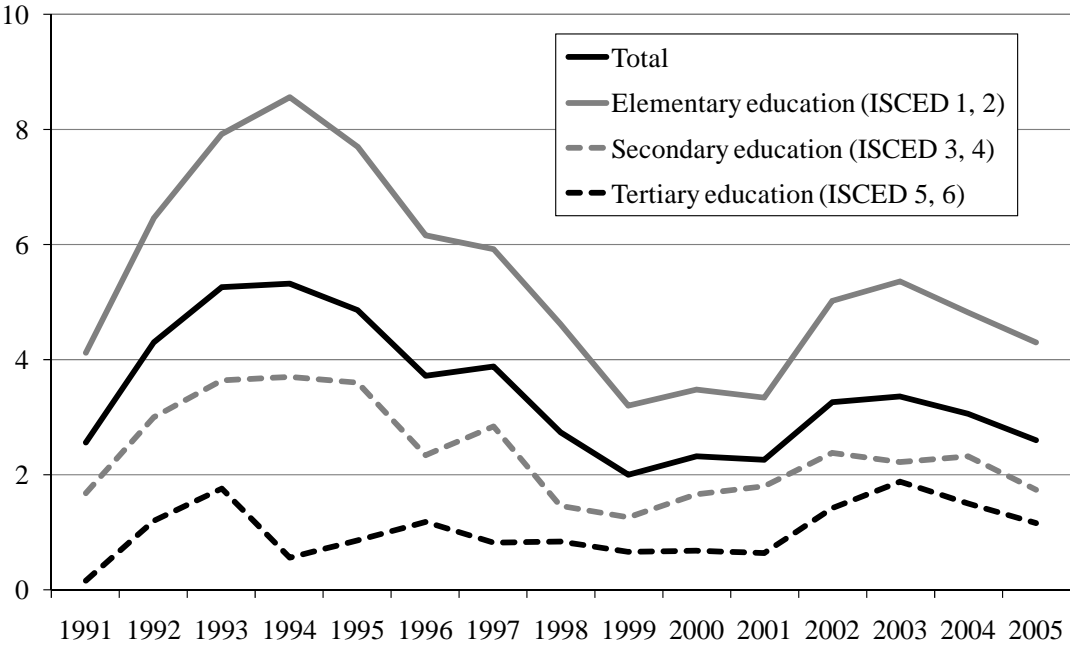
The unemployment rate might be low, but what are the flows in and out of unemployment? In a flexible labor market, labor moves quickly in and out of unemployment, thus showing a low rate of long-term unemployment.

Long-term unemployment, measured by the percentage of those unemployed who have been out of work for 12 months or longer, is 7.3% in Iceland, as seen in Table 1.19. This is quite favorable compared with the European average of 44%. New Zealand, Canada, and the United States all have long-term unemployment rates similar

to Iceland's. Other countries, except Korea and Mexico, have far higher rates. The highest rate of long-term unemployment is in the Slovak Republic, where over 70% of those unemployed have been out of work for over a year.

3.2.3. Unemployment by education level

Blau and Kahn (1999) found that in countries with compressed wage structures, such as Austria and Norway, low-skilled workers have a lower employment rate than those with middle levels of skill compared with countries having a wider wage structure. This evidence is consistent with the adverse employment effects of compressed wage structures. Similarly, we would expect that in Iceland unemployment was more highly concentrated among less-skilled workers.



Source: Statistics Iceland

Figure 1.9. Unemployment rate by education level.
Percentages.

This is evidenced by the fact that in 2005 about 60% of those unemployed had only an elementary school education or a lower secondary education. Only 10% of those unemployed had a tertiary education (Statistics Iceland).

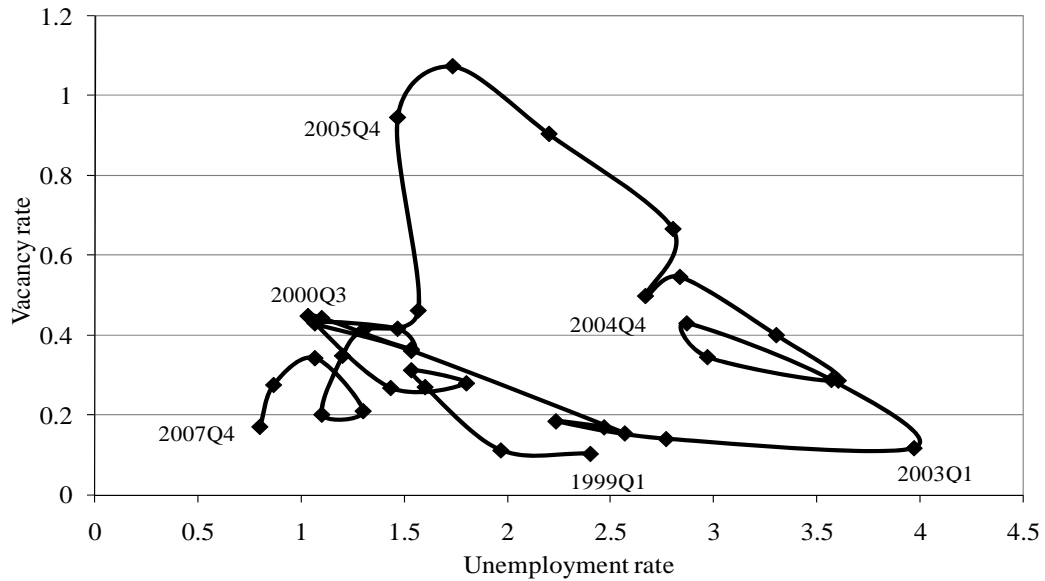
Looking at the unemployment rate by education level from 1991 to 2005 in Figure 1.9, the highest unemployment rate is consistently found among those with only an elementary education, while the lowest unemployment rate is among those with a tertiary education. The same pattern has been observed in many other countries, where persons with lower educational attainment experience higher unemployment rates (Nickell and Layard, 1999).

3.2.4. Structural unemployment

The non-accelerating inflation rate of unemployment (NAIRU) for Iceland was estimated in 1997 to have risen from around 1% during the period 1970–1988 to over 4% in 1996 (Gudmundsson and Zoega, 1997). The OECD estimated Iceland's NAIRU to be 3.2% in 2005 (OECD, 2005a). These estimates of the NAIRU seem to track the actual unemployment rate to a remarkable extent, while indicating a structural change in the relationship between inflation and unemployment around 1990. Zoega (2002) links the changes in the NAIRU to structural changes in the economy following liberalization of the economy in the 1990s, especially in the financial markets.

3.2.5. The Beveridge curve

The Beveridge curve shows the relationship between the unemployment rate and the vacancy rate. The relationship is negative, as the vacancy rate falls when unemployment grows and vice versa. The further the curve is from the origin, the greater the labor market rigidities (Solow, 1998).



Source: Central Bank of Iceland

Figure 1.10. The Beveridge curve, 1999–2007.
Percentage of labor force.

The Beveridge curve in Iceland seems to be stable from 1999 up to the last quarter of 2002, when it appears to shift to the right, where a new relationship seems to form (Figure 1.10). The shift might suggest greater rigidities in the Icelandic labor market, or an increased mismatch between patterns of unemployment and available vacancies. From the end of 2005 and throughout 2006, the relationship seems to have returned to its previous level, closer to the origin. This shift has administrative roots, as earlier, employers needed to advertise available jobs locally, and only when they were not able to fill the vacancies by those means could they apply for work permits for workers from outside the EEA. An agreement was made in the fall of 2005 to lift this restriction, thus reducing the number of advertised jobs.

3.2.6. *Unemployment and growth*

In the manner of Okun (1962), Hall et al (1998) estimated the relationship between unemployment and growth in Iceland from 1980 to 1996. They found a significant

negative relationship between migration and growth, in which a 1% increase in net outmigration leads to a 0.067% decrease in GDP. They also found a significant relationship between labor force participation rates and growth, in which a 1% increase in the labor force participation rate can be expected to increase GDP by 0.23%. On the other hand, they found the relationship between unemployment and growth to be insignificant, with an estimated coefficient of -0.078, meaning that a 1% increase in unemployment can be expected to decrease GDP by 0.078%.

4. Conclusion

The Icelandic wage bargaining system is classified as centralized and coordinated, yet there is significant flexibility in the centralization that depends largely on the economic situation and union expectations. The legal framework does not imply strictness, and many rules regarding the labor market are only stated in collective bargaining agreements. The agreements have the status of law, and strikes are not allowed while a contract is valid.

In countries with highly centralized bargaining, the wage distribution is generally narrow, as is the case in Iceland. There is still some flexibility in real wages, although the flexibility has declined significantly with the fall in inflation. The gender wage gap is higher than in the other Nordic countries and higher than would be expected in light of the degree of centralization.

The labor force participation rate is high, with both men and women actively participating in the labor market. Furthermore, average weekly working hours exceed 40 hours per week. Migration has been an integral part of the Icelandic labor market in recent years, characterized by immigration in times of robust economic growth and

outmigration in times of downturn. The tax wedge on labor is relatively low and thus should not significantly affect the decision to work, whereas pension fund contributions are mandatory.

The unemployment rate is lower than in most other countries, and there is constant flow in and out of unemployment, as long-term unemployment is low. This is aided by the unemployment benefits, which are not generous and are of limited duration.

Thus, of the measures discussed above under the heading of flexibility, the Icelandic labor market, with its centralized bargaining structure, falls in the category of being flexible.

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**CHAPTER TWO:
DECENTRALIZATION OF BARGAINING
IN THE PUBLIC SECTOR IN ICELAND:
DID IT CHANGE THE WAGE STRUCTURE?**

Abstract

It is widely accepted within the field of labor economics that union membership has a positive effect on wages and that centralization of collective bargaining leads to lower wage dispersion. The question remains whether it is possible to change the wage structure through changes in the collective bargaining agreement and decentralization of the bargaining process.

A unique opportunity to explore this question presented itself when changes were made to collective bargaining contracts in the public sector in Iceland as the bargaining process was decentralized. In this chapter I explore the effects of decentralization on wage structure in order to examine whether wage dispersion increased with decentralization, as theory would predict, and whether decentralization affected wages equally or differently depending on gender and union federation. I examine wage level and wage structure in the 4 years leading up to the changes, 1994 through 1997, and compare them with those during a 4-year period after the change in the collective bargaining agreement, 2001 through 2004. I find that the wage structure for total earnings did not change between the two periods but that the dispersion of base wages increased.

1. Objective of research

It is widely accepted within the field of labor economics that union membership has a positive effect on wages and that centralization of collective bargaining leads to

narrower wage dispersion. The question remains whether it is possible to change the wage structure by changing the wage schedule in the collective bargaining agreement and decentralizing the bargaining process. Little or no research exists on whether contract type has any bearing on union members' wages or on wage structure.

Collective bargaining contracts between Iceland's public-sector unions and its central government underwent significant changes in 1997, providing a unique opportunity to study whether the structure of labor contracts and bargaining process decentralization influences wages or wage dispersion.

There is evidence that earnings dispersion decreases with higher union membership and more coordinated collective bargaining (Blau and Kahn, 1999; and OECD, 1997 and 2004). Thus, with decentralization one should expect greater wage dispersion. It is also possible that decentralized public-sector wage determination brings the public-sector wage structure closer to that of the private sector (Holmlund and Ohlsson, 1992). The objective of this study is to find out what happens when a rigid wage structure is replaced with a much more flexible one and a centralized bargaining structure is replaced with a more decentralized one.

Several questions arise as to what determines the changes in the wage structure when the wage determination process is changed. What determines the result? Do the wages of those unions that are closely linked to the general labor market increase more on average than those of other unions? What happens to labor turnover? Does it matter whether the union has the right to strike? Is there a difference between smaller unions and larger unions? Does workplace size matter? Or is it possible that wage formation has no bearing on wage distribution?

2. The structure of the public sector

2.1. The development in the public sector in other countries

Public-sector pay systems in the OECD countries came under pressure in the early 1980s. Tightness in the labor market resulted in problems recruiting and retaining staff. This created incentives to improve managerial efficiency and to provide better services, while using wages as a managerial tool to improve the efficiency of public-sector workers. Macroeconomic considerations created pressures to improve wage flexibility in both the public and private sectors at the same time that pressures grew to curb public expenditures and government deficits (Maguire, 1993).

In response to this, wage determination in the central government administrations of many countries, which historically had been centralized, has in recent years become increasingly decentralized (Rexed et al, 2007). The important motivation behind decentralization is the need for more differentiated pay-setting as the workforce has become increasingly heterogeneous. A more decentralized system can better meet the changing needs of the labor market in terms of addressing specific situations in each institute, using the specific skills and encouraging the performance of each employee, and meeting the competition for skills in the labor market.

The possible advantages of decentralization can be significant, while the actual outcome will depend on how the managers of the decentralized system who assume responsibility for the new pay arrangements make use of the opportunities (Rexed et al, 2007). There are also costs to consider: the transaction costs of a decentralized pay-setting system increase as single-pay bargaining is replaced with multiple, separate negotiations.

The current Icelandic system in many ways resembles those in Denmark and Finland. Each of these countries has a two-level collective bargaining system, in which some conditions are regulated by central collective agreements and others by local agreements (Rexed et al, 2007). In Denmark the central collective agreements stipulate general pay increases for government employees, while individual departments or institutes can add pay increases as long as they fit within their respective budgets. In Finland, the central agreement covers general wage increases, while state civil servants can negotiate separate collective agreements. These agency-specific agreements are drawn up according to general principles contained in the central agreement.

Elliot and Bender (1997) examined public-sector reforms in the United Kingdom, Sweden, and Australia. These reforms were in the direction of decentralization of pay bargaining and the individualization of pay. Prior to the reforms all three countries had highly centralized and coordinated arrangements for determining the pay of central government employees. The countries chose to delegate responsibility for pay to either existing or newly formed agencies, and all three have introduced controls on the running costs of these agencies.

The reforms in these three countries were, according to Elliot and Bender (1997), motivated by the search for increased flexibility and efficiency and by the desire to contain the public-sector pay bill. To achieve these goals, the performance of public-sector workers could be enhanced by linking their pay to their performance. In these respects the public sector was following the lead of the private sector, as in all three countries, the private sector adopted a more decentralized approach to wage bargaining during the 1980s and 1990s.

The decentralization of pay bargaining, or the delegation of responsibility for pay, might be expected to affect both the pay dispersion between occupations within a single agency or department and the pay dispersion within the central government sector as a whole. This is mainly because the delegation of decisions over pay will result in many more separate bargaining units than before, and management in each of these may seek to reflect the specific circumstances and needs of their organization in awarding pay settlements.

Decentralization is frequently accompanied by the introduction of new pay and grading structures. In Australia and in several agencies in the UK, broader pay bands have replaced incremental pay scales. In the new pay bands, wage growth is generally tied to individual performance, whereas on the old scales, wage growth was related to seniority. For this reason and the fact the pay bands are broader than the pay scales, this change is likely to increase pay dispersion.

In the UK earnings dispersion has generally increased in both the public and private sectors since 1985, accompanied by a widening of pay differences at both the top and the bottom of the earnings hierarchy. In both sectors earnings in the bottom decile have fallen relative to those at the median, while those in the top decile have increased relative to the median.

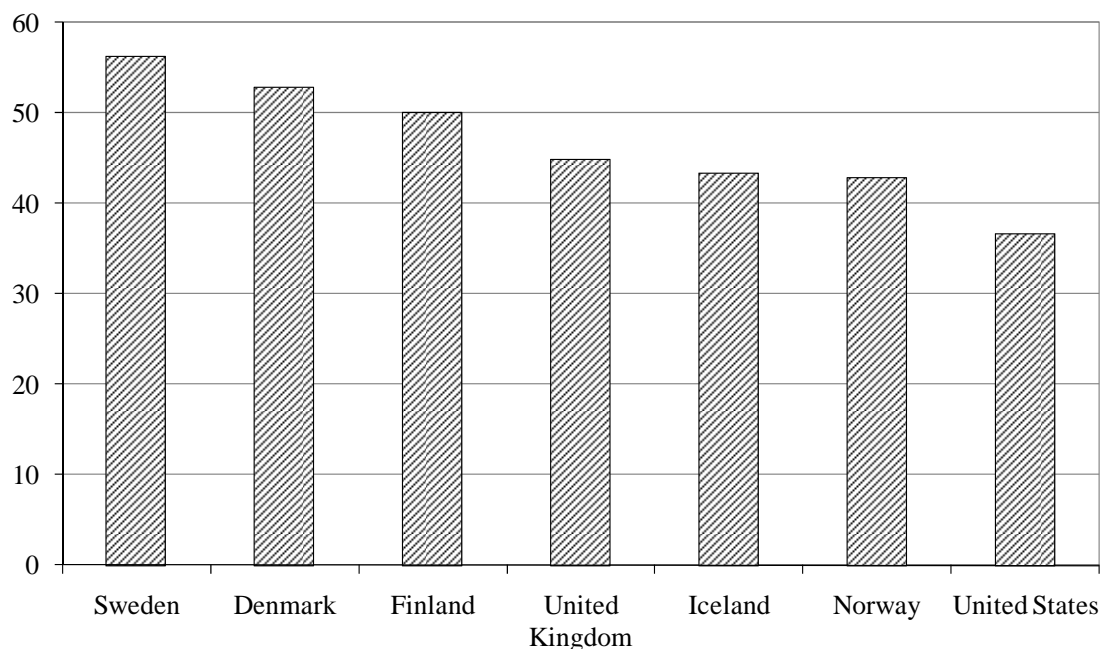
In Sweden the evidence concerning the impact of the reforms on the dispersion of public-sector earnings is mixed. There is some suggestion that earnings among the most highly paid occupations became more widely dispersed over the period. In Australia since 1990 there has been a modest increase in the earnings dispersion in the public sector.

Falch and Strom (2006) investigate the effects of moving a centralized pay system to a system with more local pay discretion, a change that took place in the local public sector in Norway in 1990. After 1990 central contracts stipulated a wage frame for each occupation and granted local governments considerable freedom to place individual employees within each frame. There is some evidence that wage differences increased somewhat as the wage setting became decentralized and that local wages have become more responsive to local budgets. The authors also suggest that because the changes in the wage distribution are small, the established pay equality norms across government workplaces continue to play a significant role in the determination of wages even after decentralization.

Public-sector unions are better able to influence employer behavior through the political process than are private-sector unions (Freeman, 1986). On the other hand, public-sector strikes may be less effective than their private-sector counterparts: in the former, services are interrupted but governments continue to receive tax revenues, whereas in the latter, production ceases and, thus, income is lost.

2.2. The public sector in Iceland

Iceland's public sector has two levels, the central government and local governments. In many ways Iceland resembles its Nordic neighbors in terms of social services, although its public sector is relatively smaller. General government outlays in Iceland amounted to 43% of GDP in 2005, as shown in Figure 2.1. Sweden, Denmark, and Finland had general government outlays above the Icelandic level. The United Kingdom's and Norway's general government outlays were similar to Iceland's spending as a share of GDP, while the United States had a lower level of spending, or 37% of GDP.



Source: OECD, 2006

Figure 2.1. General government outlays, 2005.
Percentage of GDP.

The main reason Iceland's general government outlays are lower than those of the other Nordic countries is its lower expenditure for social services. The central government is responsible for the police; the court system; foreign affairs; health services, which are largely financed through taxes; and the education system, except for elementary schools, which are the responsibility of local governments. In addition to elementary schools, local governments are responsible for preschools, local planning, local infrastructure, and certain types of welfare services, although the central government provides most of the latter (Central Bank, 2006). Defense spending is limited, as Iceland has no armed services.

2.3. Changes in the public sector in the 1990s

The central government's policy in the early 1990s aimed to increase efficiency in the public sector. This included the contracting out of services and privatization, which

increased competition in the provision of both outputs and inputs. The government's human resource policy aimed to reduce the difference between the private and public sectors, enhancing a free flow between the two.

This policy is reflected in a brochure published by the Ministry of Finance (1993), which states:

The current situation in the policy on human resources and wage policy is to a large extent characterized by centralization. Decisions are in some cases made by individuals lacking knowledge of the needs and the situation of individual institutes and government entities. . . Collective bargaining agreements provide only limited room to reward good employees and compete for labor. . . The possibilities for rewarding employees who show initiative and talent need to be increased. . . The flexibility of collective bargaining agreements needs to be increased such that individual institutes and their employees can organize their work as they see fit. (page 11; translated from Icelandic by author)

In light of this policy, the government agreed to significant changes in the public-sector collective bargaining contracts during the negotiating round that began in 1997. The pay schedule was previously quite rigid and included large automatic wage increases tied to seniority. During the negotiations a new pay schedule was implemented for a large number of unions. The new schedule was much more open and provided much greater flexibility in wage determination while significantly reducing automatic wage increases. Furthermore, the negotiations were made more decentralized, because a part of the negotiating process was moved from the central government to individual institutes.

In addition, significant changes were made to the Pension Fund for State Employees. The system that was in effect prior to 1997 (now called Division B) is based in part on funding from accumulated contributions and in part from supplemental contributions

from public sources. Fund members' rights under this system are based on various factors that relate to their working life, such as number of years employed and the base wage. This system was closed to new members starting in 1997. Employees in the system prior to 1997 were given the choice to either stay in the old system or move to the new one. The new system (Division A) is fully funded, with benefit rights based on contributions made, which are a set percentage of total earnings in which the employer and employee both pay their share.

2.4. The public-sector bargaining system

Most of those employed by the central government in Iceland belong to one of approximately 100 unions that bargain with the Ministry of Finance. Most of the unions are public-sector unions and belong to one of three federations. Public-sector employees have separate organizations from those in the private sector; the largest of these is the Federation of State and Municipal Employees (BSRB), established in 1942. In 2004 BSRB had 28 unions and 18,000 members. University graduates working for the public sector belong to a separate federation of unions, the Association of Academics (BHM), formed in 1958. In 2004 there were 25 member-unions in BHM, consisting of 8,000 employees with an academic degree of 3 years or more. Furthermore, teachers and school administrators at the preschool, primary school, and secondary school levels are members of the Icelandic Teachers' Union (KI), whose members numbered over 8,000 in 6 unions in 2004. A few public-sector unions operate outside these three federations. These include the Icelandic Air Traffic Controllers' Association, the Icelandic Medical Association, and the Society of Chartered Engineers. In addition, a small group of public-sector workers belong to unions that are a part of the Icelandic Federation of Labor (ASI). The group consists mainly of employees

doing blue-collar work, such as maintenance and custodial work, but also includes the Union of Icelandic Electrical Workers.

All central government contracts are negotiated between each union and the State Negotiation Committee (SNR) on behalf of the Minister of Finance. High-level central government employees do not belong to unions, as their wages are determined by the State Salaries Commission (Icel: Kjararad).

2.5. The legal environment

In addition to being covered by general labor-market legislation, public-sector employees in Iceland are subject to the Government Employees Act and the Act on Public Sector Collective Bargaining Agreements.

The current Government Employees Act dates from 1996 (Act no. 70/1996), while the former version dates from 1954 (Act no. 38/1954). Both acts are discussed here, as the research period dates from 1994, when the earlier act was valid. In the earlier act the general specifications for working for the central government included the following:

1. Having reached the age of 21.
2. Having attained majority.
3. Being of sound mind and body.
4. Having Icelandic citizenship.
5. Having attained general education as well as the required education for the job in question.
6. Being in charge of one's own finances where a financial responsibility is required.

The current act specifies the same general requirements, except the age requirement is now 18, and the citizenship requirement has been extended to the citizens of member countries of the European Economic Area (EEA), which are the European Union (EU) member countries, plus Norway and Lichtenstein.

Unlike the earlier act, the current act distinguishes between those employees who are hired indefinitely for a specific job and those who hold posts for 5 years at a time. In general, high-level public-sector employees hold posts for a limited time, while lower-level public-sector employees are hired indefinitely.

Central government employees who hold posts for a term of 5 years at a time are the following:

1. The Head of Staff of the Althing (the parliament), the State Auditor General, and the Ombudsman of the Althing.
2. The Secretary to the President, Permanent Secretaries of ministries, directors in ministerial offices, ambassadors and counselors in the Foreign Service.
3. Justices of the Supreme Court, Secretary to the Supreme Court, and regional court judges.
4. The Bishop of Iceland, ordainment bishops, provosts, and ministers of the church.
5. The Director of Public Prosecutions, the Deputy Director of Public Prosecutions, and other prosecutors.
6. The Solicitor General, the State Mediator, and the Ombudsman for Children.

7. District magistrates, the State Police Chief and the Deputy State Police Chief, the Reykjavík Police Chief and the Reykjavík Deputy Police Chief, the Head of the State Police Academy, and police officers.
8. The State Director of Customs, the Reykjavík Director of Customs, and customs officers.
9. The State Director of Prisons, prison directors, and prison wardens.
10. The Director of Internal Revenue, the Director of Tax Investigations, full-time members of the Appellate Tax Committee, and heads of tax offices.
11. District physicians and district nurses.
12. The State Veterinarian, district veterinarians, and the veterinarian for fish diseases.
13. The Consumer Spokesman and the head of the Consumer Agency.
14. Heads of state agencies and state enterprises not listed above.

Six months before the end of his or her 5-year term, the person holding a post will be notified about whether the post will be advertised as vacant. If it is not advertised, his or her term of appointment is automatically extended by 5 years.

All available jobs and posts are to be advertised. Under the earlier act, all jobs had to be advertised in the Legal Gazette (Icel: Logbirtingarblad), while the names of applicants were to be provided to other applicants and to the public-sector unions on request. Under the current act, all available posts should be advertised in the Legal Gazette, and the names of applicants are to be provided to the general public. Also, all jobs are to be advertised, and the requirements for advertising jobs are set by a specific set of rules published by the Minister of Finance. The deadline for applications was specified as 4 weeks under the earlier act, but is 2 weeks under the current act.

If a government employee does not fulfill his or her duties as required, he or she can be dismissed temporarily provided he or she is given a warning and a chance to improve. This rule was made more stringent in the current act, which stipulates that a written complaint be made. An employee can also ask for an explanation upon being removed from a job or post temporarily. Thus, the rules for firing central government employees are much stricter than those for the general labor market, where an employee can be dismissed without reason or prior warning. If a government employee has been dismissed temporarily his case is investigated and/or left to the courts to decide. The current act goes further than the older one, in that it specifies a committee to investigate the affair.

As for leaving a government job, the advance notice of resignation is at least 3 months, on both sides. If many employees wish to leave at the same time, the government can extend the notice period to 6 months. A government employee should retire no later than the age of 70. According to the former act, if an employee's position is eliminated, he or she is paid wages for 6 or 12 months, depending on seniority. If the employee accepts another job during this period, he or she receives the difference of the wages, provided the wages in the new job are lower than in the earlier job. In the current act, this stipulation applies only to those holding posts, not to employees.

In the earlier act, the number of holidays per year is specified as 21 to 27, depending on seniority, while the new one only refers to the State Salaries Commission or public-sector wage contracts.

The Act on Public Sector Collective Bargaining Agreements (Act no. 94/1986) covers all public-sector employees. It stipulates the conditions a union must fulfill in order to negotiate on behalf of employees and states that the Ministry of Finance negotiates on behalf of the central government. The act defines the general contents of a collective bargaining agreement, including wages, both the base wage and overtime payments, working hours, and vacation, among other topics. The act also stipulates under which conditions a union is allowed to strike and discusses which government employees are not allowed to strike.

Other items discussed in the Act on Public Sector Collective Bargaining Agreements include when and how to refer cases to a labor court in case of a disagreement between the parties to the collective bargaining agreement. Also discussed are the rights and responsibilities of shop stewards.

2.6. Conflicts and strikes in the public sector

Most central government employees have the right to strike. Only a handful of unions and employees of a few institutes do not have this right. Government employees who are not allowed to strike are the following (parentheses refer to the label used to identify the unions and institutes in the data set used in this research):¹

1. The heads of various government institutes that hold posts for a term of 5 years (not in the data set).
2. Employees of the Althing (Union 5195).

¹ According to the Government Employees Act No. 70/1996 and the previous Act No. 38/1954 and Act No. 94/1986 on Public Sector Collective Bargaining Agreements. The unions in the data set are listed in Appendix 2.B, and institutions are listed in Appendix 2.C.

3. Employees of the ministries (Union 5303 and Union 5196).
4. Employees of the National Audit Office (Union 5536).
5. Employees of the Ombudsman of the Althing (Union 5194).
6. Police officers (Union 5405).
7. Customs officers (Union 5627).
8. Employees of the Office of the President of Iceland (Institute 00-101).
9. Employees of the court system including the Supreme Court (Institutes 06-201, 06-210, 06-211, 06-212, 06-213, 06-214, 06-215, 06-216, 06-217, 06-218).
10. Employees of the State Prosecutor (Institute 06-301).
11. Employees of the State Solicitor General (Institute 09-105).
12. Employees of the State Arbitrator (Institute 07-302).
13. Employees of the Ombudsman for Children (Institute 01-241).
14. Prison guards (Union 5573 in Institutes 06-501, 06-512, 06-513, 06-590).

During negotiations, if either party is unsatisfied with the progress being made, that party can send the negotiation to arbitration. At that point the State Arbitrator takes over and leads the negotiation process until an agreement is reached.

While a contract is valid a peace obligation is in effect; thus, a strike cannot be called.

A strike can be called only if the following requirements have been fulfilled:

1. No contract is valid, that is, the previous contract has expired.
2. The conflict has been called into arbitration and attempts have been made to solve the conflict with the aid of the State Arbitrator.
3. A secret ballot has been cast among union members in which at least 50% of active union members take part and the majority votes for a strike.
4. A strike has been announced at least 15 days in advance.

The number of conflicts in the public sector during the period 1994–2004 is shown in Table 2.1.

Table 2.1. Conflicts in the public sector, 1994–2004.

	Number of conflicts.			
	Arbitration	Called a strike	Went on strike	Went on a long strike
1994	2	2	2	2
1995	7	2	2	2
1996	9	0	0	0
1997	46	2	0	0
1998	0	0	0	0
1999	0	0	0	0
2000	2	1	1	1
2001	16	9	5	0
2002	1	0	0	0
2003	1	0	0	0
2004	0	0	0	0

Source: The State Arbitrators' Office

During the period 1994–1996, many contracts were short-term contracts valid for a year or less, and each year a few contracts entered arbitration. In 1994 two unions entered arbitration, biomedical scientists and practical nurses. Both unions called strikes, which lasted for 45 and 50 days, respectively. The following year, seven unions entered arbitration, two of which called a strike. Both unions were teachers in secondary schools, and both unions ended up striking for 41 days. Nine unions went into arbitration in 1996, but no strikes were called.

All contracts were up for renegotiation in 1997; thus, it is not surprising that 46 unions entered arbitration that year, especially as the employer (the central government) was offering a significant change to the contracts. Two unions called a strike, but both

strikes were averted. There were no strikes in 1998 and 1999 in the public sector, as contracts were in force for all public-sector unions.

In 2000 as the contracts made in 1997 expired, two unions entered arbitration, air traffic controllers and secondary school teachers. The teachers went on strike, which lasted for 61 days and ended in early 2001.

Contracts from the negotiating round that started in 2000 were still being negotiated in early 2001, and 16 unions entered arbitration. Of the 16, 9 unions called a strike and 5 eventually went on strike. These were air traffic controllers, registered nurses, practical nurses, and social educators, as well as teachers, who had begun their strike in 2000. There were no strikes in the public sector in 2002, 2003, and 2004, as contracts were in force for most public-sector unions. Only 2 unions entered arbitration, hospital doctors and pharmacists.

2.7. The earlier agreements

During the previous decades, public-sector wage contracts in Iceland were very rigid. All job titles were defined in the contracts and were limited to a narrow range of pay levels. Unlike private-sector contracts, which stipulate only the minimum wage, public-sector contracts stipulate the base wage for all employees. The base wage was presented in a single wage table. A sample of such a table from the secondary school teachers' collective bargaining agreement can be seen in Table 2.2.

These earlier agreements held that all related communication was to take place between the Ministry of Finance, on the one hand, and individual unions, on the other.

Any decision regarding placing an individual within the wage table was made by the parties to the agreement, and little or no flexibility existed within each institute.

Table 2.2. Wage schedule from contracts prior to 1997.

Employees move down the wage schedule with promotion, while a horizontal move is due to seniority and/or age. A limited vertical move is also possible in some contracts due to seniority and/or age. In this contract most individuals start in the third column and in line marked 142.

lil	1.prep	2.prep	3.prep	4.prep	5.prep	6.prep	7.prep	8.prep
137	56.950	59.798	62.788	65.927	68.564	71.307	74.159	77.126
138	58.659	61.592	64.672	67.905	70.621	73.446	76.384	79.439
139	60.419	63.440	66.612	69.942	72.740	75.650	78.676	81.823
140	62.231	65.343	68.610	72.041	74.922	77.919	81.036	84.277
141	64.098	67.303	70.668	74.202	77.170	80.257	83.467	86.806
142	66.021	69.322	72.788	76.428	79.485	82.664	85.971	89.410
143	68.002	71.402	74.972	78.721	81.869	85.144	88.550	92.092
144	70.042	73.544	77.221	81.082	84.326	87.699	91.207	94.855
145	72.143	75.750	79.538	83.515	86.855	90.330	93.943	97.700
146	74.307	78.023	81.924	86.020	89.461	93.039	96.761	100.631
147	76.537	80.364	84.382	88.601	92.145	95.831	99.664	103.650
148	78.833	82.774	86.913	91.259	94.909	98.706	102.654	106.760
149	81.198	85.258	89.521	93.997	97.756	101.667	105.733	109.963
150	83.634	87.815	92.206	96.816	100.689	104.717	108.905	113.262
151	86.143	90.450	94.972	99.721	103.710	107.858	112.173	116.659
152	88.727	93.163	97.822	102.713	106.821	111.094	115.538	120.159
153	91.389	95.958	100.756	105.794	110.026	114.427	119.004	123.764
154	94.130	98.837	103.779	108.968	113.327	117.860	122.574	127.477
155	96.954	101.802	106.892	112.237	116.726	121.395	126.251	131.301
156	99.863	104.856	110.099	115.604	120.228	125.037	130.039	135.240
157	102.859	108.002	113.402	119.072	123.835	128.788	133.940	139.297
158	105.945	111.242	116.804	122.644	127.550	132.652	137.958	143.476
159	109.123	114.579	120.308	126.324	131.376	136.632	142.097	147.781
160	112.397	118.017	123.917	130.113	135.318	140.730	146.360	152.214

Source: Collective Bargaining Agreement between the Minister of Finance and the Association of Teachers in Upper Secondary Schools (1995)

The contract spelled out the range in which an individual with certain types of responsibilities could be placed, usually within two or three lines of the contract. This determined vertical placement within the wage table. Horizontal placement was determined by the person's age or seniority. In some cases a vertical move was also possible due to age or seniority. Thus one could attain a significant wage gain simply by growing older.

During negotiations the government tried to limit the increase in the base wage. This pushed the wage pressures into other wages, overtime, and other payments, thus causing “wage drift.” This also encouraged job title “inflation.” Other measures to increase pay were also used; the most common was to pay “unworked” overtime, a tactic in which an agreement was made to pay an employee for a certain number of overtime hours each month without the work actually being done. Thus, by the middle of the 1990s, the base wage accounted for only about 60% of total earnings.

The contract period was often less than a year, and during the period 1994–1997 the general contracts were in place during these periods:

1. May 1993 to December 1994. This contract held no general wage increases but made specific allowances for the lowest-paid employees.
2. Spring 1995 to December 1996. The contracts had either an increase of 2,700 kronur or a 3% increase. The wages increased first at the signing of the contract and again in January 1996.

2.8. The new collective agreements

In the negotiating round that took place in 1997, significant changes were made to the wage structure in the contract.

The agreements made with the new wage structure state the following as the objective of both negotiating parties:

The negotiating parties agree on a new wage system. The objective of the change is the following:

To increase the flexibility of the wage system and reduce centralization in wage determination and introduce a more efficient wage system that takes into account the needs and responsibilities of the institutes and their employees.

To give an individual institute the responsibility of executing the collective agreement such that it can, given its type of operation, organization, or other characteristics, make an agreement with the union, which then becomes part of the collective agreement, on what should be the underlying factors for evaluating the jobs at the institute.

To increase the share of the base wage. This is done by reducing the number of seniority steps in the agreement and thereby reducing the weight of automatic wage increases. At the same time the possibility is created to change the composition of total earnings to reduce the share of overtime payments and increase the base wage without reducing the total amount actually worked or reducing productivity. (Collective Bargaining Agreement between the Minister of Finance and the Union of Natural Scientists, 1997; translated from Icelandic by author)

The changes resulted in decentralization of the wage negotiation process, as the negotiations were split in two. First, there is a central contract between the union and the Ministry of Finance. This defines the base wage in kronur and general wage increases during the term of the contract, usually a general increase once a year during a 3-year contract. In each contract, three to four wage ranges, or so-called frames, are defined in the central agreement and include a broad job definition for each wage range, with the ranges usually overlapping. With the overlapping frames, an able specialist can be placed next to an average middle manager. The broad idea is that general staff are in the lowest frame, Frame A, middle managers are in Frame B, and higher-level officials are in the highest frame, Frame C. The range from the lowest wage in Frame A to the highest wage in Frame C is in most cases much wider than the range from the lowest to the highest wage in the earlier contracts. An example of a wage schedule according to the new wage agreements can be seen in Table 2.3. According to the new wage schedule, individuals move to the right as they age. Note

that seniority is not a factor for lateral movement in the table, unlike in the previous contract.

In the second stage of negotiation, the members of a specific union in each workplace negotiate with the head of each institute on how the contract will be applied to that particular workplace, based on the broad definition given in the central agreement. Thus, an additional agreement, the institutional agreement (Icel: stofnanasamningur), is made within each institute with each union operating in that institute. This institutional agreement is considered part of the collective bargaining agreement.

Secondary negotiations can involve the restructuring of wages, that is, a new classification of jobs specific to the workplace involved. Most importantly, these negotiations can include moving “extra” wages into the base wage, thus increasing the share of the base wage in total earnings. Thus, the outcome of wage negotiations depends on both steps of the negotiating process.

As a result of these negotiations, the range of wages from lowest to highest was broadened significantly from the previous contract. At the same time, automatic age/seniority payment increases were minimized. Instead, the head of each institute has been granted much more responsibility and power in the human resources policy of his/her institute, that is, the power to grant individual pay increases based on merit, education, and so forth, where rules guiding these decisions are made in the institutional agreement.

Table 2.3. Wage schedule from a post-1997 contract.

The wage schedule consists of three frames, A, B, and C. Each individual moves right in the table according to age, whereas a move down the table is discretionary. A move between frames usually constitutes a promotion. The figures show the monthly base wage for a full-time job.

Age	<25 yrs	25 yrs	27 yrs	30 yrs	35 yrs	40 yrs
Category	Step 1	Step 1 2	Step 3	Step 4	Step 5	Step 6
A01	103.111	106.228	109.438	111.080	112.746	114.437
A02	106.228	109.438	112.746	114.437	116.154	117.896
A03	109.438	112.746	116.154	117.896	119.664	121.459
A04	112.746	116.154	119.664	121.459	123.281	125.130
A05	116.154	119.664	123.281	125.130	127.007	128.912
A06	119.664	123.281	127.007	128.912	130.846	132.809
A07	123.281	127.007	130.846	132.809	134.801	136.823
A08	127.007	130.846	134.801	136.823	138.875	140.958
A09	130.846	134.801	138.875	140.958	143.072	145.218
A10	134.801	138.875	143.072	145.218	147.396	149.607
A11	138.875	143.072	147.396	149.607	151.851	154.129
A12	143.072	147.396	151.851	154.129	156.441	158.788
A13	147.396	151.851	156.441	158.788	161.170	163.588
A14	151.851	156.441	161.170	163.588	166.042	168.533
A15	156.441	161.170	166.042	168.533	171.061	173.627
A16	161.170	166.042	171.061	173.627	176.231	178.874
Age	<30 yrs	30 yrs	35 yrs	40 yrs	45 yrs	
Category	Step 1	Step 2	Step 3	Step 4	Step 5	
B01	132.809	134.801	136.823	138.875	140.958	
B02	136.823	138.875	140.958	143.072	145.218	
B03	140.958	143.072	145.218	147.396	149.607	
B04	145.218	147.396	149.607	151.851	154.129	
B05	149.607	151.851	154.129	156.441	158.788	
B06	154.129	156.441	158.788	161.170	163.588	
B07	158.788	161.170	163.588	166.042	168.533	
B08	163.588	166.042	168.533	171.061	173.627	
B09	168.533	171.061	173.627	176.231	178.874	
B10	173.627	176.231	178.874	181.557	184.280	
B11	178.874	181.557	184.280	187.044	189.850	
B12	184.280	187.044	189.850	192.698	195.588	
B13	189.850	192.698	195.588	198.522	201.500	
B14	195.588	198.522	201.500	204.523	207.591	
B15	201.500	204.523	207.591	210.705	213.866	

Table 2.3 (Continued)

Age	<30 yrs	30 yrs	35 yrs	40 yrs	45 yrs
Category	Step 1	Step 2	Step 3	Step 4	Step 5
B16	207.591	210.705	213.866	217.074	220.330
B17	213.866	217.074	220.330	223.635	226.990
B18	220.330	223.635	226.990	230.395	233.851
Age	<40 yrs	40 yrs	45 yrs		
Category	Step 1	Step 2	Step 3		
C01	151.851	154.129	156.441		
C02	158.788	161.170	163.588		
C03	166.042	168.533	171.061		
C04	173.627	176.231	178.874		
C05	181.557	184.280	187.044		
C06	189.850	192.698	195.588		
C07	198.522	201.500	204.523		
C08	207.591	210.705	213.866		
C09	217.074	220.330	223.635		
C10	226.990	230.395	233.851		
C11	237.359	240.919	244.533		
C12	248.201	251.924	255.703		
C13	259.539	263.432	267.383		
C14	271.394	275.465	279.597		
C15	283.791	288.048	292.369		
C16	296.755	301.206	305.724		

Source: Collective Bargaining Agreement between the Minister of Finance and the Union of Natural Scientists (1997)

The first contract was signed in March 1997 with two independent unions bargaining together, the Union of Engineers and the Union of Technicians. The contracts took account of the fact that it would take time to implement the changes; thus, the changes to the wage table took effect in late 1997 and extended into early 1998.

Participating in the first wave toward a new wage structure were member unions of the two public-sector federations, BSRB (Federation of State and Municipal Employees) and BHM (the Association of Academics), along with some of the independent unions. Most of the contracts were signed in the spring of 1997, as Table 2.4 shows.

Most of the remaining public-sector unions followed suit in the subsequent round of negotiations in 2001, including the third federation, KI.

The contracts stipulated a 4.7% increase at the time of completion. The unions that agreed to the new wage system received an additional 1.5% increase. Most unions received this increase in the beginning of 1998 along with a 4% contractual increase, thus receiving a 5.56% increase in wages. The contracts called for a further increase of 3.5% in January 1999 and an additional 3% in January 2000. Most contracts expired at the end of October 2000.

Table 2.4. Number of unions signing contracts each month in 1997.

	New wage system	Old system
March	2	0
April	21	0
May	18	2
June	13	0
July	0	2
August	1	2
September	0	1
November	0	2
December	0	1
Total	55	10

The next round of negotiations resulted in general contracts being signed in the spring of 2001 for most unions. These contracts stipulated an initial general increase of 6.9% at signing and 3% at the beginning of each of the years 2002, 2003, and 2004, with the contracts expiring at the end of November 2004.

2.9. Contracts in the public sector

The structure of the various collective bargaining agreements with different unions in the public sector is similar. The first 12 chapters of the agreements include similar items, with slight variations depending on union type. When the wage structure changed, the general structure of the agreements did not, except for the first chapter on wages. This section discusses a few of the collective bargaining agreements in more detail.

2.9.1. The Union of Natural Scientists (FIN)

The Union of Natural Scientists (FIN) is a member union of the Association of Academics (BHM). In the last contract before the changes were made, effective from September 1995 to December 1996, the automatic wage increases due to age or seniority were 38% (Collective Bargaining Agreement between the Minister of Finance and the Union of Natural Scientists, 1995). In the contract signed in June 1997 and valid until October 2000, the automatic wage increases were reduced to 11% (Collective Bargaining Agreement between the Minister of Finance and the Union of Natural Scientists, 1997). The span of wages in the new agreement was 196% from the lowest wage to the highest wage, up from an effective span of 103% in the earlier agreement. The highest wage in the wage table in the new agreement was 74% higher than the highest wage in the earlier agreement.

The contract contains the following chapters:

Introduction, validity period.

1. Wages.
2. Working hours.
3. Lunch and coffee breaks, cafeterias.

4. Vacation time and payments while on vacation.
5. Travel and lodging while working, moving.
6. Working conditions and safety issues.
7. Insurance.
8. Tools and protective clothing.
9. Rules for replacing a superior.
10. Continuing education.
11. Standing committee of collective bargaining parties.
12. The wage receipt and union dues.
13. Validity of agreement.

The annex to the contract includes various additions to the agreement, including an agreement on working hours in accordance with EU directives. Other examples include an agreement on payments for employees doing marine field research.

2.9.2. The Union of University Teachers (FH)

The Union of University Teachers also belongs to the Association of Academics (BHM). The automatic wage increases in the last contract before 1997, effective from August 1995 to December 1996, were at least 26.5% (Collective Bargaining Agreement between the Minister of Finance and the Union of University Teachers, 1995). In the later contract, which was valid from May 1997 to October 2000, the automatic wage increases were 11% (Collective Bargaining Agreement between the Minister of Finance and the Union of University Teachers, 1997). The effective span from the lowest to the highest wage in the earlier contract was 109%, whereas it was 205% in the later contract. The highest wage in the wage table in the new contract was 85% higher than the highest wage in the older contract.

The contract contains the following chapters:

Introduction, validity period.

1. Wages.
2. Working hours.
3. Lunch and coffee breaks, cafeterias.
4. Vacation time and payments while on vacation.
5. Travel and lodging while working, moving.
6. Working conditions and safety issues.
7. Insurance.
8. Tools and protective clothing.
9. Rules for replacing a superior.
10. Education.
11. Standing committee of collective bargaining parties and institutional agreements.
12. Union members' rights in case of illness or accidents.
13. Parental leave.
14. Family and support fund.
15. Additional payments to pension funds.
16. The wage receipt and union dues.
17. Premise of the agreement and validity period.

The annex to the contract includes an agreement on how to move from the old wage system to the new wage system. Also included is an agreement on working hours in accordance with the EU directive.

2.9.3. SFR–Union of Public Servants

SFR is a member union of the Federation of State and Municipal Employees (BSRB). It is the largest of the public-sector unions and is represented in the sample by over 4,000 individuals. Although a single union with a single contract, SFR consists of three separate groups: unskilled employees in the health sector, technical staff, and clerical staff. Thus, in the data set the union is treated as three separate unions.

In the agreement that was valid from April 1995 to December 1996, the minimum automatic wage increase was 24% but could go up to 29% (Collective Bargaining Agreement between the Minister of Finance and SFR–Union of Public Servants, 1995). In the contract that was valid from April 1997 to October 2000, these automatic wage increases were reduced to 11% (Collective Bargaining Agreement between the Minister of Finance and SFR–Union of Public Servants, 1997). The span from the lowest to the highest wage in both contracts was similar, or 170%. The highest wage in the wage table in the new contract was 40% higher than the highest wage in the older contract.

The contract contains the following chapters:

Introduction, validity period.

1. Wages.
2. Working hours.
3. Lunch and coffee breaks, cafeterias.
4. Vacation time and payments while on vacation.
5. Travel and lodging while working.
6. Working conditions and safety issues.
7. Insurance.

8. Tools and protective clothing.
9. Rules for replacing a superior.
10. Continuing education.
11. Standing committee of collective bargaining parties.
12. The wage receipt and union dues.
13. The role of the union.
14. The premise of the agreement.

The annex includes an agreement on working hours in accordance with EU directives. Because it is such a large union, SFR encompasses a wide variety of employees. Therefore, the annex also includes various agreements for different groups, such as ballet dancers, theater staff other than actors and actresses, prison guards, and people engaged in field marine research, among others.

2.9.4. The Policemen's Union

The Policemen's Union also belongs to the Federation of State and Municipal Employees (BSRB). This union did not change its contract in the same way as most other unions in this period. In the contract that was valid from October 1995 to December 1996, the wage increase in the wage table due to seniority or age was at least 33% (Collective Bargaining Agreement between the Minister of Finance and the Policemen's Union, 1995). The total span of the wage table, that is, the span from the lowest wage to the highest wage, was 140%.

In the agreement that was valid from August 1997 to October 2000, automatic increases were reduced to 28% maximum (Collective Bargaining Agreement between the Minister of Finance and the Policemen's Union, 1997). The span from the lowest

to the highest wage in the wage table was 130%. The highest wage in the new wage table was 20% higher than the highest wage in the old wage table.

In the policemen's contract there is no provision regarding general wage increases, which are an important factor in the other contracts. This does not mean there are no general wage increases during the term of the contract. To compensate for the fact that policemen do not have the right to strike, the contract includes a specific clause that ensures that they receive an increase in the base wage equal to the average increase in the base wage obtained by other central government workers. Every May and November policemen's base wages are adjusted according to this measure. This rule also applies to the Icelandic Customs Officers' Union.

The contract contains the following chapters:

Introduction, validity period.

1. Wages.
2. Working hours.
3. Lunch and coffee breaks, cafeterias.
4. Vacation time and payments while on vacation.
5. Travel and lodging while working.
6. Working conditions and safety issues.
7. Insurance.
8. Tools and protective clothing.
9. Rules for replacing a superior.
10. Continuing education.
11. Standing committee of collective bargaining parties.
12. The wage receipt and union dues.

13. Telephone costs.
14. Validity of the agreement and resignation clause.

The annex includes the agreement on working hours in accordance with EU directives, an agreement on how the biannual increase in the base wage should be measured, and an agreement regarding weapons used by policemen, among other topics.

2.9.5. The Association of Teachers in Upper Secondary Schools (KI)

Secondary school teachers used to belong to two separate unions, one that operated within the Association of Academics (BHM) and another that operated outside the main federations as KI. However, the two unions planned to merge and thus their contracts were identical during the period in question, although they operated within different federations. In the contract prior to 1997, the automatic wage increases amounted to 23%, while the span from the lowest to the highest effective wage in the wage table was 109% (Collective Bargaining Agreement between the Minister of Finance and the Association of Teachers in Upper Secondary Schools, 1995).

The unions negotiated a common contract again in 1997 but did not enter the new wage system. The two unions merged in 2000, and the resulting union operates as a part of KI, the Teachers' Union. In early 2001, following a long strike, the teachers signed a contract adopting the new wage system. The automatic increases in the new contract amount to 16% (Collective Bargaining Agreement between the Minister of Finance and the Association of Teachers in Upper Secondary Schools, 2001).

The contract contains the following chapters:

Introduction, validity period.

1. Wages.

2. Working hours (unlike other contracts, the teachers' contracts stipulate in detail how working hours are determined).
3. Lunch and coffee breaks, cafeterias.
4. Vacation time and payments while on vacation.
5. Travel and lodging while working.
6. Working conditions and safety issues.
7. Insurance.
8. Tools and protective clothing.
9. Rules for replacing a superior.
10. Continuing education.
11. Standing committee of collective bargaining parties.
12. Union members' rights in case of illness or accidents.
13. Parental leave.
14. Family and support fund.
15. Additional payments to pension funds.
16. The wage receipt and union dues.
17. Premise of the agreement and validity period.

The annexes to the agreement include a more detailed discussion of items in the contract as well as various items that the parties to the agreement have agreed to discuss during the term of the contract.

3. The economic situation

Before analyzing the wage data in the sample, I will briefly discuss economic development in Iceland from 1994–2004. Table 2.5 shows the economic conditions in terms of economic growth, unemployment, and inflation.

Table 2.5. Economic conditions.

Percentage change from previous year, except unemployment.

	Economic growth %	Unemployment rate %	Inflation rate %
1994	3.6	4.8	1.5
1995	0.1	5.0	1.7
1996	4.8	4.4	2.3
1997	4.9	3.9	1.8
1998	6.3	2.8	1.7
1999	4.1	1.9	3.4
2000	4.3	1.3	5.0
2001	3.9	1.4	6.7
2002	0.1	2.5	4.8
2003	2.4	3.4	2.1
2004	7.7	3.1	3.2
Average 1994-1997	3.3	4.5	1.8
Average 2001-2004	3.5	2.6	4.2

Source: Statistics Iceland

Economic growth was on average quite similar during the periods 1994–1997 and 2001–2004, the two periods used in this study. During the period 1994–1997, average growth was 3.3% per year, while during the period 2001–2004 it was 3.5% per year. Furthermore, the economic cycle in terms of growth is similar in the two periods. The output gap, however, is narrower in the second period than in the first. This is evident when one looks at the unemployment rate, which averaged 4.5% during the period 1994–1997, compared with 2.6% during the period 2001–2004. As would be expected, inflationary pressures were more pronounced during the second period (4.2%) than during the first (1.8%).

There is no significant change in the central government from 1994 to 2004. A coalition government of the same two parties was in power from 1995 to 2007. One of

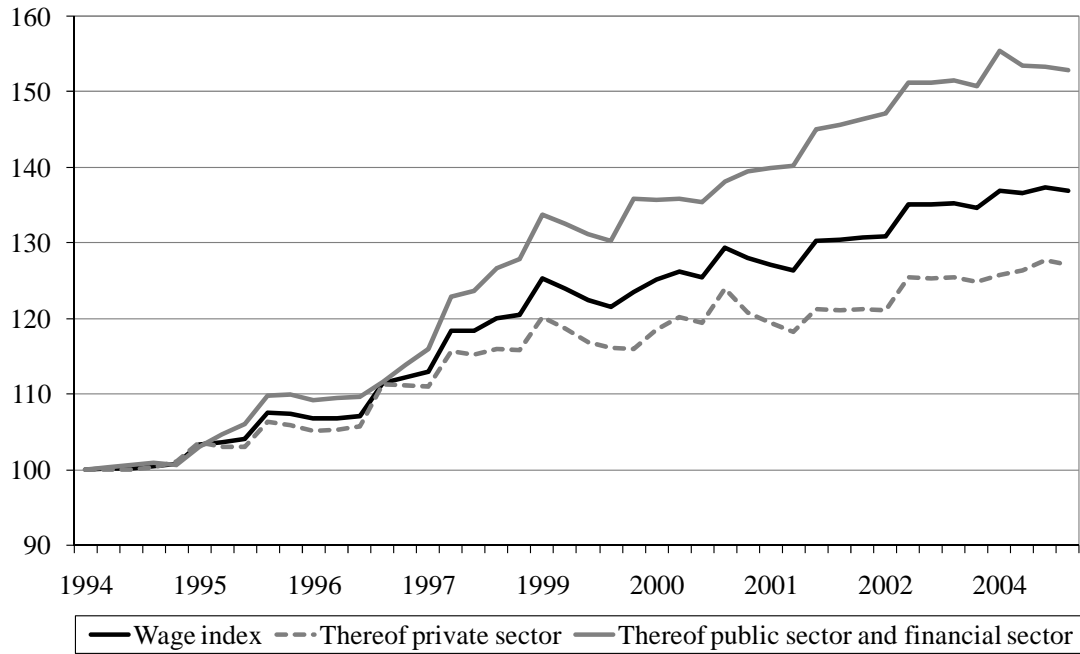
the coalition parties was also in government from 1991 to 1995. Thus, fiscal policy did not change significantly during the period in question. However, monetary policy changed as the Central Bank adopted an inflation target in 2001, replacing a fixed exchange rate regime.

3.1. Wage development in the public sector compared with the private sector

From 1994 to 2004, real wages according to the official wage index rose by 37%, or by 3.2% per year on average. There is a significant difference between wage development in the private sector, on the one hand, and wage development in the public and financial sectors, on the other. Real wages rose by 27% in the private sector from 1994 to 2004, or by 2.4% per year on average, while wages in the public sector and financial sector rose by 53% in real terms, which averages 4.3% per year. This development can be seen in Figure 2.2.

Looking at the two time periods that are the basis for this study, 1994–1997 and 2001–2004, we find a significant difference in wage development between them. According to the official wage index, real wage increases were slightly greater in the public and financial sectors than in the private sector from 1994 to 1997, as shown in Figure 2.3. While real wages in general rose by 13% from the first quarter of 1994 to the fourth quarter of 1997, real wages in the public and financial sectors rose by 16% as wages in the private sector grew by 11%.

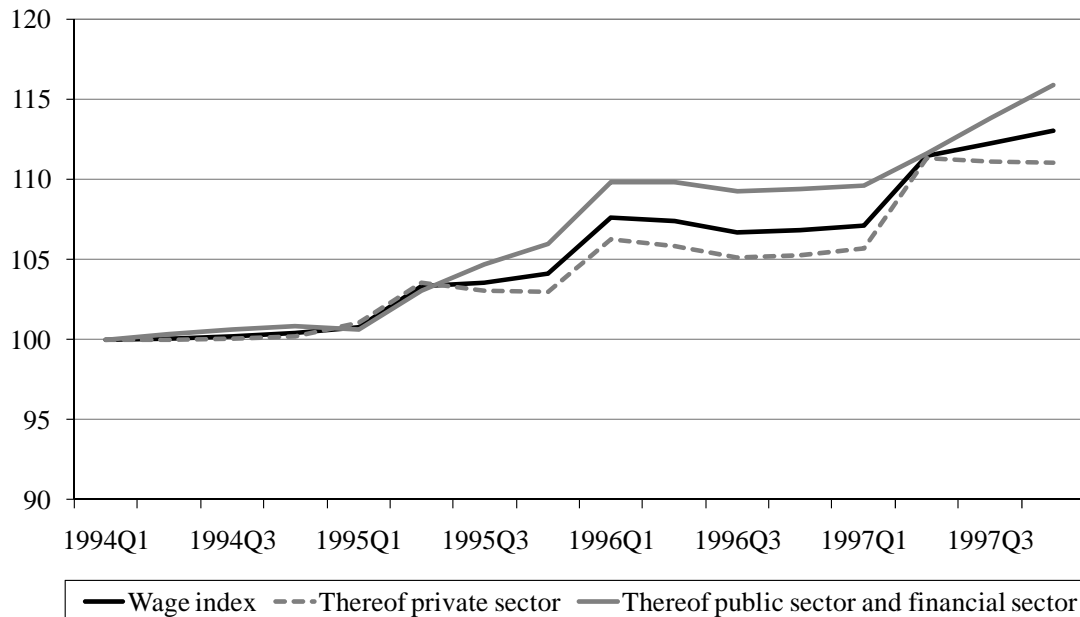
The difference is much greater when looking at the period from 2001 to 2004, as shown in Figure 2.4. From the first quarter of 2001 to the fourth quarter of 2004, real wages in general rose by 6%. Real wages in the public and financial sectors increased by 11%, while real wages in the private sector grew by 2.5%.



Source: Statistics Iceland

Figure 2.2. The wage index, 1994–2004.

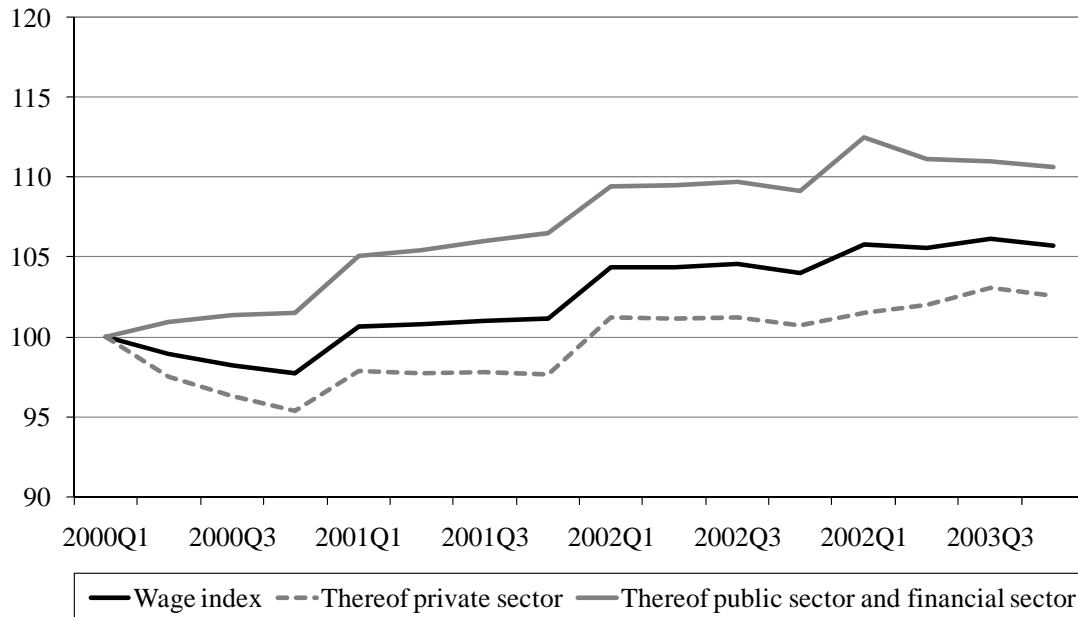
Quarterly figures adjusted for inflation, index 1994 = 100.



Source: Statistics Iceland

Figure 2.3. Wage development from 1994 to 1997.

Quarterly figures adjusted for inflation. Index first quarter 1994 = 100.



Source: Statistics Iceland

Figure 2.4. Wage development from 2001 to 2004.

Quarterly figures adjusted for inflation. Index first quarter 2001 = 100.

4. The data set

The data were supplied by the Ministry of Finance in Iceland. The data set consists of information on all wages paid by the central government to members of the public-sector unions.

The data used in this study are wages paid in October of each of the years 1994 to 1997 and again in October of 2001 to 2004 for the unions in the three public-sector federations and the public-sector unions outside the federations. The years 1994 through 1997 are the 4 years leading up to the changes made to the collective bargaining agreements, and the period 2001–2004 represents a 4-year period after the changes were implemented for those unions that adopted the new scheme in the negotiating round of 1997–1998. The month of October is chosen because there are no

public holidays in Iceland in October and because it is not affected by summer holidays or by end-of-year or beginning-of-year events.

Two groups of public-sector employees are excluded from the data set. A small number of central government employees belong to private-sector unions. Most of these employees are involved in maintenance and custodial work, and their contracts did not undergo any changes; therefore, they are not included in the data set. In addition, a small number of employees, largely those who hold posts with the central government, are outside the public-sector unions. Their wages are determined by the State Salaries Commission and therefore are not included in the data set.

To ensure that the data set consists of individuals whose main source of employment is with the central government, only those with base wages are included. This excludes individuals working mainly in the private sector while serving on a government committee or giving occasional lectures at a state university. Furthermore, the data set was limited to those individuals whose share of base wages was between 0.2 and 1.2.

The wage measures used are total earnings and the base wage. Total earnings are the sum of all payments to the individual for the month in question, the base wage, and all other types of wages, including overtime payments. The base wage is the wage paid for a normal working day, that is, wages paid for daytime work without any extra payments, presented as a share of full-time work. To reduce the effect of different working hours in comparing the base wage across individuals, the base wage for individuals working part-time is adjusted to reflect full-time work. On the other hand, there is no reliable measure of the amount of work behind total earnings. All wage

figures are presented using the 2004 price level; thus, any wage changes shown reflect real wage changes.

4.1. Changes in the data during the period

During the period of the study, several government entities were made into corporations owned by the government, while others were privatized. The post and telecommunications service was split into two corporations, and the telecommunications part was privatized. Thus, the Postmen's Union and the Telecommunication Workers' Union were dropped from the sample. Similarly, a few architects had previously worked for the government. Their services were outsourced during the research period; thus, their union is dropped from the sample.

Two unions, the Firemen's Union and the Association of Teachers in Primary and Lower Secondary Schools, were dropped from the sample because their services moved from the central to local governments during the period. The primary school system had previously fallen under the central government's jurisdiction, but in 1996 the responsibility moved to the local governments.

Thus 5,500 individuals are dropped from the sample for each of the years 1994 and 1995, as Table 2.6 shows. Two thousand individuals are dropped for 1996.

During the period of study, some unions merged or moved between federations. One teachers' union moved from BHM to KI. The two unions of employees working for state radio and TV, respectively, merged. The union of midwives and the union of social educators moved from BSRB to BHM. A few of the smaller unions in BSRB joined forces and made a joint contract and thus are taken as one union in this study.

When comparing federations in this chapter the figures are corrected for movements between federations to ensure their comparability.

Table 2.6. Observations dropped from the data set.

	1994	1995	1996	1997
<u>Due to privatization:</u>				
Postmen's union	829	825	822	0
Telecommunication workers' union	984	994	1,000	0
Architects' union	17	19	16	11
<u>Operation moved from central to local government:</u>				
Firemen's union	16	17	21	22
Primary school teachers' unions	3,312	3,426	37	2
Other employees due to primary school	311	292	112	6
Total	5,469	5,573	2,008	41
	2001	2002	2003	2004
<u>Due to privatization:</u>				
Postmen's union	0	0	0	0
Telecommunication workers' union	0	0	0	0
Architects' union	0	0	0	0
<u>Operation moved from central to local government:</u>				
Firemen's union	4	4	0	0
Primary school teachers' unions	0	0	0	0
Other employees due to primary school	0	0	0	0
Total	4	4	0	0

4.2. Description of the data set

The number of individuals in the sample each year ranges from 11,100 to 14,300, as shown in Table 2.7. The age of individuals ranges from 16 to 74. Over 86% of all central government workers work in or close to the capital area.

Table 2.7. Description of the data set.

Numbers.

	1994	1995	1996	1997
Observations	11,239	11,372	11,506	11,405
Individuals	11,125	11,229	11,351	11,220
Men	4,965	5,004	4,986	4,730
Women	6,274	6,368	6,520	6,675
	2001	2002	2003	2004
Observations	13,572	13,925	14,367	14,550
Individuals	13,331	13,670	14,107	14,273
Men	5,260	5,309	5,381	5,477
Women	8,312	8,616	8,986	9,073

The number of public-sector unions in the data set is 64 at the beginning of the period, whereas because of mergers the number of unions in the sample decreased to 59 at the end of the period. Union size varies greatly: from almost 4,000 members in the largest unions being paid by the central government to 1 member in a single union. Of the 59 unions in 2004, 7 had 10 or fewer members being paid by the central government. Over 70% of the employees, however, belonged to one of the 10 largest unions.

Table 2.8 shows that from 1994 to 1997, the average age of employees in the sample is 44.0 years. The women are slightly younger than the men, having an average age of 43.3 years compared with 44.8 years for men. Women make up over half of the sample, or 56.8%.

Table 2.8. Descriptive statistics by federation, 1994–1997.

	1994	1995	1996	1997	Average
<u>Total:</u>					
Observations	11,239	11,372	11,506	11,405	11,381
Average age	43.7	44.0	44.2	44.0	44.0
Avg. age women	42.9	43.4	43.5	43.5	43.3
Avg. age men	44.7	44.9	45.0	44.7	44.8
Women, %	55.8	56.0	56.7	58.5	56.8
Men, %	44.2	44.0	43.3	41.5	43.2
<u>BHM (Association of Academics):</u>					
Individuals	3,270	3,341	3,469	3,553	3,408
Average age	41.7	42.0	42.3	41.7	41.9
Women, %	60.9	60.6	61.0	66.4	62.2
Men, %	39.1	39.4	39.0	33.6	37.8
<u>BSRB (Federation of State and Municipal Employees):</u>					
Individuals	5,584	5,562	5,570	5,451	5,542
Average age	45.0	45.2	45.2	45.1	45.1
Women, %	61.9	62.6	62.9	62.4	62.4
Men, %	38.1	37.4	37.1	37.6	37.6
<u>KI (Teachers' Association of Iceland):</u>					
Individuals	1,306	1,337	1,295	1,358	1,324
Average age	44.5	44.8	45.2	45.8	45.1
Women, %	44.5	45.7	47.2	47.0	46.1
Men, %	55.5	54.3	52.8	53.0	53.9
<u>Unions outside federations:</u>					
Individuals	1,079	1,132	1,172	1,043	1,107
Average age	42.7	43.5	43.4	43.7	43.3
Women, %	22.6	22.1	24.7	26.7	24.0
Men, %	77.4	77.9	75.3	73.3	76.0

Table 2.9. Descriptive statistics by federation, 2001–2004.

	2001	2002	2003	2004	Average
<u>Total:</u>					
Individuals	13,331	13,670	14,107	14,273	13,845
Average age	44.4	44.6	44.8	45.0	44.7
Avg. age women	43.8	44.0	44.2	44.6	44.2
Avg. age men	45.4	45.6	45.6	45.6	45.6
Women, %	62.4	63.0	63.7	63.6	63.2
Men, %	37.6	37.0	36.3	36.4	36.8
<u>BHM (Association of Academics):</u>					
Individuals	4,669	4,802	5,058	5,143	4,918
Average age	42.9	43.1	43.5	43.9	43.4
Women, %	69.1	69.7	70.1	69.9	69.7
Men, %	30.9	30.3	29.9	30.1	30.3
<u>BSRB (Federation of State and Municipal Employees):</u>					
Individuals	6,313	6,456	6,601	6,620	6,498
Average age	44.9	45.1	45.1	45.2	45.1
Women, %	64.7	65.7	66.4	65.5	65.6
Men, %	35.3	34.3	33.6	34.5	34.4
<u>KI (Teachers' Association of Iceland):</u>					
Individuals	1,323	1,352	1,332	1,408	1,354
Average age	47.1	47.3	47.5	47.5	47.4
Women, %	48.7	48.4	49.8	52.0	49.7
Men, %	51.3	51.6	50.2	48.0	50.3
<u>Unions outside federations:</u>					
Individuals	1,267	1,315	1,376	1,379	1,334
Average age	45.0	45.1	45.0	45.3	45.1
Women, %	27.9	26.8	28.9	29.9	28.4
Men, %	72.1	71.6	71.1	70.1	71.2

The largest federation of unions is BSRB (Federation of State and Municipal Employees), representing 49% of all employees; BHM (the Association of Academics) is the second-largest federation of unions, representing 30% of the

employees in the sample. KI (the Icelandic Teachers' Union) is the smallest federation, representing 12% of employees. The members of BSRB and KI are the oldest, at an average age of 45 years. The share of men and women in the two largest federations is similar: around 60% women and 40% men. The gender division is more even in KI, at 45% women and 55% men.

In the second research period, 2001–2004, the average age is slightly higher than in the first period, or 44.7 years compared with 44.0 years in 1994–1997, as shown in Table 2.9. The share of women in the sample has risen from 56.8% to 63.2% in the second period.

BSRB is still the largest federation, although its share has fallen slightly, from 49% to 47%. BHM has gained share from 30% to 35%. KI's share has fallen from 12% to 10%. The share of women is growing in BHM and BSRB, as the share of women in BHM is up to 70% and 65% in BSRB. The gender division in KI is, on the other hand, equal.

4.3. Data set for alternative workers

The model used in chapter 3 requires information on the alternative wage or the outside wage, meaning the wage the public-sector employee would be likely to receive if he or she were working in the private sector. In order to estimate the alternative wage in the private sector from 1994 to 1997, I used data from Statistics Iceland. The data collection method in the two periods is not the same. The data for 1994–1997 are quarterly data based on those companies willing to submit data, whereas the data for 2001–2004 are monthly data based on a survey of employers with 10 or more employees.

The data used for 2001–2004 are from October of each year. The data for 1994–1997 are fourth-quarter data. Furthermore, the data collection according to this system was abandoned in the middle of 1997, and no data are available for the second half. Thus, the data for 1997 are second-quarter data calculated to fourth-quarter equivalents using the wage index (a 2.56% increase). The data for 1994–1997 accurately reflect the wages of a general office worker, but the data set contains only a handful of employees with a tertiary degree. Thus, a correction had to be made to the data for 1994–1997 to account for this.

A markup in wages due to university education was estimated for the period 2001–2004. Information on university education is not included in the data set, but from job type it is possible to deduct which individuals have a university education and which do not. The estimates of approximately 0.398 log points for total earnings and 0.426 log points for the base wage in the second period were used to reflect university-educated employees in the first period. This method assumes that the markup remained constant between the two periods. To test this assumption, the university markup was estimated using wage surveys taken among engineers each year during both periods. This estimate yielded a similar markup in both periods, thus supporting the use of the method discussed above.

5. Wage development in the public sector

5.1. Contractual wage increases

Table 2.10 shows the increase in contractual wages according to the public-sector wage agreements along with the increase in the CPI from October to October each year, giving the real wage change. The increase in contractual wages refers to the general wage increase in the collective bargaining agreement every employee receives.

During the period 1994–1997 the increase in contractual wages was 4.3% in real terms, or 1.4% per year on average, whereas during the period 2001–2004 the total increase was 0.2% in real terms. From 1997 to 2001, the increase amounted to 0.6% in real terms.

Table 2.10. Contractual changes in base wages.

	Increase in contractual wages	CPI increase October-October	Real change in contractual wages
1994	No increase	1.7%	-1.6%
1995	3% or 2,700 kr.	2.4%	0.6%
1996	3% or 2,700 kr.	2.1%	0.9%
1997	4.7%	1.9%	2.7%
1998	4% + 1.5%	0.9%	4.6%
1999	3.5%	5.3%	-1.7%
2000	3%	4.2%	-1.2%
2001	6.9%	8.0%	-1.0%
2002	3%	2.9%	0.1%
2003	3%	2.2%	0.8%
2004	3%	3.7%	-0.7%

5.2. Changes in total earnings

The data set shows that the wage level in real terms rises far beyond the increase in contractual wages between the two periods. Total earnings increase by 41% from the average level in 1994–1997 to the average level in 2001–2004, adjusted for inflation, as Table 2.11 shows. In comparison, the real change in contractual wages during the same period is 3.6%. The earnings of teachers and those outside the federations have risen most, or by 50–52% in real terms. The earnings of the largest federations, BHM and BSRB, have risen less, or by 39% and 34%, respectively.

Table 2.11. Development of total earnings by federation.
Total earnings per month in Icelandic kronur, fixed 2004 prices.

	BHM	BSRB	KI	Other	Total
<u>Earnings:</u>					
1994	194,079	146,741	193,292	275,751	178,309
1995	202,681	155,142	216,911	294,758	190,268
1996	206,364	160,770	224,511	300,060	195,749
1997	210,403	170,935	247,366	335,784	207,407
Average	203,567	158,324	220,754	300,859	192,995
2001	275,146	205,531	325,883	421,994	261,419
2002	282,106	212,370	329,271	465,898	271,710
2003	288,009	216,548	336,741	469,063	277,034
2004	288,301	216,110	329,452	466,484	276,325
Average	283,592	212,722	330,328	456,443	271,781
<u>Change:</u>					
94-97	8.4	16.5	28.0	21.8	16.3
01-04	4.8	5.1	1.1	10.5	5.7
Average	39.3	34.4	49.6	51.7	40.8

Of the three federations, the average earnings in BHM and KI are similar in 1994 and higher than the average level in BSRB. The members of BHM and most members of KI have a tertiary education, while only a few of the members of BSRB have more than a secondary education. Thus, a difference in the average level of earnings between these federations is not surprising. By 2004 the average earnings in KI exceeded the average earnings in BHM. BSRB, on the other hand, lags further behind the other federations at the end of the period than in the beginning. These estimates of the average level of earnings do not take into account a possible change in the composition of each group, including changes in seniority.

Table 2.12. Development of total earnings by gender and by federation.

Total earnings per month in Icelandic kronur, fixed 2004 prices.

	Earnings		Change
	1994-1997	2001-2004	
<u>Men:</u>			
BHM	243,718	325,078	33.4
BSRB	215,686	289,315	34.1
KI	252,639	367,818	45.6
Other	321,804	487,517	51.5
Total	246,506	344,391	39.7
<u>Women:</u>			
BHM	179,261	265,559	48.1
BSRB	123,831	172,528	39.3
KI	183,462	292,461	59.4
Other	234,431	379,545	61.9
Total	152,225	227,312	49.3
<u>Women's earnings as percentage of men's:</u>			
BHM	73.6	81.7	8.1
BSRB	57.4	59.6	2.2
KI	72.6	79.5	6.9
Other	72.8	77.9	5.0
Total	61.8	66.0	4.3

Looking at total earnings by gender we see that women's total earnings have increased more than men's, or by 49.3% in real terms, compared with men's 39.7% increase, as seen in Table 2.12. Thus, women's total earnings as a share of men's earnings have increased. The ratio increased from 61.8% to 66% for the whole sample. The largest change is within BHM, where the share rose from 73.6% to 81.7%, or by 8.1 percentage points. BHM also had the highest initial share. BSRB, however, had the lowest share initially, as women's total earnings amounted to 57.4% of men's total

earnings. BSRB also showed the least change, as the share went up by 2.2 percentage points to 59.6%.

5.3. Changes in base wages

The premise of the contracts was to increase the share of base wages of total earnings. When looking at base wages adjusted to reflect daytime wages for full-time work, we can see a greater increase in the wage level than when looking at the level of total earnings. As Table 2.13 shows, the base wage rose by 58.4% on average from 1994–1997 to 2001–2004 in real terms, compared to 40.8% for total earnings. The base wages of employees outside the federations rose the most, or by 75.8%. The base wages of KI members rose by 66.5%, while the base wages of BHM members rose by 60.1%, and the base wages of BSRB members rose by 45.6%.

Looking only at base wages, we see that men's wages have risen more than women's wages, or by 63.3% compared with 57.0%, as seen in Table 2.14. Thus, women's base wages as a share of men's wages have fallen from 86.2% to 82.9%, or by 3.3 percentage points. The share fell for BHM and BSRB, while it rose for KI and the unions outside the federations. The women's share of base wages for members of KI amounts to 97.4%; thus the gender difference in base wages is barely noticeable.

5.4. Base wages as a share of total earnings

With base wages rising more than total earnings, it follows that base wages as a share of total earnings have risen. This is reflected in Table 2.15. The share rose from 61.8% to 68.9% between the two periods in question, an increase of 7 percentage points. BHM, which initially had the largest share, shows the largest increase, or 9.1

percentage points. BSRB and the unions outside the federations, however, show the smallest change, or 5.4 percentage points.

Table 2.13. Development of base wages by federation.

Wages for daytime work, full-time equivalent, per month in Icelandic kronur, fixed 2004 prices.

	BHM	BSRB	KI	Other	Total
<u>Wages:</u>					
1994	141,950	104,560	129,309	168,506	124,454
1995	146,185	111,120	138,344	174,734	130,955
1996	150,384	113,901	143,339	181,532	135,249
1997	153,797	119,821	154,035	209,460	142,677
Average	148,221	112,306	141,361	183,579	133,372
2001	226,797	155,348	231,085	295,809	200,423
2002	235,213	163,856	234,085	321,137	210,135
2003	241,799	167,131	238,356	335,017	216,101
2004	244,409	167,367	237,694	336,421	217,427
Average	237,313	163,516	235,341	322,652	211,199
<u>Change:</u>					
94-97	8.3	14.6	19.1	24.3	14.6
01-04	7.8	7.7	2.9	13.7	8.5
Average	60.1	45.6	66.5	75.8	58.4

Table 2.16 shows the change in base wages as a share of total earnings by gender. Initially the share of base wages of total earnings is lower among men than among women, or 56.1% compared with 68.9% for men. This suggests that men receive more “extra” payments, that is, payments other than base wages, and/or work more overtime. Women’s share rose by 4.4 percentage points to 73.3% between the two periods, while men’s share rose by 7.9 percentage points, thus slightly reducing the gap between men and women. The largest change is among men in BHM, where base wages as a share of total earnings rose by 13.1%.

Table 2.14. Development of base wages by gender and by federation.

Wages for daytime work, full-time equivalent, per month in Icelandic kronur, fixed 2004 prices.

	Wages		Change
	1994-1997	2001-2004	
<u>Men:</u>			
BHM	155,151	257,061	65.7
BSRB	120,388	179,438	49.1
KI	143,629	238,456	66.0
Other	189,787	335,669	76.9
Total	144,701	236,238	63.3
<u>Women:</u>			
BHM	144,026	228,730	58.8
BSRB	107,446	155,160	44.4
KI	138,708	232,195	67.4
Other	163,893	290,439	77.2
Total	124,740	195,864	57.0
<u>Women's wages as percentage of men's:</u>			
BHM	92.8	89.0	-3.9
BSRB	89.2	86.5	-2.8
KI	96.6	97.4	0.8
Other	86.4	86.5	0.2
Total	86.2	82.9	-3.3

Base wages as a share of total earnings is similar between men and women in BHM, with the men's share at 74.6% compared with 73% for women. In all other federations the share is higher for women than for men. For BSRB the men's share is 59.5%, while the women's share is 75.3%, suggesting a sizeable difference between the compositions of men's and women's wages.

Table 2.15. Base wages as a share of total earnings by federation.
Wages for daytime work as a share of total earnings.

	BHM	BSRB	KI	Other	Total
<u>Share:</u>					
1994	65.1	63.1	62.3	56.4	62.7
1995	64.1	63.0	60.0	54.8	61.7
1996	64.8	62.3	59.7	56.0	61.8
1997	63.9	61.6	58.2	57.7	61.3
Average	64.5	62.5	59.9	56.4	61.8
2001	72.5	67.1	66.9	62.7	68.4
2002	73.4	68.2	66.8	60.2	68.6
2003	73.8	68.0	66.9	61.7	68.9
2004	74.2	68.3	66.9	62.8	69.4
Average	73.5	67.9	66.9	61.8	68.9
<u>Change:</u>					
94-97	-1.3	-1.4	-4.1	1.3	-1.4
01-04	1.7	1.2	0.0	0.1	1.1
Average	9.1	5.4	7.0	5.4	7.0

5.5. Wage dispersion

Decentralization can be expected to bring about more wage flexibility in response to changing supply and demand and, thus, greater wage dispersion (Kahn, 1998). Hibbs and Locking (1996) found that with centralized agreements in Sweden, wage dispersion fell from 1970 into the 1980s. After 1982–1983, wage dispersion began to rise again as the centralized wage formation system started to break down.

Figure 2.5 shows the variance of $\log(\text{wages})$ for both base wages and total earnings. Consistent with the findings of Dominguez and Gutiérrez (2004) on wages in Spanish firms in industry and services, the variance of total earnings is greater than the variance of base wages. This holds for both periods. Figure 2.5 also shows the

development in the variance over the research period. The variance of total earnings remains unchanged from the period 1994–1997 to the period 2001–2004, while the variance of base wages increased from the first period to the second with the decentralization of the bargaining process and efforts to increase base wages as a share of total earnings.

Table 2.16. Base wages as a share of total earnings by gender.

Wages for daytime work as a share of total earnings.

	Share		Change
	1994-1997	2001-2004	
<u>Men:</u>			
BHM	61.5	74.6	13.1
BSRB	53.9	59.5	5.6
KI	54.9	62.2	7.3
Other	54.5	60.4	5.9
Total	56.1	64.0	7.9
<u>Women:</u>			
BHM	66.9	73.0	6.0
BSRB	71.5	75.3	3.8
KI	67.9	72.9	4.9
Other	64.5	66.3	1.8
Total	68.9	73.3	4.4

Looking at other measures of wage dispersion, we see the same pattern emerge. The wage dispersion of total earnings barely changes between the two periods. This holds for the gini coefficient, the 90/10 centile ratio, and the 90/50 and the 50/10 ratios, as shown in Table 2.17. However, the wage dispersion increases between the two periods when we look at base wages. The gini coefficient increased from 0.0133 to 0.0143, while the 90/10 centile ratio increased from 1.0435 on average in 1994–1997 to 1.0572 on average in 2001–2004. Although both ratios rise, there is a larger increase

in the 50/10 ratio than in the 90/50 ratio, suggesting that some employees at the bottom of the distribution are lagging in terms of increases in base wages.

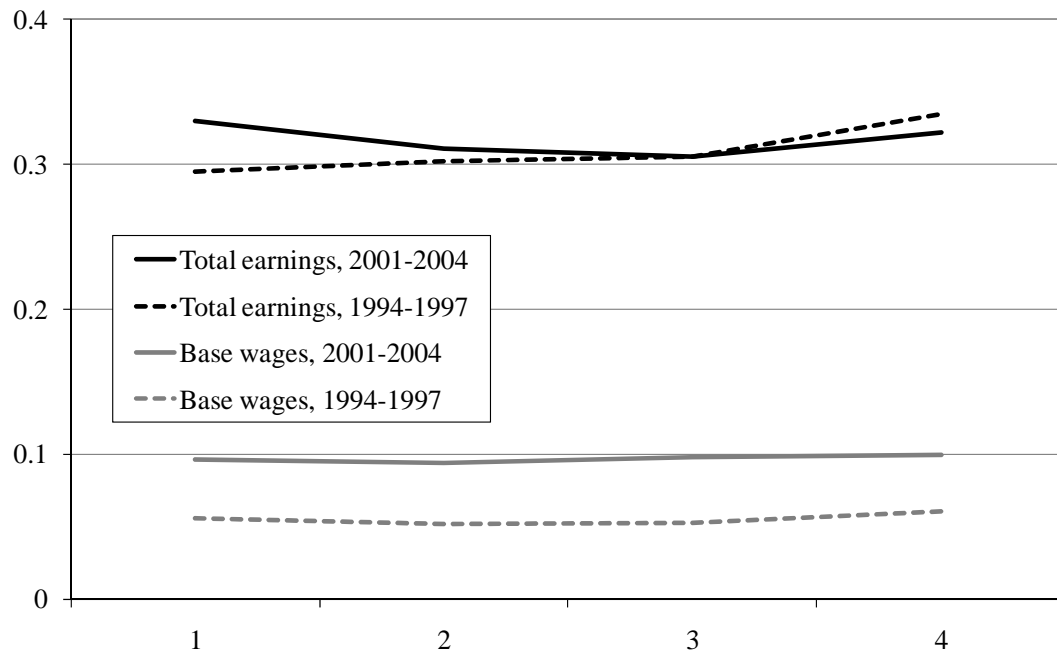


Figure 2.5. Variance in base wages and total earnings.

Variance in log(wages) each year, both periods.

The fact that the dispersion of base wages is rising while the dispersion of total earnings remains the same is further supported by looking at wage density. The density of base wages is shown in Figure 2.6, while the density of total earnings can be seen in Figure 2.7. Each line shows the average density over each research period. The wage density of base wages shows a greater change than the density for total earnings. Interestingly, the crooked shape of the density of base wages does not change between the two periods.

Table 2.17. Wage dispersion.

The gini coefficient, 90/10, 90/50, and 50/10 centiles using log(wages).

	1994	1995	1996	1997	Average
<u>Gini coefficient:</u>					
Total earnings	0.0252	0.0255	0.0256	0.0265	0.0257
Base wages	0.0113	0.0108	0.0194	0.0116	0.0133
<u>90/10</u>					
Total earnings	1.1117	1.1134	1.1158	1.1168	1.1144
Base wages	1.0448	1.0419	1.0427	1.0445	1.0435
<u>90/50</u>					
Total earnings	1.0414	1.0443	1.0448	1.0467	1.0443
Base wages	1.0200	1.0192	1.0189	1.0196	1.0195
<u>50/10</u>					
Total earnings	1.0675	1.0662	1.0680	1.0670	1.0672
Base wages	1.0243	1.0222	1.0233	1.0243	1.0236
	2001	2002	2003	2004	Average
<u>Gini coefficient:</u>					
Total earnings	0.0258	0.0249	0.0247	0.0252	0.0251
Base wages	0.0144	0.0141	0.0143	0.0145	0.0143
<u>90/10</u>					
Total earnings	1.1139	1.1068	1.1059	1.1088	1.1088
Base wages	1.0590	1.0555	1.0568	1.0576	1.0572
<u>90/50</u>					
Total earnings	1.0414	1.0405	1.0397	1.0395	1.0403
Base wages	1.0219	1.0228	1.0226	1.0226	1.0225
<u>50/10</u>					
Total earnings	1.0696	1.0637	1.0636	1.0667	1.0659
Base wages	1.0362	1.0320	1.0334	1.0342	1.0340

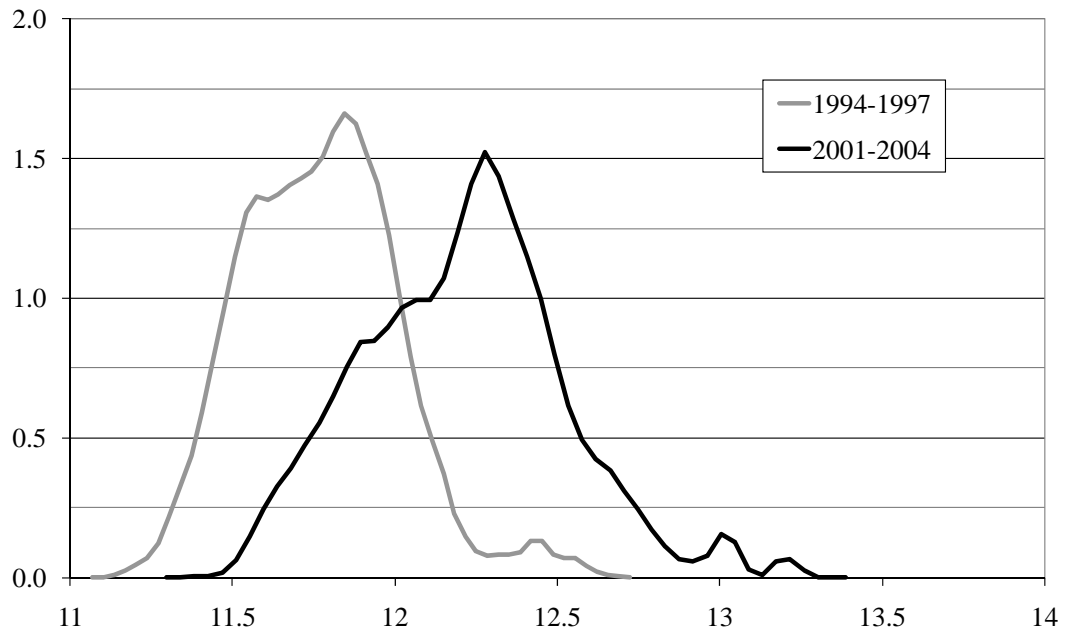


Figure 2.6. Wage density, 1994–1997 and 2001–2004.
Average base wages, full-time equivalent, log(wages), 2004 price level.

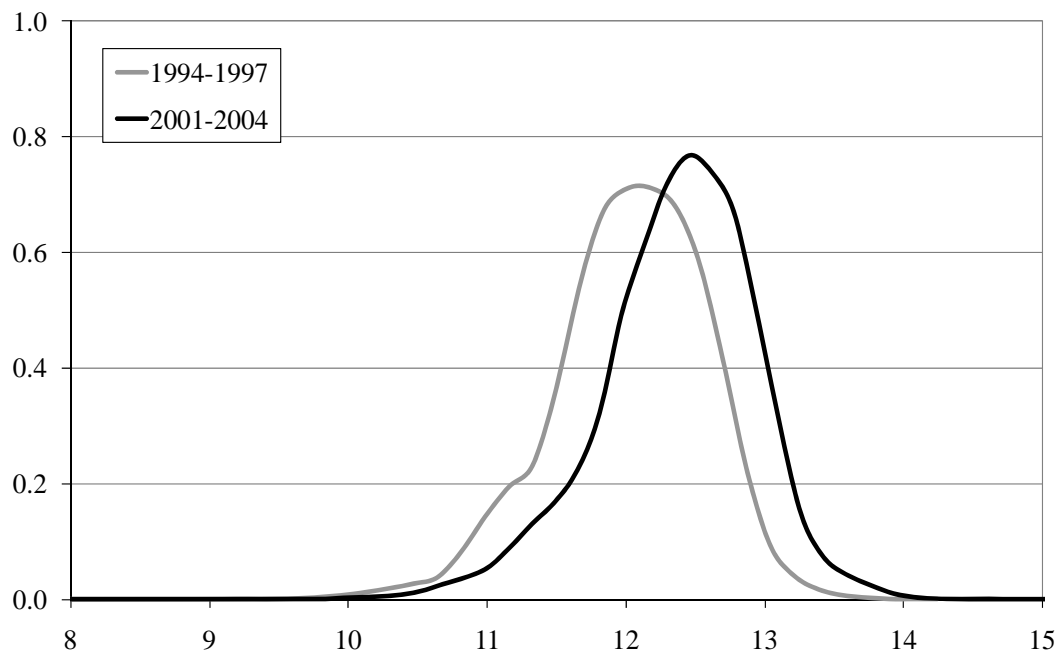


Figure 2.7. Earnings density, 1994–1997 and 2001–2004.
Average total earnings, log(earnings), 2004 price level.

5.5.1. Wage dispersion by gender

Table 2.18 shows the wage dispersion by gender. The wage dispersion of total earnings is greater among women than among men. The reverse is true, however, for base wages, where the dispersion is greater among men. From the first period to the second, the wage dispersion of total earnings increases for men, while it stays relatively constant for women, thus reducing the gender gap in the dispersion of total earnings.

Table 2.18. Wage dispersion by gender.

The gini coefficient, 90/10, 90/50, and 50/10 centiles using log(wages).

	Men		Women	
	Average 1994-1997	Average 2001-2004	Average 1994-1997	Average 2001-2004
<u>Gini coefficient:</u>				
Total earnings	0.0212	0.0219	0.0237	0.0238
Base wages	0.0119	0.0150	0.0097	0.0130
<u>90/10</u>				
Total earnings	1.0867	1.0891	1.1032	1.1034
Base wages	1.0475	1.0628	1.0392	1.0520
<u>90/50</u>				
Total earnings	1.0307	1.0317	1.0390	1.0392
Base wages	1.0184	1.0247	1.0202	1.0222
<u>50/10</u>				
Total earnings	1.0543	1.0556	1.0618	1.0618
Base wages	1.0286	1.0371	1.0185	1.0292

As one would expect, the wage density by gender shows that women's wages are generally lower than men's wages. The difference in base wages in the two periods can be seen in Figure 2.8 and Figure 2.9.

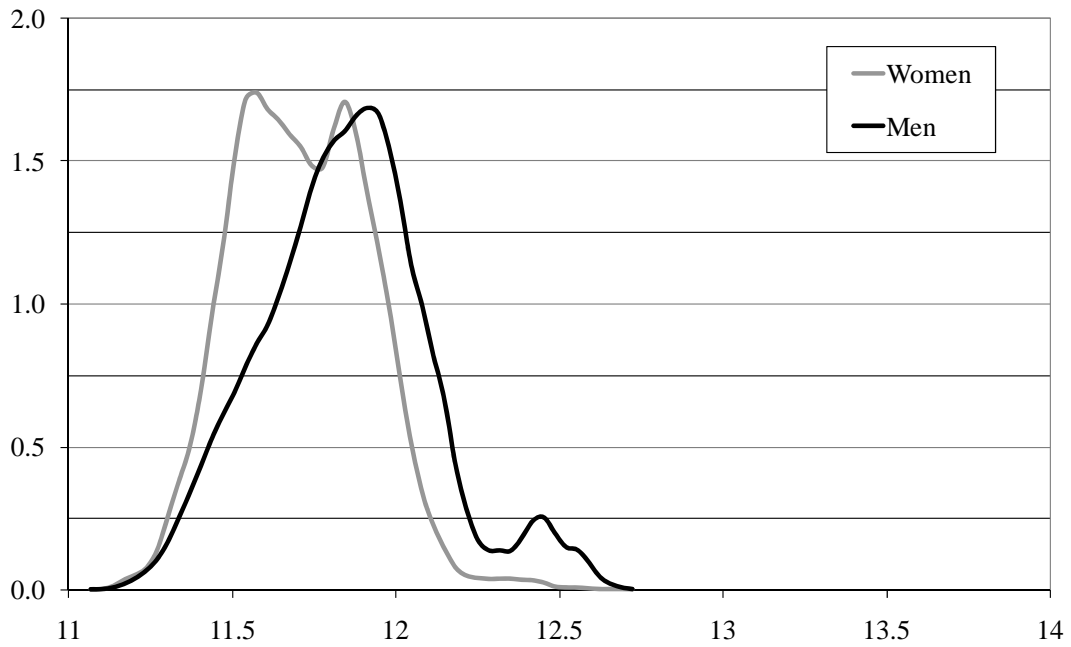


Figure 2.8. Wage density by gender, base wages, 1994–1997.
 Average base wages, full-time equivalent, log(wages), 2004 price level.

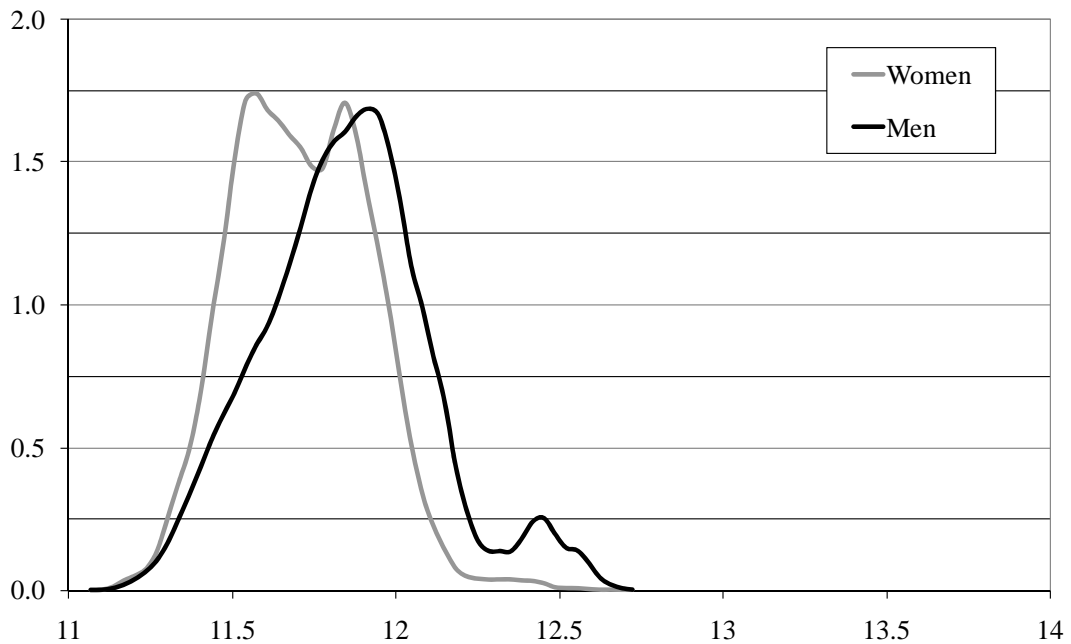


Figure 2.9. Wage density by gender, base wages, 2001–2004.
 Average base wages, full-time equivalent, log(wages), 2004 price level.

The gender difference is even greater when we look at total earnings in the two periods, as shown in Figure 2.10 and Figure 2.11, although as shown in Table 2.18, the difference narrows slightly from the first period to the second.

5.5.2. Wage dispersion by federation

Table 2.19 shows the wage dispersion by federation, averaged over each of the two periods. On the whole, the dispersion of base wages increases between the two periods, while the dispersion of total earnings remains unchanged in most cases. Still, the wage dispersion of both base wages and total earnings for KI falls between the two periods, contrary to the general result. This effect can also be seen for total earnings within BHM, although there the change is smaller. The wage dispersion of total earnings in the second period is largest in BSRB, which also is the largest federation.

The density of base wages by federation changes between the two periods, as Figure 2.12 and Figure 2.13 show. In both cases, BSRB has the lowest base wages of the three federations. During the period 1994–1997 the wage density of BHM and KI is quite similar. In the second period the wages in KI are higher than in BHM, and the dispersion is smaller when we look at base wages.

There is less difference between the densities in the two periods when we look at total earnings, as seen in Figure 2.14 and Figure 2.15. As shown in Table 2.11, BSRB has the lowest wage level, trailing BHM and KI.

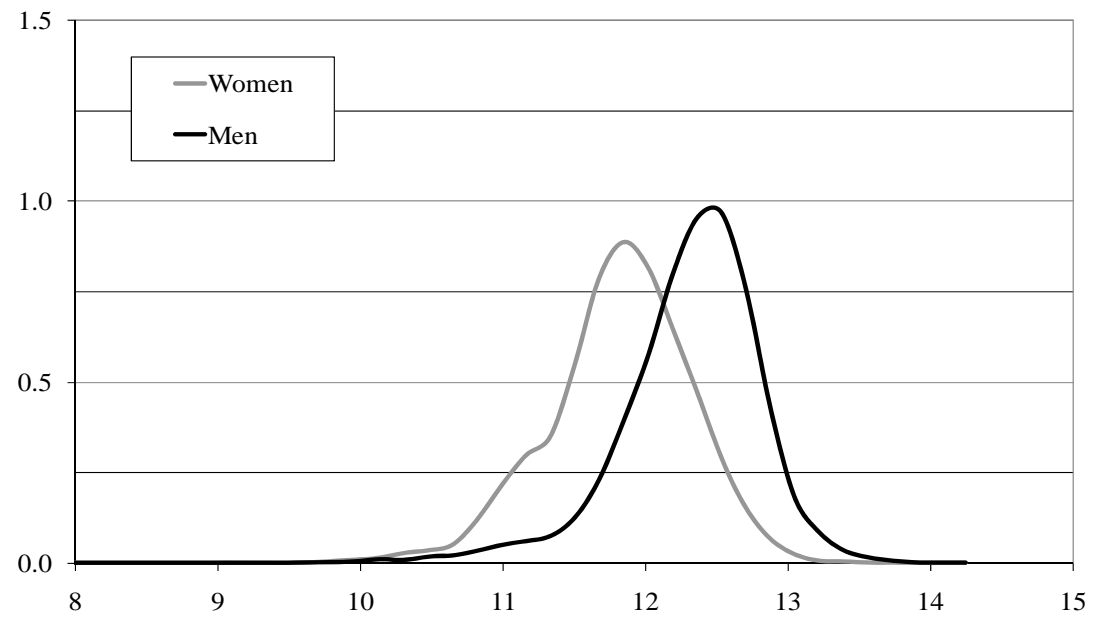


Figure 2.10. Wage density by gender, total earnings, 1994–1997.
Average total earnings, log(earnings), 2004 price level.

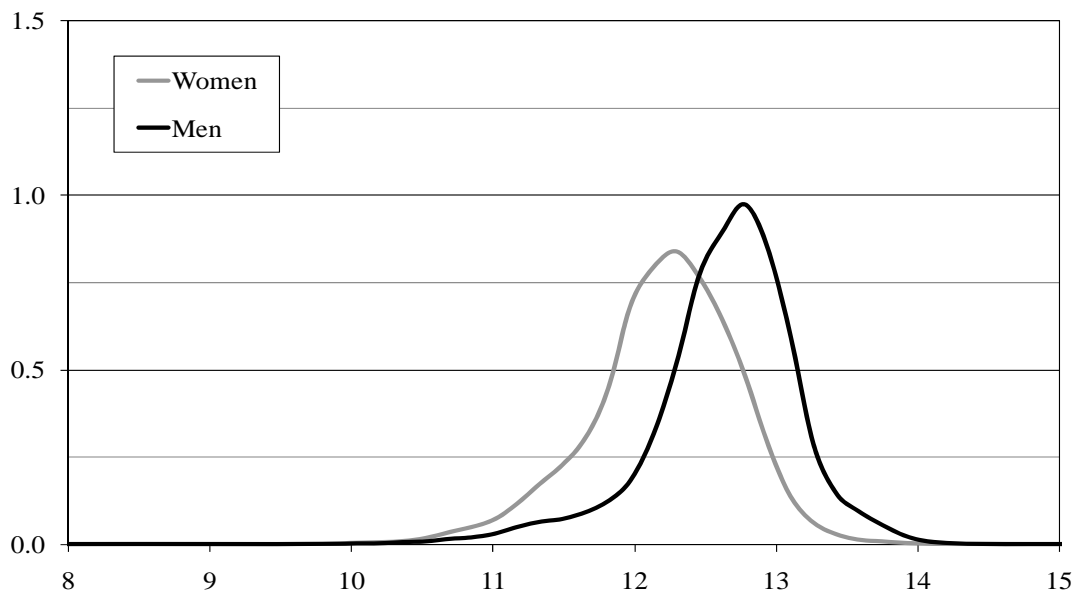


Figure 2.11. Wage density by gender, total earnings, 2001–2004.
Average total earnings, log(earnings), 2004 price level.

Table 2.19. Wage dispersion by federation.

The gini coefficient, 90/10, 90/50, and 50/10 centiles using log(wages).

1994-1997	BHM	BSRB	KI	Total
<u>Gini coefficient</u>				
Total earnings	0.0214	0.0251	0.0237	0.0257
Base wages	0.0105	0.0080	0.0060	0.0133
<u>90/10</u>				
Total earnings	1.0929	1.1130	1.1114	1.1144
Base wages	1.0270	1.0311	1.0239	1.0435
<u>90/50</u>				
Total earnings	1.0339	1.0453	1.0298	1.0443
Base wages	1.0120	1.0161	1.0091	1.0195
<u>50/10</u>				
Total earnings	1.0571	1.0648	1.0793	1.0672
Base wages	1.0148	1.0148	1.0147	1.0236
2001-2004	BHM	BSRB	KI	Total
<u>Gini coefficient</u>				
Total earnings	0.0199	0.0244	0.0204	0.0251
Base wages	0.0083	0.0103	0.0057	0.0143
<u>90/10</u>				
Total earnings	1.0861	1.1085	1.0933	1.1088
Base wages	1.0326	1.0416	1.0226	1.0572
<u>90/50</u>				
Total earnings	1.0293	1.0415	1.0275	1.0403
Base wages	1.0176	1.0192	1.0075	1.0225
<u>50/10</u>				
Total earnings	1.0552	1.0643	1.0640	1.0659
Base wages	1.0147	1.0219	1.0150	1.0340

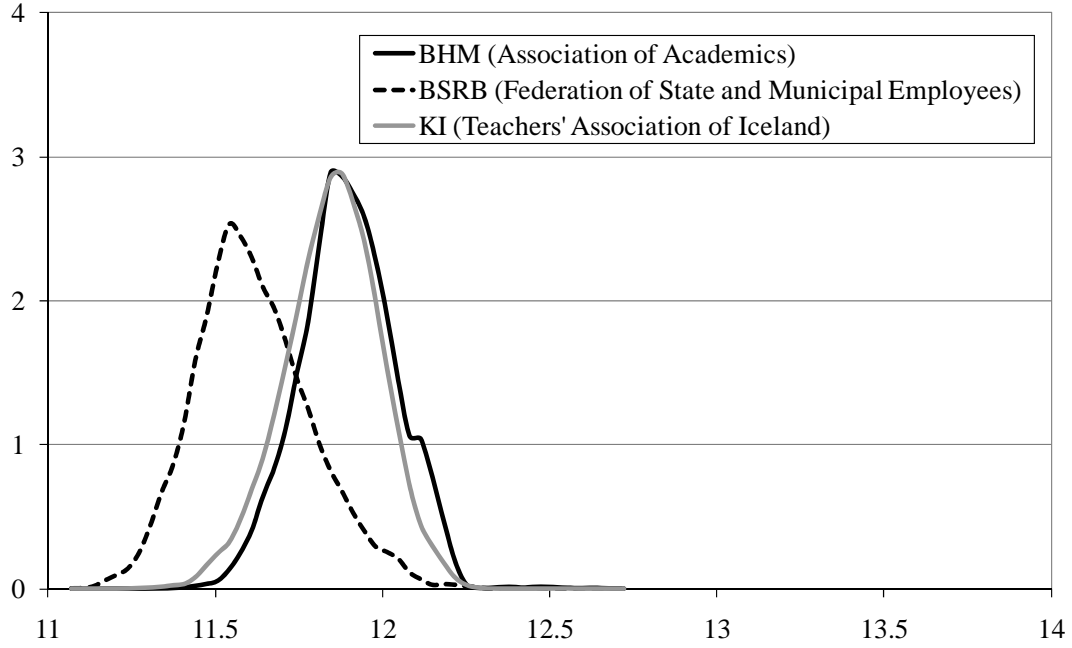


Figure 2.12. Wage density by federation, base wages, 1994–1997.
Average base wages, full-time equivalent, $\log(\text{wages})$, 2004 price level.

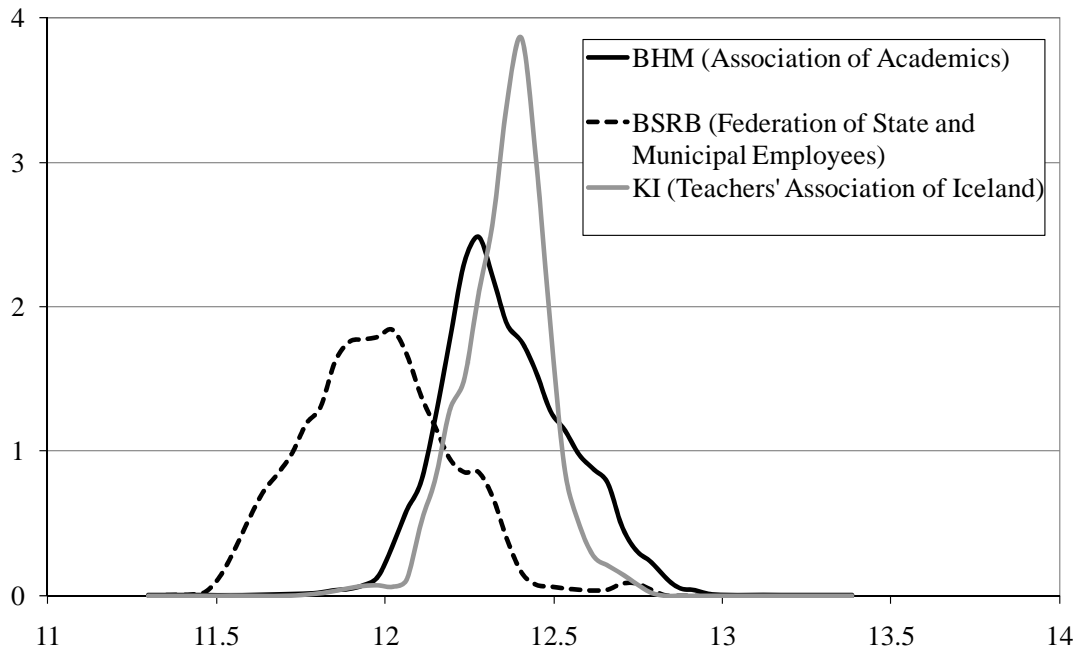


Figure 2.13. Wage density by federation, base wages, 2001–2004.
Average base wages, full-time equivalent, $\log(\text{wages})$, 2004 price level.

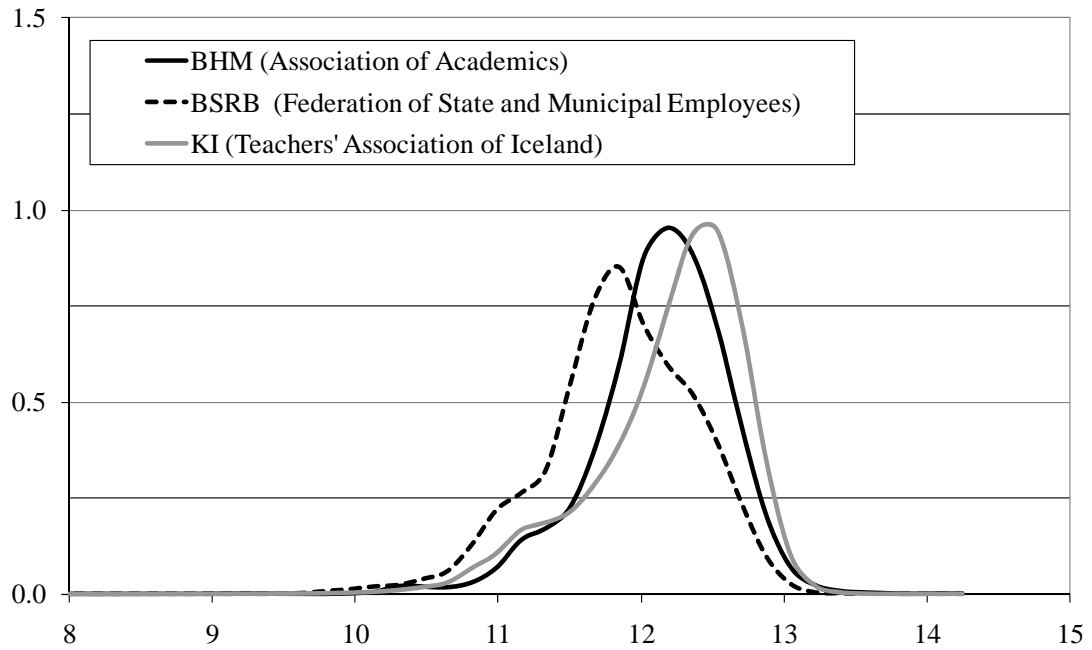


Figure 2.14. Wage density by federation, total earnings, 1994–1997.
Average total earnings, log(earnings), 2004 price level.

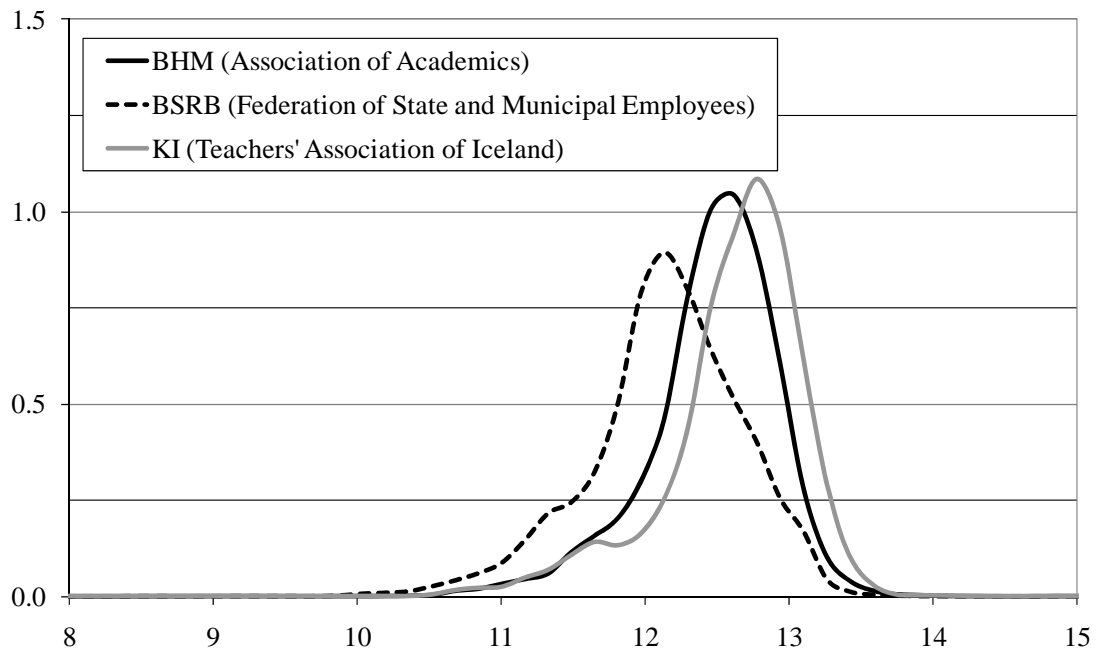


Figure 2.15. Wage density by federation, total earnings, 2001–2004.
Average total earnings, log(earnings), 2004 price level.

5.6. Wage changes by percentiles

As discussed above, the distribution of base wages has increased, while the distribution of total earnings is unchanged. Thus, there does not seem to be a redistribution of wages within the group. This is further supported by looking at wage changes by percentiles, as shown in Figure 2.16.

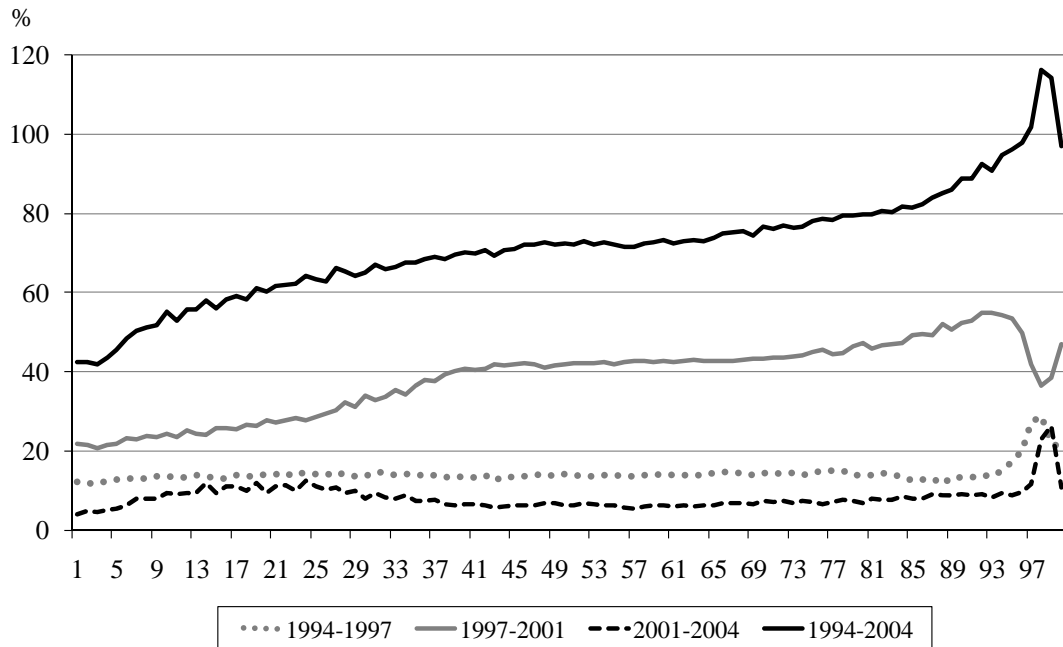


Figure 2.16. Wage changes by percentiles, base wages, full-time equivalent.

The top line in Figure 2.16 shows the real wage increase by percentile over the entire research period, that is, from 1994 to 2004. The lower three lines show the increase within each research period as well as the increase between the two periods.

The lowest percentiles show the smallest increase in base wages, while the wage increases rise with higher wage levels, resulting in a greater distribution of base wages. This is also reflected in the increase in the 50/10 centile ratio. Excluding the

top and the bottom five percentiles, the wage increase rises by 0.37 percentage points for every percentile increase in the wage level.

Total earnings show the same trend at the bottom and at the top, as shown in Figure 2.17, as the lowest earnings levels rise the least and the highest earnings levels receive the greatest increase. Unlike in the case of base wages, most of the percentiles show the same increase in earnings. Excluding the top and bottom five percentiles, the earnings increases fall by 0.02 percentage points for each percentile in the earnings level.

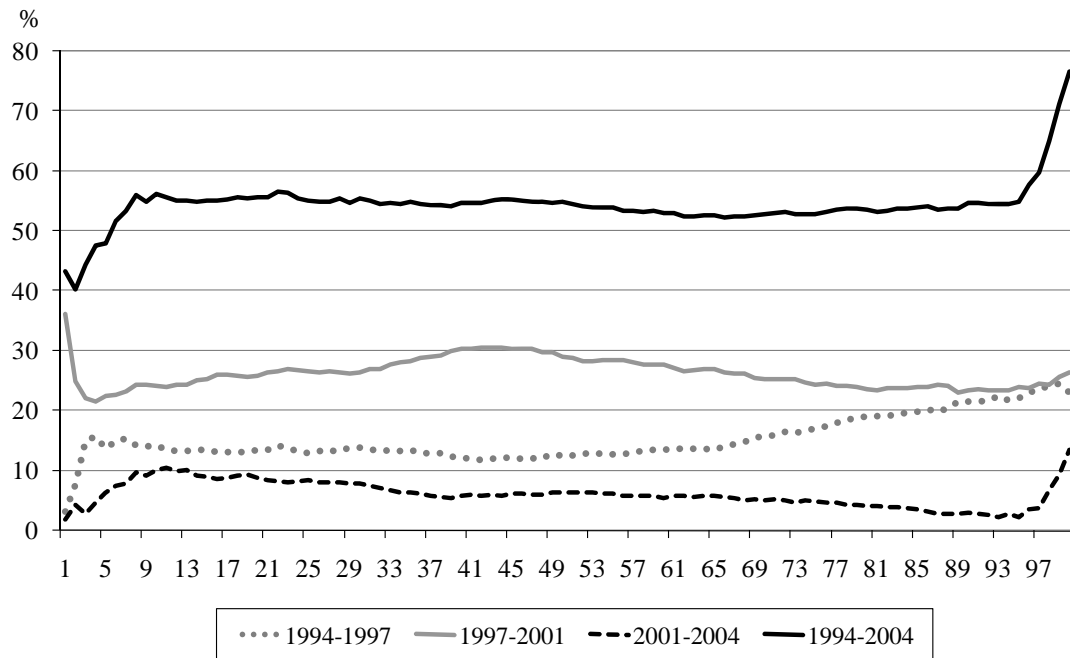


Figure 2.17. Earnings changes by percentiles, total earnings.

5.7. Labor turnover

With the decentralization of wage bargaining and the rise in the wage level, we would expect the turnover of public-sector employees to decrease. During the period 1994–1997 the exit rate among public-sector employees was 16.0% per year on average,

while during the period 2001–2004 the exit rate measured 14.3% on average. The turnover figures can be seen in Table 2.20.

Table 2.20. Labor turnover.

Exit rate, entry rate, and total change in employment.

	1994/95	1995/96	1996/97	1994/97
Total	11,125	11,229	11,351	11,125
Exit	1,556	1,722	2,118	3,397
Entry	1,660	1,844	1,987	3,492
Exit rate	13.99	15.34	18.66	30.53
Entry rate	14.92	16.42	17.51	31.39
Change in employment	0.93	1.09	-1.15	0.85
	2001/02	2002/03	2003/04	2001/04
Total	13,331	13,670	14,107	13,331
Exit	1,971	1,847	2,046	3,403
Entry	2,310	2,284	2,212	4,345
Exit rate	14.79	13.51	14.50	25.53
Entry rate	17.33	16.71	15.68	32.59
Change in employment	2.54	3.20	1.18	7.07

A third of those employed in 1994 had left by 1997, while a quarter of those employed in 2001 had left by 2004. The number of employees rose by 0.85% from 1994 to 1997, while the increase amounted to 7.07% from 2001 to 2004.

5.8. Individual wage changes

Each contract stipulates a general increase in base wages that is received by every employee. While this wage increase can vary between collective bargaining contracts

in the same bargaining round, such variation is rare. In addition to the general wage increase, individuals can receive wage increases above the increase in contractual wages. For example, they can receive a wage increase because of longer working hours, either through a higher share of full-time work or a greater number of overtime hours. Some contracts stipulate wage increases on the basis of age, seniority, and promotion. Furthermore, wages can rise as a result of good job performance or increased responsibility on the job.

This section looks at wage increases received by each individual between two consecutive years. To minimize the effect of a change in daytime working hours on wages, individuals who changed their share of daytime work by more than 20% in either direction between years are excluded. In general, we should not see a decrease in base wages between two periods, although this is possible where an individual temporarily takes on a supervisor's job and then returns to his or her old job. A decrease in total earnings can easily take place, however, especially if an employee worked less overtime than in the previous year.

5.8.1. Changes in wages from 1994 to 1997

According to collective bargaining agreements, wages rose by at least 3% in nominal terms in the spring of 1995. With an inflation rate of 2.4%, the real wage change between October 1994 and October 1995 is at least 0.6%. The actual wage increase received by public-sector employees between 1994 and 1995 was far higher, as most employees received a wage increase of 4% in real terms when looking at base wages, with a mean increase of 6.3%, as seen in Figure 2.18. Furthermore, 59% of all employees received an increase in base wages of between 1% and 7% in real terms.

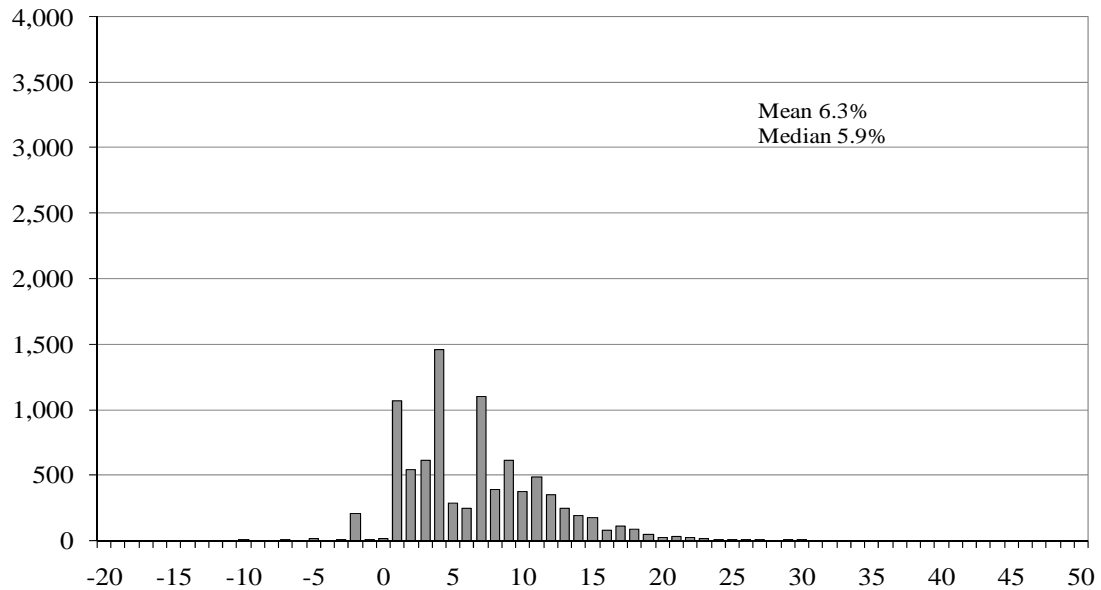


Figure 2.18. Changes in base wages, full-time equivalent, from 1994 to 1995.
 Number of individuals receiving real wage change in each category.

The wage increases are significantly larger when we look at total earnings, as Figure 2.19 reflects. As with base wages, the most common increase is 4% in real terms, with a mean increase of 9.9%. The wage increases are, thus, well in excess of the increase in contractual wages of 0.6%. Interestingly, the median increase of total earnings of 6.1% is very close to the median increase in base wages of 5.9%.

This pattern of wage changes, in which the changes in total earnings are greater than the changes in base wages, reflects the policy followed during this period of keeping increases in the base wage to a minimum. Instead, other wage payments increased. The same picture emerges when we look at changes in wages from 1995 to 1996, as shown in Figure 2.20 and Figure 2.21.

Nominal wages according to the collective bargaining agreements rose by 3% in the beginning of 1996, leaving a real increase in contractual wages of 0.9% between 1995

and 1996. Most employees received a 1% increase in base wages in real terms, and 64% of employees received an increase in base wages of between 1% and 4%. When looking at total earnings, we see that 19% of employees received an increase of between 1% and 4%. Again, the medians of base wage increases and total earnings increases are similar, although the means differ.

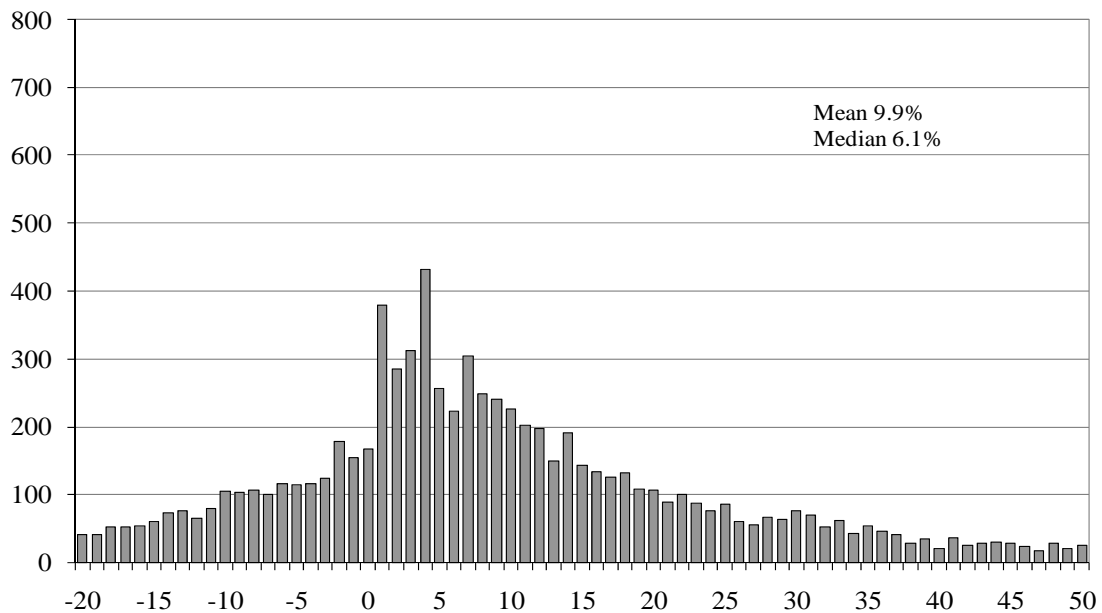


Figure 2.19. Changes in total earnings from 1994 to 1995.

Number of individuals receiving real earnings change in each category.

In the spring and summer of 1997, most unions received an increase of 4.7% in the general wage level upon signing the new agreement. Thus, the real increase in contractual wages according to the contracts between 1996 and 1997 is 2.7%. Between 1996 and 1997, 44% of employees received a 3% increase in base wages in real terms, in line with the contractual wage increase, as Figure 2.22 shows. While 3% is also the most common increase when it comes to total earnings, only 8% of employees fall into that category, as seen in Figure 2.23.

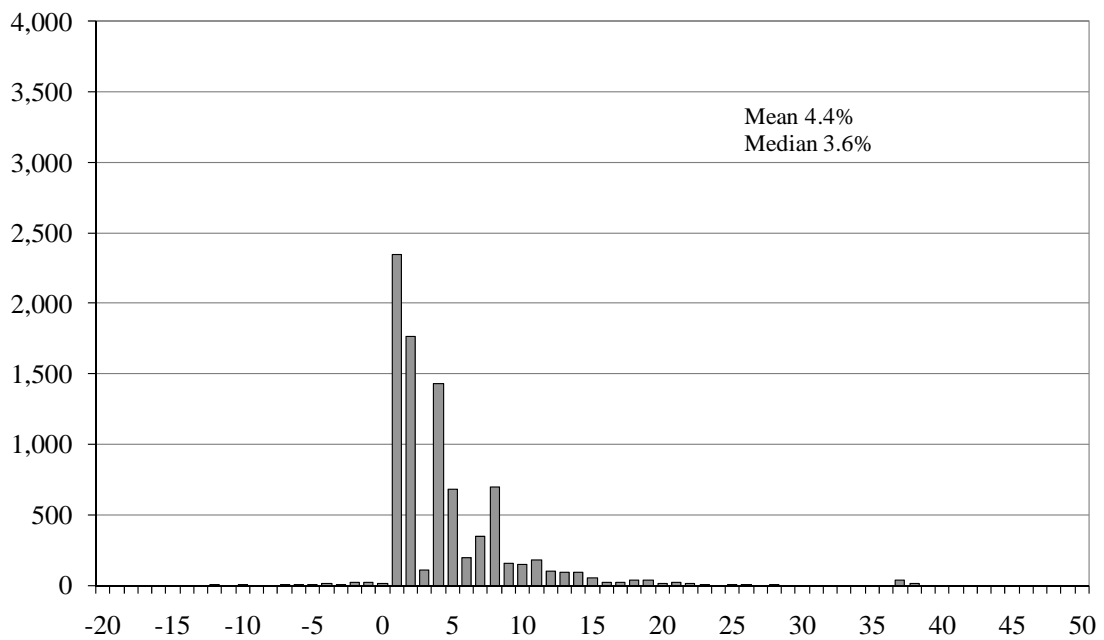


Figure 2.20. Changes in base wages, full-time equivalent, from 1995 to 1996.
 Number of individuals receiving real wage change in each category.

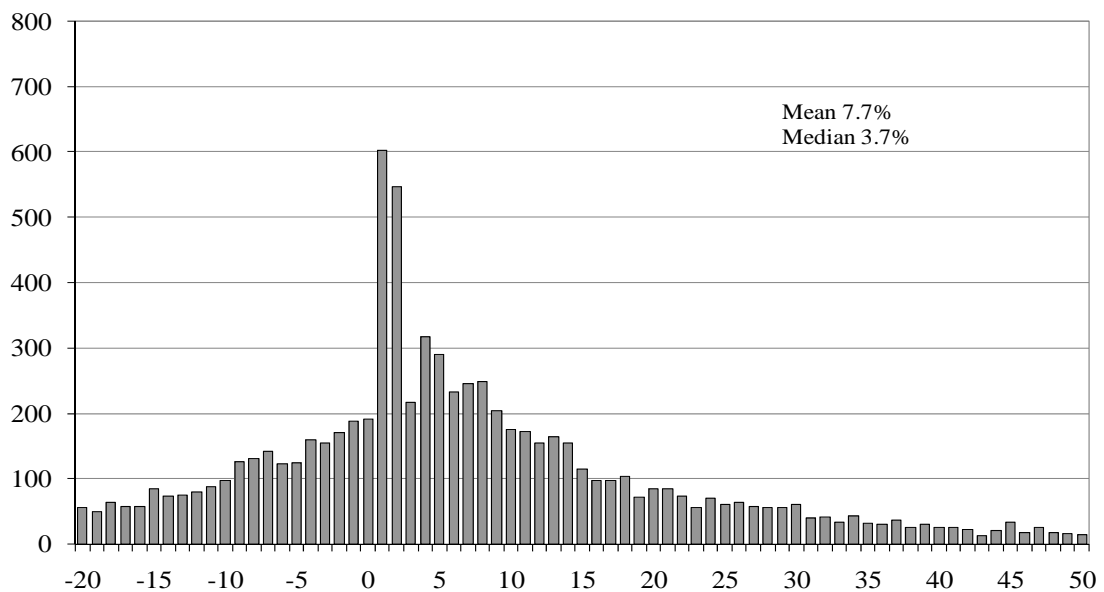


Figure 2.21. Changes in total earnings from 1995 to 1996.
 Number of individuals receiving real earnings change in each category.

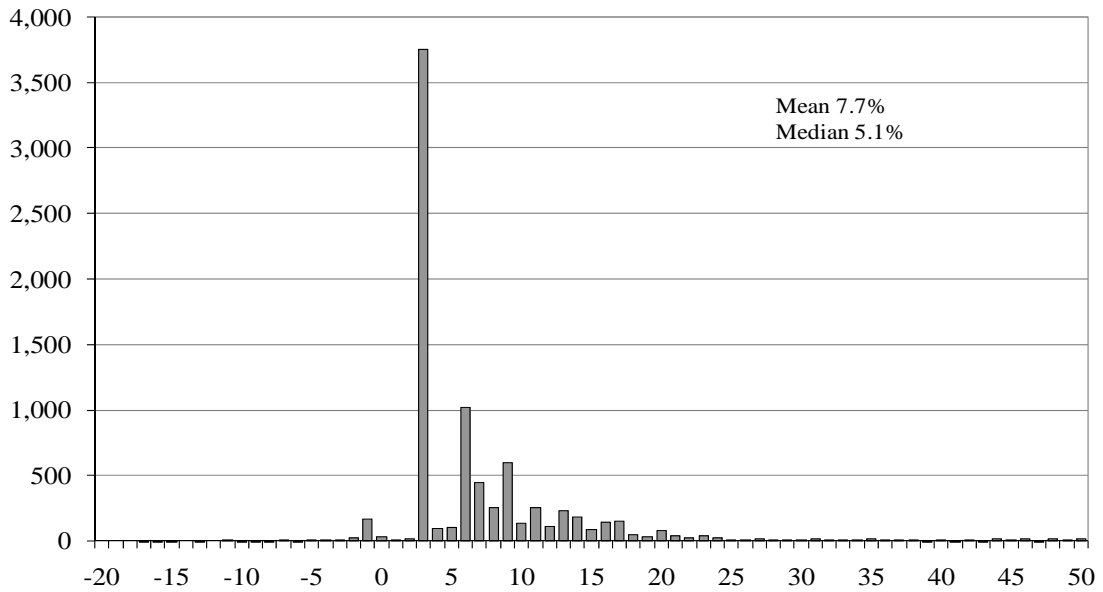


Figure 2.22. Changes in base wages, full-time equivalent, from 1996 to 1997.

Number of individuals receiving wage change in each category.

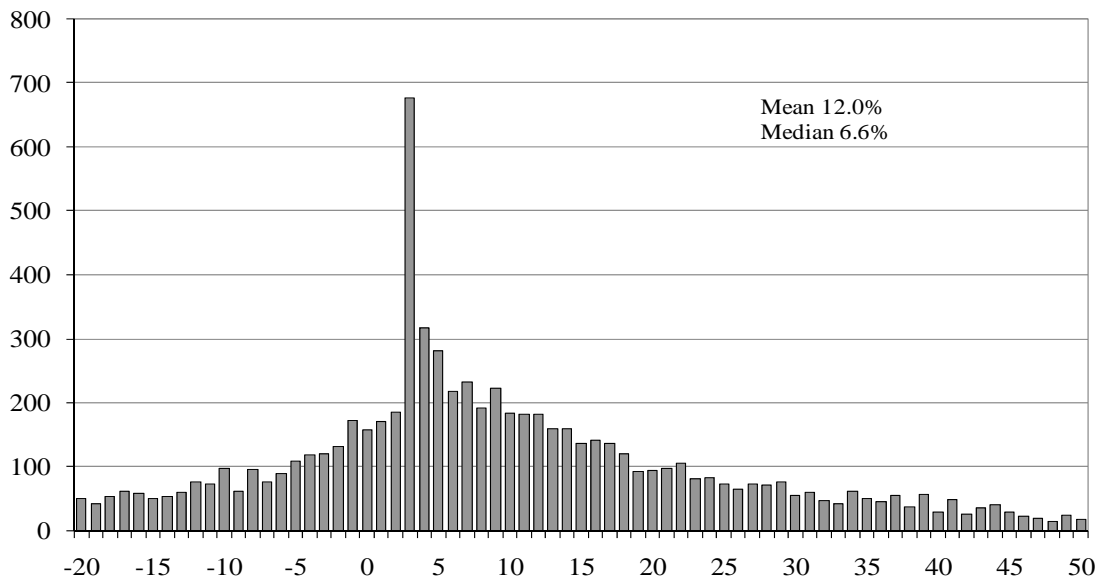


Figure 2.23. Changes in total earnings from 1996 to 1997.

Number of individuals receiving earnings change in each category.

5.8.2. Changes in wages from 2001 to 2004

Following the changes in the wage structure that took place from 1997 to 2001, we continue to find a difference between increases in base wages and total earnings, although the difference is smaller than before. The contractual increase in wages from 2001 to 2002 is 3% in nominal terms, leaving a real change in base wages of 0.1% between October 2001 and October 2002. Over 55% of employees received an increase of between 1% and 4% in base wages between 2001 and 2002, while 22% received an increase of total earnings in that bracket. Thus, a majority of employees received an increase in wages in excess of the contractual increase, as seen in Figure 2.24 and Figure 2.25. A pattern similar to that during the first period appears: the mean increase in total earnings is greater than the mean increase in base wages, while the median increase is similar between base wages and total earnings.

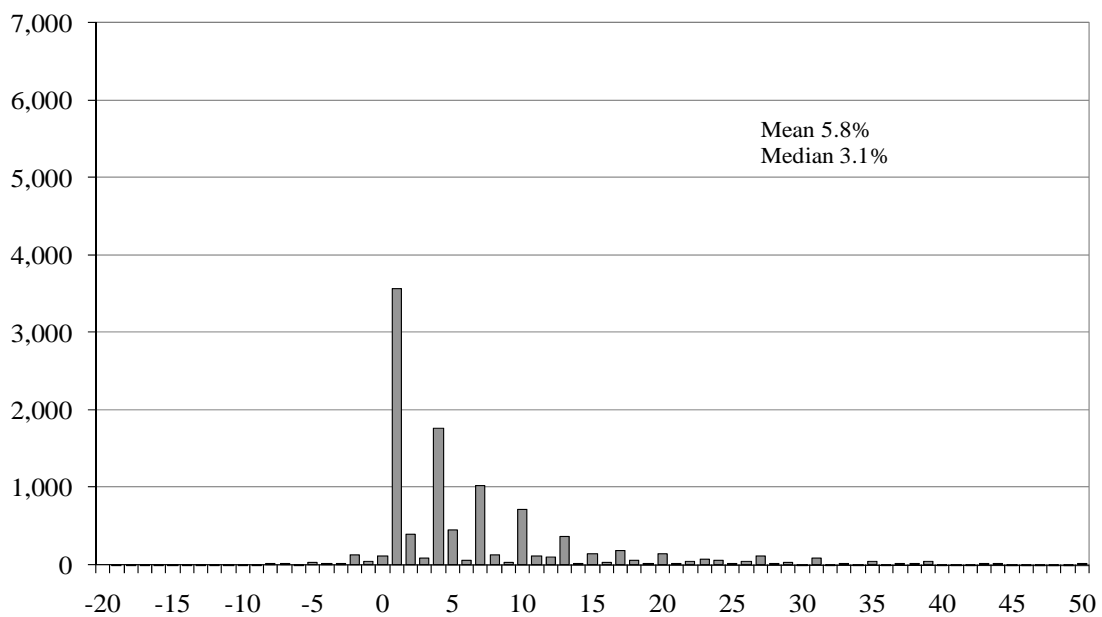


Figure 2.24. Changes in base wages, full-time equivalent, from 2001 to 2002.

Number of individuals receiving wage change in each category.

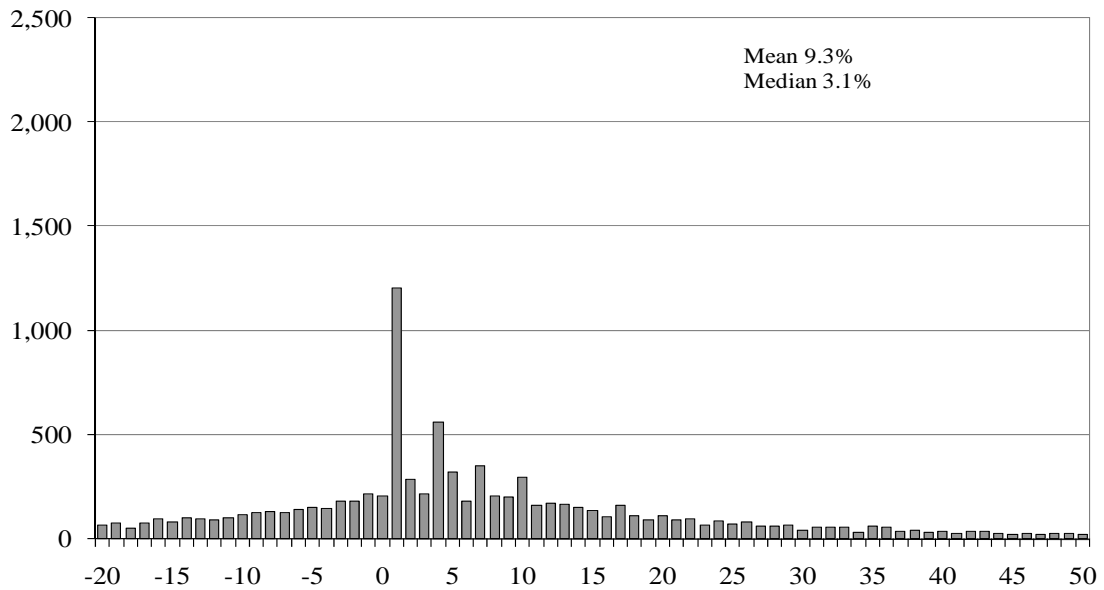


Figure 2.25. Changes in total earnings from 2001 to 2002.

Number of individuals receiving earnings change in each category.

The collective bargaining agreements called for a nominal increase in wages of 3% in the beginning of 2003, yielding a real increase in contractual wages of 0.8% between October 2002 and October 2003. Looking at individual wage increases, we see that 53% of all employees received an increase of 1% for base wages in real terms, as seen in Figure 2.26, in line with the collective bargaining agreements. When looking at total earnings, we see that the most common increase was also 1%; 17% of employees received that increase, as shown in Figure 2.27.

From 2003 to 2004 actual wage increases were also in line with contractual wage increases. According to the contracts, wages rose by 3% in nominal terms in the beginning of 2004. With the inflation rate in excess of 3%, this resulted in a real decrease in base wages of 0.7% between October 2003 and October 2004. A total of 60% of employees received no real increase in their base wages, while 19% received no increase in their total earnings, as seen in Figure 2.28 and Figure 2.29. The median

wage change is also in line with the contractual wage increase for both base wages and total earnings.

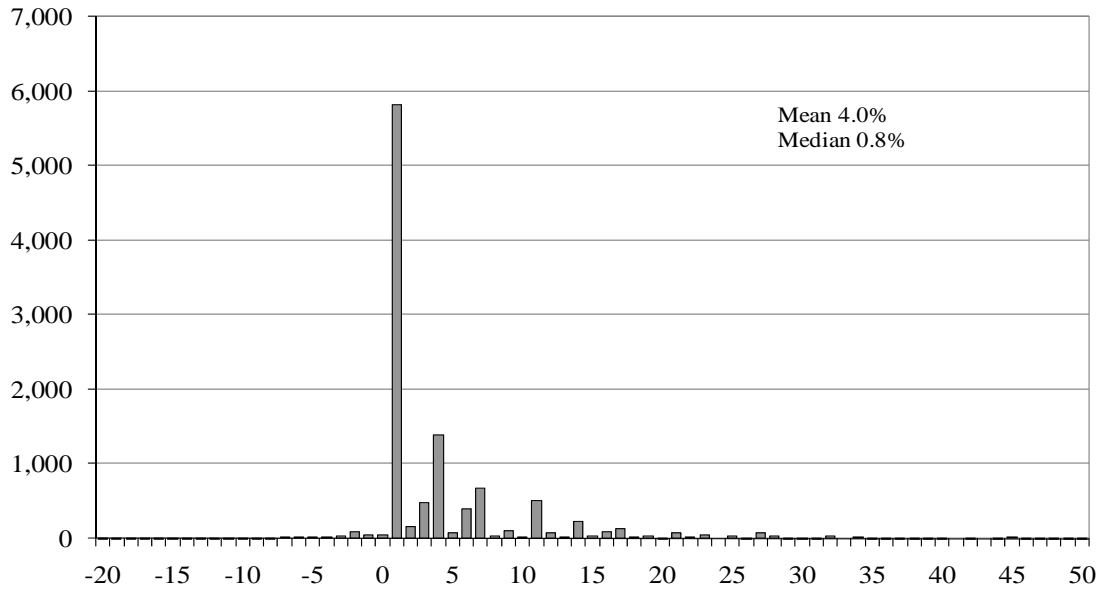


Figure 2.26. Changes in base wages, full-time equivalent, from 2002 to 2003.

Number of individuals receiving wage change in each category.

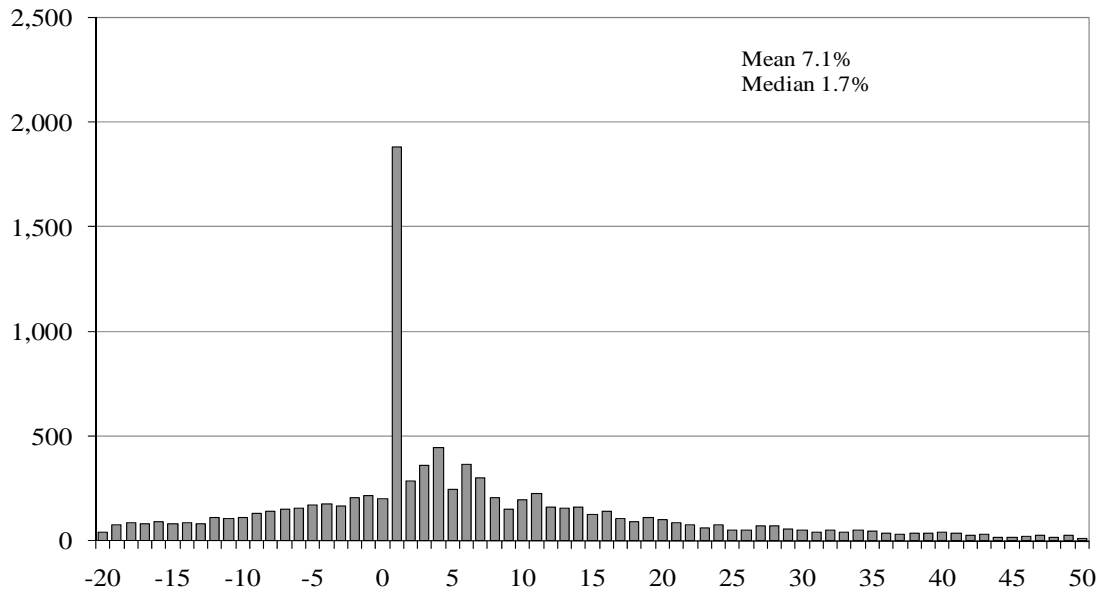


Figure 2.27. Changes in total earnings from 2002 to 2003.

Number of individuals receiving earnings change in each category.

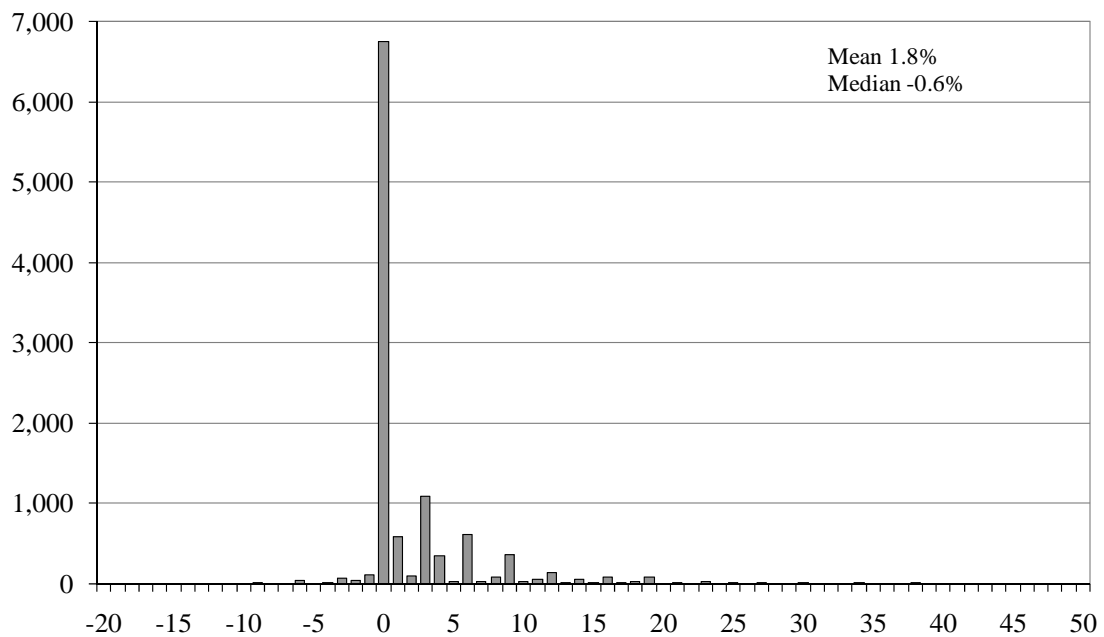


Figure 2.28. Changes in base wages, full-time equivalent, from 2003 to 2004.

Number of individuals receiving wage change in each category.

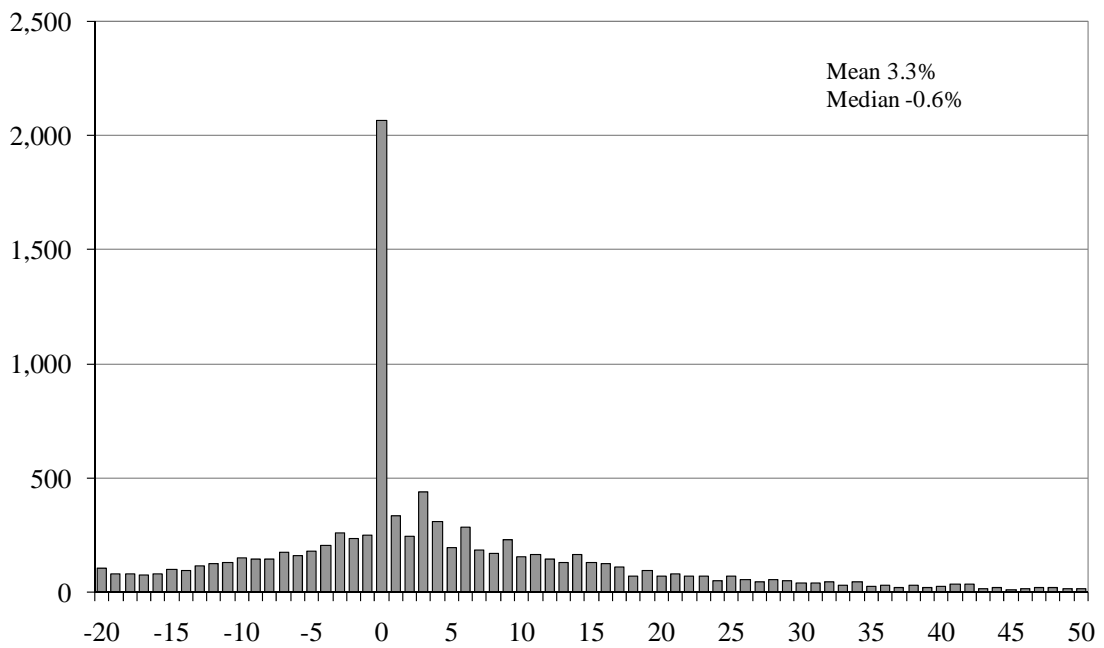


Figure 2.29. Changes in total earnings from 2003 to 2004.

Number of individuals receiving earnings change in each category.

A marked difference can be found between the two periods, in which the actual increases in the second period are much more in line with the contractual increase in the base wages than experienced in the first period.

6. Human capital equations

To further explore the wage formation in the public sector in Iceland, I ran classic human capital regressions using random effects on the individual, as shown below.

$$\ln W_{it} = X_{it}\beta + \epsilon_{it} \quad (1)$$

Where W_{it} is wages, X_{it} is a vector of independent variables that explain wages, ϵ_{it} is an error term, i refers to the individual, and t stands for time. The regressions are run with both base wages and total earnings as the independent variable for both the period 1994–1997 as well as 2001–2004.

6.1. Human capital regressions on the whole sample

Three regressions were run using the available explanatory variables. The difference between regressions (1) and (2) is that in regression (1) union dummies are included and federation dummies are excluded. In regression (2), this is reversed: union dummies are excluded and federation dummies are included. Equations (1) and (2) are therefore classical human capital regressions. Regression (3) is identical to regression (2) with the addition of the alternative wage, which alters the interpretation somewhat compared with the classical human capital regressions as discussed below. Table 2.21 shows the results for base wages for full-time work during the period 1994 to 1997.

The explanatory power of the three regressions is very similar. The results of the regressions show that women received 4 to 5% lower base wages than men. The wage-age profile has the shape of an inverse parabola, where wages reach a peak at the age of 54.77. Those who did not have the right to strike received 7 to 8% higher wages than those who were allowed to strike. There was a significant increase in real wages in each of the years of the period in question, and there was also a significant difference in wages between federations. The alternative wage had a small (3%), although significant, effect on wages. By including the alternative wage in the human capital regression, the other explanatory variables can now be interpreted as the effect on public-sector wages given the comparable wage in the private sector. It is therefore surprising that although the alternative wage has a significant effect on public-sector wages, including this variable does not have much effect on the estimation of the coefficients of the other variables in equation (3), as can be seen by comparing equations (2) and (3).

Table 2.22 shows the same results as Table 2.21, for the second period, 2001 to 2004.

The explanatory power of regressions (2) and (3) is very similar, while regression (1) has a greater explanatory power, suggesting that including individual unions is an improvement on including federations.

In other respects, the results are in many ways similar to the results from the first period, except the alternative wage seems to have a greater impact on public-sector wages in the second period than in the first. This suggests that during this period base wages were more responsive to the development of base wages in the private sector. There was still a significant gender difference in wages, and the magnitude was

similar, 5 to 6%. The highest wage was reached at the age of 56.28. The effect on wages of not being allowed to strike was smaller than in the earlier period and even measures negative in regression (1). There was still a significant increase in real wages in each year; however, the increase was smaller than during the period 1994 to 1997. There is a significant difference in base wages between federations, and the difference has grown, as the wages of members of BSRB (the excluded federation variable) seem to lag behind the wages of members of the other federations. The wage level of KI members also caught up with the wage level of BHM members.

The same set of regressions was also run for total earnings. Table 2.23 shows the human capital regressions for total earnings during the period 1994 to 1997.

The picture changes somewhat when the dependent variable is total earnings, that is, base wages and all extra payments received by the individual during the month in question. Again, the explanatory power is similar between the three regressions. However, the gender difference is much greater when it comes to total earnings than the difference in base wages, or 12 to 14%. The highest total earnings were reached later in life than base wages, or at 50.72 years of age, which suggests that older workers received a greater share of their wages as extra payments than did their younger counterparts. The wage effect of not being allowed to strike is similar for total earnings as estimated for base wages. During the period 1994 to 1997 the real earnings increase in each year is similar to the increase for base wages. When comparing federations, we see that the difference between base wages and total earnings is similar, except for KI members, whose base wages are 14 to 15% higher than the wages received by BSRB members. When it comes to total earnings, KI members

received wages that are 2% higher than the BSRB wage level. Thus, BSRB members received more extra payments than did KI members.

Table 2.21. Human capital regressions, base wages, 1994–1997.

Dependent variable: Log(base wages)	(1)	(2)	(3)
constant	10.72862 *	10.76166 *	10.48762 *
alternative wage	-	-	0.02626 *
gender	-0.04497 *	-0.04765 *	-0.04184 *
age	0.03430 *	0.03538 *	0.03368 *
age squared	-0.00031 *	-0.00033 *	-0.00031 *
share of daytime work	0.04735 *	0.04675 *	0.04681 *
share of women in union	0.00150 *	0.00049 *	0.00044 *
part time share in union	0.00078 *	-0.00012	-0.00007
size of union	0.00012 *	-0.00002 *	-0.00002 *
no strike	-0.01126	0.07090 *	0.07344 *
working in country	-0.00258	-0.00691 *	-0.00124
working close to city	-0.00862	-0.00876	-0.00860
year 1995	0.05298 *	0.05510 *	0.05241 *
year 1996	0.08402 *	0.08918 *	0.08769 *
year 1997	0.14220 *	0.15012 *	0.14373 *
federation bhm	-	0.22953 *	0.22034 *
federation ki	-	0.14467 *	0.13627 *
outside federations	-	0.43716 *	0.42869 *
size of institute	0.00046 *	0.00013 *	0.00012 *
budget for institute	-0.00001 *	-0.00013 *	-0.00001 *
choice	-0.33733 *	-0.04589 *	-0.04351 *
ministry dummies	yes	yes	yes
union dummies	yes	no	no
R-squared:			
within	0.6604	0.6557	0.6553
between	0.7755	0.7231	0.7238
overall	0.7617	0.7046	0.7053
N	42,842	42,842	42,842

* significant at 5% level.

Table 2.22. Human capital regressions, base wages, 2001–2004.

Dependent variable: Log(base wages)	(1)	(2)	(3)
constant	14.88307 *	11.02892 *	10.34202 *
alternative wage	-	-	0.09038 *
gender	-0.05246 *	-0.06362 *	-0.04907 *
age	0.03338 *	0.03598 *	0.03129 *
age squared	-0.00031 *	-0.00033 *	-0.00028 *
share of daytime work	0.12591 *	0.05883 *	-0.26607 *
share of women in union	0.00254	-0.00093 *	-0.00092 *
part time share in union	-0.00970 *	0.00060 *	0.00059 *
size of union	-0.00267 *	0.00000 *	0.00000
no strike	-0.03456	0.04333 *	0.04280 *
working in country	-0.03152 *	-0.02252 *	-0.01435 *
working close to city	-0.04240 *	-0.02460 *	-0.02408 *
year 2002	dropped	0.04381 *	0.04463 *
year 2003	dropped	0.06989 *	0.06678 *
year 2004	dropped	0.07538 *	0.07157 *
federation bhm	-	0.30743 *	0.26425 *
federation ki	-	0.29914 *	0.25585 *
outside federations	-	0.59131 *	0.55269 *
size of institute	-0.00015 *	-0.00014 *	-0.00014 *
budget for institute	0.00001 *	0.00000 *	0.00000 *
choice	1.32170 *	-0.04610 *	-0.04663 *
ministry dummies	yes	yes	yes
union dummies	yes	no	no
R-squared:			
within	0.5806	0.4674	0.4675
between	0.7732	0.7164	0.7164
overall	0.7738	0.6942	0.6942
N	55,414	55,414	55,414

* significant at 5% level.

Table 2.23. Human capital regressions, total earnings, 1994–1997.

Dependent variable: Log (total earnings)	(1)	(2)	(3)
constant	9.37128 *	9.55412 *	8.77745 *
alternative wage	-	-	0.08181 *
gender	-0.15316 *	-0.15407 *	-0.13353 *
age	0.04650 *	0.04645 *	0.04236 *
age squared	-0.00046 *	-0.00046 *	-0.00042 *
share of daytime work	1.53156 *	1.52563 *	1.52440 *
share of women in union	0.00131 *	-0.00143 *	-0.00150 *
part time share in union	-0.00029	0.00056 *	0.00063 *
size of union	0.00020 *	-0.00003 *	-0.00003 *
no strike	0.02641	0.07041 *	0.07483 *
working in country	0.00793	0.00714 *	0.02163 *
working close to city	0.03641 *	0.03671 *	0.03697 *
year 1995	0.05390 *	0.05752 *	0.05559 *
year 1996	0.08448 *	0.09204 *	0.08529 *
year 1997	0.15016 *	0.15832 *	0.14758 *
federation bhm	-	0.23498 *	0.20829 *
federation ki	-	0.04657	0.02184 *
outside federations	-	0.42981 *	0.40489 *
size of institute	0.00018 *	0.00014 *	0.00014 *
budget for institute	0.00001 *	0.00001 *	0.00001 *
choice	-0.58216 *	-0.11339 *	-0.10981 *
ministry dummies	yes	yes	yes
union dummies	yes	no	no
R-squared:			
within	0.4035	0.3981	0.3979
between	0.7631	0.7432	0.7435
overall	0.7080	0.6865	0.6869
N	42,842	42,842	42,842

* significant at 5% level.

Table 2.24. Human capital regressions, total earnings, 2001–2004.

Dependent variable: Log (total earnings)	(1)	(2)	(3)
constant	13.41698 *	9.98614 *	10.18650 *
alternative wage	-	-	-0.02039
gender	-0.16774 *	-0.15679 *	-0.16211 *
age	0.03936 *	0.04119 *	0.04234 *
age squared	-0.00039 *	-0.00040 *	-0.00041 *
share of daytime work	1.63604 *	1.50891 *	1.53885 *
share of women in union	-0.00032	-0.00278 *	-0.00278 *
part time share in union	-0.00117	0.00230 *	0.00231 *
size of union	-0.00281 *	0.00000	0.00000
no strike	0.14526 *	0.12975 *	0.12993 *
working in country	-0.00065	0.00209	0.00072
working close to city	0.06726 *	0.04708 *	0.04693 *
year 2002	dropped	0.04020 *	0.04036 *
year 2003	dropped	0.06569 *	0.06671 *
year 2004	dropped	0.05995 *	0.06150 *
federation bhm	-	0.30087 *	0.30898 *
federation ki	-	0.32977 *	0.33789 *
outside federations	-	0.56195 *	0.56934 *
size of institute	0.00006 *	0.00004 *	0.00004 *
budget for institute	0.00003 *	0.00001 *	0.00001 *
choice	1.57593 *	-0.12693 *	-0.12674 *
ministry dummies	yes	yes	yes
union dummies	yes	no	no
R-squared:			
within	0.7763	0.4425	0.4425
between	0.7188	0.7501	0.7501
overall	0.7234	0.6945	0.6945
N	55,414	55,414	55,414

* significant at 5% level.

Table 2.25. Human capital regressions by gender—Base wages.

Dependent variable:				
Log (base wages)				
Period	1994-1997	2001-2004	1994-1997	2001-2004
Gender	women	women	men	men
constant	9.51476 *	9.01346 *	12.70104 *	10.97936 *
alternative wage	0.12797 *	0.27169 *	-0.21057 *	-0.02543 *
age	0.02312 *	0.01864 *	0.05674 *	0.04663 *
age squared	-0.00021 *	-0.00016	-0.00053 *	-0.00042 *
share of daytime work	0.04672 *	-0.92113 *	0.04567 *	0.15413
share of women in union	0.00057 *	-0.00045 *	0.00046 *	-0.00110 *
part time share in union	-0.00011	0.00017 *	-0.00020	0.00205 *
size of union	-0.00002 *	0.00000	-0.00001 *	0.00000 *
no strike	0.05753 *	0.04267 *	0.07420 *	0.02291 *
working in country	0.02665 *	-0.01033 *	-0.06067 *	-0.00884 *
working close to city	-0.01321 *	-0.04177 *	-0.00797	-0.01033 *
year 2	0.04317 *	0.05225	0.07462 *	0.03391 *
year 3	0.08022 *	0.06873	0.10167 *	0.05730 *
year 4	0.10737 *	0.07375	0.21327 *	0.06180 *
federation bhm	0.17696 *	0.19972	0.34855 *	0.33002 *
federation ki	0.11059 *	0.22646	0.26067 *	0.24191 *
outside federations	0.40866 *	0.50441 *	0.53677 *	0.52140 *
size of institute	0.00004 *	-0.00013 *	0.00019 *	-0.00015 *
budget for institute	-0.00001 *	0.00000 *	-0.00001 *	0.00001 *
choice	-0.02505 *	-0.00132 *	-0.04818 *	-0.12676 *
ministry dummies	yes	yes	yes	yes
R-squared:				
within	0.7055	0.4545	0.6359	0.5053
between	0.7373	0.7305	0.7168	0.7104
overall	0.7106	0.7010	0.6998	0.6929
N	24,393	34,367	18,449	21,047

* significant at 5% level.

Table 2.26. Human capital regressions by gender—Total earnings.

Dependent variable:				
Log (total earnings)				
Period	1994-1997	2001-2004	1994-1997	1994-1997
Gender	women	women	men	men
constant	7.47221 *	6.82539 *	10.60926 *	13.08961
alternative wage	0.22415 *	0.33083 *	-0.15186 *	-0.36038 *
age	0.02795 *	0.01946 *	0.06831 *	0.07412 *
age squared	-0.00029 *	-0.00017	-0.00066 *	-0.00074 *
share of daytime work	1.48974 *	0.90305 *	1.62311 *	2.22061
share of women in union	-0.00123 *	-0.00235 *	-0.00070	-0.00270 *
part time share in union	0.00097	0.00172 *	-0.00112 *	0.00425 *
size of union	-0.00003 *	0.00000	-0.00001 *	0.00000
no strike	0.05904 *	0.13297 *	0.05151 *	0.09109
working in country	0.01046 *	-0.00644 *	0.00402	0.00106
working close to city	0.08812 *	0.04600 *	-0.02502 *	0.03840
year 2	0.05604 *	0.04121	0.05954 *	0.03596
year 3	0.06760 *	0.05608	0.11244 *	0.07114
year 4	0.09924 *	0.04814	0.20459 *	0.07084 *
federation bhm	0.19180 *	0.20732	0.26589 *	0.37786 *
federation ki	-0.03632 *	0.21858	0.14630 *	0.43902 *
outside federations	0.38307 *	0.46950 *	0.47278 *	0.60247 *
size of institute	0.00014 *	0.00006 *	0.00012 *	0.00002 *
budget for institute	0.00001 *	0.00001 *	0.00001 *	0.00001 *
choice	-0.07209 *	-0.10811 *	-0.12166 *	-0.13565 *
ministry dummies	yes	yes	yes	yes
R-squared:				
within	0.4427	0.4466	0.3397	0.4462
between	0.7296	0.7387	0.6719	0.7009
overall	0.6666	0.6776	0.5655	0.6264
N	24,393	34,367	18,449	21,047

* significant at 5% level.

In Table 2.24 we can see the human capital regressions for total earnings during the period 2001 to 2004.

Here, the explanatory power of the first regression is greater than the explanatory power of regressions (2) and (3). This suggests that the development of wages between the first and the second period depends more on individual unions than on individual federations.

In the first period, the gender difference in wages measured 12 to 14%, while in the second period the gender difference increased to 14 to 16%. The highest wage was reached at the age of 51.41. The effect of not being allowed to strike was low when it came to base wages during the period 2001 to 2004, but the effect on total earnings is estimated to be 14%. In accordance with the objectives of the collective agreements during this period, the annual increase in real wages for base wages is somewhat greater than the increase measured for total earnings.

Comparing the regressions for total earnings for the period 1994–1997, on the one hand, and the period 2001–2004, on the other, we see that the regressions are in fact quite similar. The age effect is almost identical in the two periods in spite of the fact that automatic wage increases due to age and seniority were cut almost in half in the new collective bargaining agreements. The effect of not being allowed to strike increased from 8 to 14%. Comparing the two periods, there also seems to be some reordering of the federations, as the wages of KI members were much higher than those of BSRB members (the omitted federation) in the second period than in the first period. The difference lies in that the effect of the alternative wage is positive and significant in the first period, and negative and insignificant in the second period. The

alternative wage has a significant effect on total earnings in the first period, while adding the alternative wage variable does not have much effect on the other variables in the equation. In the second period, however, the alternative wage has a negative and insignificant effect on total earnings, suggesting that total earnings in the private sector are unrelated to total earnings in the public sector in the second period.

6.2. Human capital regressions by gender

In the previous section, the effects of each of the explanatory variables on base wages and total earnings are assumed to be the same for both genders, except for the effects of the variable gender. In this section, the data are divided by gender and the regressions are run separately on women and men, thus allowing for different effects of the individual explanatory variables.

Table 2.25 shows regressions on base wages identical to regression (3) in the previous tables, except now with separate regressions for men and women. Interestingly, the sign of the alternative wage is different between the two genders. While the alternative wage had a positive effect on women's wages, it had a negative effect on men's wages.

The share of daytime work had a similar effect on men and women in the first period, whereas in the second period it had larger effects and negative effects on women, while the effects on men's wages are positive. The age effects were slightly larger for women than for men. The wage effects for those who were not allowed to strike were similar for women in the two periods, while for men the effects were greater than the effects for women in the first period and lower than the effects on women's wages in the second period. Being a member of the union federation BHM had larger effects on

base wages for men than for women in both periods. In the first period the effect of being a member of KI was larger for men than for women. However, in the second period the effects were similar for men and women, thus reducing the wage differential in that federation. For those individuals who were members of unions where it is easy to move from the public sector to the private sector, the wage effect was negative. In the first period it was quite small, and larger for men than for women. In the second period, the wage differential had almost vanished for women, while the differential had grown for men.

Table 2.26 shows a comparable regression to the one shown in Table 2.25, except that the dependent variable is total earnings instead of base wages. As for base wages, the alternative wage has a positive coefficient for women, and a negative coefficient for men. Furthermore, the absolute value of the coefficients grows with time.

The age effects of total earnings were larger than for base wages. As for base wages, the age effects were larger for women than for men. The effect of not being allowed to strike was similar for both genders in the first period. In the second period the effects grew, and the increase was larger for women than for men. The earnings effect for members of the union federations BHM and KI grew from the first period to the second. However, the effect was larger for men than for women.

7. Conclusion

The real wage level in the public sector rose considerably during the period from 1994 to 2004. The teachers' federation (KI) received the highest increase of the three federations during this period, in both base wages and total earnings. Individual unions outside the federations also received large increases in real wages. Women's wages

rose more than men's wages, thus reducing the gender wage gap. The share of base wages in total earnings rose during the period in question, thus meeting that objective of the collective bargaining agreements.

However, the dispersion of wages did not change much from 1994 to 2004. The dispersion of base wages increased somewhat, but the dispersion of total earnings was largely unchanged, regardless of the measurement used.

Thus, there is no strong evidence for a structural change in wages between the two periods. Looking at wage increases by percentiles, we see that most employees received the same increase in real wages from 1994 to 2004, thus raising the real wage level without changing the structure.

Simple human capital regressions show that even though there are some differences in the individual estimated coefficients between the two periods, both when looking at regressions using base wages as the dependent variable and when using total earnings as the dependent variable, the difference is quite small.

APPENDIX 2.A: GLOSSARY

BHM: Association of Academics.

BSRB: Federation of State and Municipal Employees.

FIN: The Union of Natural Scientists.

FH: The Union of University Teachers

KI: Icelandic Teachers' Union.

Kjararad: State Salaries Commission.

Logbirtingarblad: Legal Gazette.

SFR: Union of Public Servants

SNR: State Negotiation Committee.

Stofnanasamningur: Institutional Agreement.

APPENDIX 2.B: UNIONS

BHM Association of Academics

u5129 Dýralæknafélag Íslands	Icelandic Veterinary Association
u5171 Stéttarfélag bókasafns- og upplýsingafræðinga	Union of Library and Information Scientists
u5184 Félag fréttamanna	The Society of Broadcast Journalists
u5192 Félag háskólakennara	The Union of University Teachers
u5193 Félag háskólakennara á Akureyri	The Union of University Teachers in Akureyri
u5196 Fél hásk.mennt starfsmanna stjórnarráðsins	The Association of University Graduates Ministry Employees
u5225 Félag íslenskra fræða	The Society for Icelandic Studies
u5232 Félag íslenskra hjúkrunarfræðinga	The Icelandic Nurses' Association
u5243 Félag íslenskra náttúrufræðinga	The Union of Natural Scientists
u5252 Stéttarfélag sjúkraþjálfara	The Union of Physiotherapists
u5307 Félag tækniháskólakennara	The Union of Engineering College Teachers
u5313 Kjaradeild Félags ísl. félagsvísindamanna	Icelandic Social Science Association
u5366 Iðjuþjálfafélag Íslands	Icelandic Occupational Therapy Association
u5397 Kennarafélag Kennaraháskóla Íslands	The Teachers' Association of the Iceland University of Education
u5406 Kjarafélag viðskipta- og hagfræðinga	Union of Economists
u5414 Ljósmeðrafélag Íslands	The Icelandic Midwives' Association
u5440 Stéttarfélag háskólamanna á matvæla- og næringarsviði	Union of Nutrition Scientists
u5445 Félag lífeindafræðinga	Biomedical Scientists' Union
u5469 Félag geislafræðinga	The Icelandic Society of Radiographers
u5477 Sálfræðingafélag Íslands	Union of Psychologists in Iceland
u5580 Félagsráðgjafafélag Íslands	The Icelandic Association of Social Workers
u5582 Stéttarfélag lögfræðinga	The Lawyers Union
u5641 Útgarður, félag háskólamanna	The Union of University Graduates
u5740 Þroskaþjálfafélag Íslands	Association of Social Educators

BSRB Federation of State and Municipal Employees

u5177 Félag flugmálastarfmanna ríkisins	Union of Public Employees in Aviation
u5303 Félag starfsmanna stjórnarráðsins	The Union of Government Ministries' employees
u5405 Landssamband lögreglumanna	The Policemen's Union
u5479 Sjúkraliðafélag Íslands	The Icelandic Union of Practical Nurses
u5535 Starfsmannafélag Reykjavíkur	Reykjavik Municipal Employees' Association
u5546 Starfsmannafélag Ríkisútvarpsins	State Radio and Television Employees' Association
u5573 Starfsmannafélag ríkisstofnana T	Union of Public Servants, technicians
u5574 Starfsmannafélag ríkisstofnana S	Union of Public Servants, office workers

u5575 Starfsmannafélag ríkisstofnana H	Union of Public Servants, health sector workers
u5627 Tollvarðafélag Íslands	Icelandic Customs Officers Union
u8001 Samflot BSRB-félaga 1994-1997	Various local unions with a common contract 1994-1997
u8002 Samflot BSRB-félaga I 2001-2004	Various local unions with a common contract I 2001-2004
u8001 Samflot BSRB-félaga II 2001-2004	Various local unions with a common contract II 2001-2004

KI The Icelandic Teachers' Union

u5321 Félag ísl. leikskólakennara	The Association of Teachers in Preschools
u5341 Hið íslenska kennarafélag	The Association of Teachers in Upper Secondary Schools
u5343 Kennarasamband Íslands	The Association of Teachers in Upper Secondary Schools
u5400 Kennarasamband Íslands	The Association of Teachers in Upper Secondary Schools

UTAN Outside federations

u5195 Félag starfsmanna Alþingis	Union of Employees of Althingi
u5222 Félag íslenskra flugumferðarstjóra	Icelandic Air Traffic Controllers' Association.
u5404 Kjarafélag tæknifræðinga	The Icelandic Society of Engineers
u5412 Leikarafélag Íslands	Icelandic Actors' Association
u5418 Læknafélag Íslands	The Icelandic Medical Association
u5536 Starfsmannafélag Ríkisendurskoðunar	Union of Employees of the National Audit Office
u5576 Starfsm.fél Sinfóníuhljómsveitar Íslands	Union of Members of the Symphonic Orchestra
u5732 Stéttarfélag verkfræðinga	Society of Chartered Engineers
u7581 Stéttarfélag íslenskra lyfjafræðinga	Pharmaceutical Society of Iceland

APPENDIX 2.C: LIST OF INSTITUTES

ID	Name of Institute
00-101	Embætti forseta Íslands
00-201	Alþingi
00-610	Umboðsmaður Alþingis
00-620	Ríkisendurskoðun
01-101	Forsætisráðuneyti aðalskrifstofa
01-231	Norræna ráðherranefndin
01-241	Umboðsmaður barna
01-251	Þjóðmenningarhúsið
01-255	Minningarsafn Halldórs Laxness
01-261	Óbyggðanefnd
01-271	Ríkislögmaður
01-901	Húsameistari ríkisins
01-902	Þjóðgarðurinn á Þingvöllum
02-101	Menntamálaráðuneyti aðalskrifstofa
02-201	Háskóli Íslands
02-202	Tilraunastöð háskólans að Keldum
02-203	Raunvísindastofnun Háskólans
02-204	Stofnun Sigurðar Nordals
02-205	Stofnun Árna Magnússonar á Íslandi
02-206	Orðabók Háskólans
02-207	Íslensk málstöð
02-208	Örnefnastofnun Íslands
02-210	Háskólinn á Akureyri
02-211	Tækniskóli Íslands
02-215	Kennaraháskóli Íslands
02-223	Rannsóknastofnun uppeldis- og menntamála
02-231	Rannsóknarráð Íslands
02-299	Háskóla- og rannsóknastarfsemi
02-301	Menntaskólinn í Reykjavík
02-302	Menntaskólinn á Akureyri
02-303	Menntaskólinn á Laugarvatni
02-304	Menntaskólinn við Hamrahlíð
02-305	Menntaskólinn við Sund
02-306	Framhaldsskóli Vestfjarða
02-307	Menntaskólinn á Egilsstöðum
02-308	Menntaskólinn í Kópavogi, fjölbraut
02-309	Kvennaskólinn í Reykjavík
02-319	Framhaldsskólar almennt
02-350	Fjölbrautaskólinn í Breiðholti
02-351	Fjölbrautaskólinn Ármúla
02-352	Flensborgarskóli fjölbraut
02-353	Fjölbrautaskóli Suðurnesja
02-354	Fjölbrautaskóli Vesturlands Akranesi
02-355	Framhaldsskólinn í Vestmannaeyjum
02-356	Fjölbrautaskóli Norðurlands vestra
02-357	Fjölbrautaskóli Suðurlands
02-358	Verkmenntaskóli Austurlands
02-359	Verkmenntaskólinn á Akureyri
02-360	Fjölbrautaskólinn í Garðabæ
02-361	Framhaldsskólinn í Austur-Skaftafellssýslu
02-362	Framhaldsskólinn á Húsvík
02-363	Framhaldsskólinn á Laugum
02-365	Borgarholtsskóli
02-430	Samskiptastöð heyrnarlaustra og heymarskertra
02-441	Fullorðinsfræðsla fatlaðra
02-506	Vélskóli Íslands
02-507	Stýrimannaskólinn í Reykjavík
02-514	Iðnskólinn í Reykjavík
02-516	Iðnskólinn í Hafnarfirði
02-523	Fósturskóli Íslands
02-524	Þroskaþjálfaskóli Íslands
02-531	Íþróttakennaraskóli Íslands
02-541	Hússtjórnarskólinn í Reykjavík
02-551	Hússtjórnarskólinn Hallormsstað
02-561	Myndlista- og handíðaskóli Íslands
02-562	Leiklistarskóli Íslands
02-563	Tónlistarskólinn í Reykjavík
02-564	Listdansskólinn
02-571	Sjómannaskólahúsið
02-720	Grunnskólar almennt
02-725	Námsháskóli Íslands
02-804	Kvikmyndaskoðun
02-902	Þjóðminjasafn Íslands
02-903	Þjóðskjalasafn Íslands
02-904	Safnahúsið við Hverfisgötu
02-905	Landsbókasafn Íslands, Háskólabókasafn
02-906	Listasafn Einars Jónssonar
02-907	Listasafn Íslands
02-908	Kvikmyndasafn Íslands
02-909	Blindrabókasafn Íslands
02-969	Ýmis stofnkostnaður og viðhald
02-972	Íslenski dansflokkurinn
02-979	Húsfriðunarsjóður
02-981	Kvikmyndasjóður
02-996	Íslenska upplýsingasamfélagið
03-101	Útanríkisráðuneyti aðalskrifstofa
03-201	Sýslumaðurinn á Keflavíkurflugvelli
03-211	Flugmálastjórn Keflavíkurflugvelli
03-300	Sendiráð Íslands og fastanefndir
03-301	Sendiráð Íslands í Berlín
03-302	Sendiráð Íslands í Kaupmannahöfn
03-303	Sendiráð Íslands í London
03-304	Sendiráð Íslands í Moskvu
03-305	Sendiráð Íslands í Ósló
03-306	Sendiráð Ísl. í París fastan OECD UNESCO FAO
03-307	Sendiráð Íslands í Stokkhólmi

03-308	Sendiráð Íslands í Washington	06-331	Umferðarráð
03-309	Fastanefnd Íslands hjá Sameinuðu þjóðunum	06-395	Landhelgisgæsla Íslands
03-310	Sendiráð Íslands í Brussel og hjá EB	06-398	Útlendingaeftirlitið
03-311	Fastanefnd Ísl hjá Norður-Atlantshafsbandal	06-411	Sýslumaðurinn í Reykjavík
03-312	Fastanefnd Ísl hjá alþjóðastofnunum og EFTA	06-412	Sýslumaðurinn Akranesi
03-313	Fastanefnd Íslands hjá ÖSE í Evrópu	06-413	Sýslumaðurinn Borgarnesi
03-314	Sendiráð Íslands í Peking	06-414	Sýslumaðurinn Stykkishólmi
03-315	Sendiráð Íslands í Ottawa	06-415	Sýslumaðurinn Búðardal
03-316	Sendiráð Íslands í Tókíó	06-416	Sýslumaðurinn Patreksfirði
03-317	Sendiráð Íslands í Helsinki	06-417	Sýslumaðurinn Bolungarvík
03-318	Fastanefnd Ísl hjá Evrópuráðinu	06-418	Sýslumaðurinn Ísafirði
03-390	Þróunarsamvinnustofnun Íslands	06-419	Sýslumaðurinn Hólmavík
03-401	Alþjóðastofnanir	06-420	Sýslumaðurinn Blönduósi
04-101	Landbúnaðarráðuneyti aðalskrifstofa	06-421	Sýslumaðurinn Sauðárkróki
04-211	Rannsóknastofnun landbúnaðarins	06-422	Sýslumaðurinn Siglufirði
04-221	Veiðimálastofnun	06-423	Sýslumaðurinn Ólafsfirði
04-233	Yfirdýralæknir	06-424	Sýslumaðurinn Akureyri
04-236	Aðfangaeftirlit ríkisins	06-425	Sýslumaðurinn Húsavík
04-261	Landbúnaðarháskólinn á Hvanneyri	06-426	Sýslumaðurinn Seyðisfirði
04-271	Bændaskólinn á Hólum	06-427	Sýslumaðurinn Neskaupstað
04-283	Garðyrkjuskóli ríkisins	06-428	Sýslumaðurinn á Eskifirði
04-311	Landgræðsla ríkisins	06-429	Sýslumaðurinn Höfn í Hornafirði
04-321	Skógrækt ríkisins	06-430	Sýslumaðurinn Vík í Mýrdal
04-331	Héraðsskógar	06-431	Sýslumaðurinn Hvolsvelli
04-831	Jarðasjóður og Jarðeignir ríkisins	06-432	Sýslumaðurinn Vestmannaeyjum
05-101	Sjávarútvegsráðuneyti aðalskrifstofa	06-433	Sýslumaðurinn Selfossi
05-202	Hafrannsóknastofnunin	06-434	Sýslumaðurinn Keflavík
05-203	Rannsóknastofnun fiskiðnaðarins	06-436	Sýslumaðurinn Hafnarfirði
05-204	Fiskistofa	06-437	Sýslumaðurinn Kópavogi
05-213	Verðlagsstofa skiptaverðs	06-490	Ýmis rekstrarkostnaður sýslumannsembætta
05-272	Bygging rannsóknarstofnunar sjávarútvegsins	06-501	Fangelsismálastofnun ríkisins
06-101	Dóms- og kirkjumálaráðuneyti aðalskrifstofa	06-701	Þjóðkirkja Íslands
06-102	Stjórnartíðindi	07-101	Félagsmálaráðuneyti aðalskrifstofa
06-105	Lögbirtingablað	07-302	Ríkissáttasemjari
06-201	Hæstiréttur	07-313	Jafnréttisstofa
06-210	Héraðsdómstólar	07-331	Vinnueftirlit ríkisins
06-211	Héraðsdómur Reykjavíkur	07-400	Barnaverndarstofa
06-212	Héraðsdómur Vesturlands	07-401	Barnaverndarráð Íslands
06-213	Héraðsdómur Vestfjarða	07-402	Unglingaheimili ríkisins
06-214	Héraðsdómur Norðurlands vestra	07-700	Málefni fatlaðra
06-215	Héraðsdómur Norðurlands eystra	07-701	Málefni fatlaðra Rvík
06-216	Héraðsdómur Austurlands	07-702	Málefni fatlaðra Reykjanesi
06-217	Héraðsdómur Suðurlands	07-703	Málefni fatlaðra Vesturlandi
06-218	Héraðsdómur Reykjaness	07-704	Málefni fatlaðra Vestfjörðum
06-251	Persónuvernd	07-705	Málefni fatlaðra Norðurl vestra
06-301	Ríkissaksóknari	07-706	Málefni fatlaðra Norðurl eystra
06-303	Ríkislögreglustjóri	07-707	Málefni fatlaðra Austurlandi
06-305	Lögregluskóli ríkisins	07-708	Málefni fatlaðra Suðurlandi
06-311	Lögreglustjórinn í Reykjavík	07-710	Meðferðarheimili og sambýli einhverfra
06-321	Almannavarnir ríkisins	07-711	Styrktarfélag vangefinna
		07-720	Skálatúnsheimilið Mosfellsbæ
		07-750	Greiningar- og ráðgjafarstöð ríkisins
		07-795	Framkvæmdasjóður fatlaðra

07-801	Jöfnunarsjóður sveitarfélaga	09-205	Skattstofa Norðurlands vestra Siglufirði
07-980	Vinumálastofnun	09-206	Skattstofa Norðurlands eystra Akureyri
07-981	Félagsmálaráðuneyti vinnumál	09-207	Skattstofa Austurlands Egilsstöðum
07-984	Atvinnuleysistryggingasjóður	09-208	Skattstofa Suðurlands Hellu
08-101	Heilbrigðis- og tryggingam.ráðuneyti aðalskr	09-209	Skattstofa Vestmannaeyja
08-201	Tryggingastofnun ríkisins	09-211	Skattstofa Reykjaness Hafnarfirði
08-301	Landlæknir	09-214	Yfirkattanevnd
08-305	Lýðheilsustöð	09-215	Skattrannsóknarstjóri ríkisins
08-311	Héraðslæknir í Reykjavík	09-261	Ríkistollstjóri
08-315	Héraðslæknir á Norðurlandi eystra	09-262	Tollstjórinn í Reykjavík
08-324	Heyrnar og talmeinstöð Íslands	09-402	Fasteignamat ríkisins
08-326	Sjónstöð Íslands	09-901	Framkvæmdasýsla ríkisins
08-327	Geislavarnir ríkisins	09-905	Ríkiskaup
08-330	Manneldisráð	09-980	Arnarhvoll
08-397	Lyfjastofnun	09-984	Fasteignir ríkissjóðs
08-399	Heilbrigðismál ýmis starfsemi	10-101	Samgönguráðuneyti aðalskrifstofa
08-402	Framkvæmdasjóður aldraðra	10-211	Vegagerðin
08-500	Heilugæslustöðvar almennt	10-335	Siglingastofnun Íslands
08-505	Heilsugæsla í Reykjavík	10-381	Rannsóknanevnd sjóslysa
08-510	Heilsuverndarstöðin í Reykjavík	10-471	Flugmálastjórinn
08-522	Heilsugæslustöðin Borgarnesi	10-481	Rannsóknanevnd flugslysa
08-524	Heilsugæslustöð Ólafsvík	10-512	Póst- og fjarskiptastofnun
08-525	Heilsugæslustöð Grundarfirði	10-651	Ferðamálaráð
08-526	Heilsugæslustöð Búðardal	11-101	Iðnaðarráðuneyti aðalskrifstofa
08-552	Heilsugæslustöð Dalvík	11-102	Einkaleyfastofan
08-553	Heilsugæslustöðin Akureyri	11-201	Iðntæknistofnun Íslands
08-555	Heilsugæslustöð Kópaskeri	11-203	Rannsóknastofnun byggingariðnaðarins
08-556	Heilsugæslustöð Raufarhöfn	11-299	Iðja og iðnaður
08-561	Heilsugæslustöð Vopnafirði	11-301	Orkustofnun
08-565	Heilsugæslustöð Eskifirði	12-101	Viðskiptaráðuneyti aðalskrifstofa
08-566	Heilsugæslustöð Fáskrúðsfirði	12-302	Löggildingarstofa
08-567	Heilsugæslustöð Djúpavogi	12-402	Fjármálaeftirlitið
08-568	Heilsugæslustöðin Höfn í Hornafirði	12-902	Samkeppnisstofnun
08-571	Heilsugæslustöðin Kirkjubæjarklaustri	13-101	Hagstofa Íslands
08-572	Heilsugæslustöð Vík í Mýrdal	14-101	Umhverfisráðuneyti aðalskrifstofa
08-574	Heilsugæsla Rangárbings	14-202	Náttúruvannsóknastöðin við Mývatn
08-575	Heilsugæslustöð Hellu	14-205	Náttúruvernd ríkisins
08-576	Heilsugæslustöð Laugarási	14-210	Veidistjóri
08-578	Heilsugæslustöð Hveragerði	14-211	Umhverfisstofnun
08-579	Heilsugæslustöð Þorlákshöfn	14-221	Hollustuvernd ríkisins
08-582	Heilsugæslustöð Hafnarfirði	14-301	Skipulagsstofnun
08-583	Heilsugæslustöð Garðabæ	14-310	Landmælingar Íslands
08-584	Heilsugæslustöð Kópavogi	14-321	Brunamálastofnun ríkisins
08-585	Heilsugæslustöð Seltjarnarnesi	14-401	Náttúrufræðistofnun Íslands
08-586	Heilsugæslustöðin Mosfellsbæ	14-403	Náttúrustofur
08-621	Forvarnarsjóður	14-407	Stofnun Vilhjálms Stefánssonar
08-996	Íslenska upplýsingasamfélagi	14-410	Veðurstofa Íslands
09-101	Fjármálaráðuneyti aðalskrifstofa	22-872	Lánasjóður íslenskra námsmanna
09-103	Ríkisbókhald	22-970	Ríkisútvarp
09-201	Ríkisskattstjóri	22-973	Þjóðleikhúsið
09-202	Skattstofan í Reykjavík	22-974	Sinfóníuhljómaveit Íslands
09-203	Skattstofa Vesturlands Akranesi	23-101	Fríhöfnin Keflavíkurflugvelli
09-204	Skattstofa Vestfjarða Ísafirði		

29-101 Áfengis- og tóbaksverslun ríkisins
29-932 Húseignin Borgartún 7
29-934 Tollstöðvarhús
31-301 Íslenskar orkurannsóknir

31-321 Rafmagnsveitur ríkisins
47-201 Íbúðalánasjóður
88-000 Landspítali Háskólasjúkrahús

APPENDIX 2.D: VARIABLES IN THE DATA SET

Variables on the individual:

Id: A number used to identify each individual. The ID number is the same throughout the sample, while not traceable back to the individual in question. Each individual can have more than one observation in the sample in the case where he/she is paid from more than one institute.

Gender: A dummy which takes the value 1 if the individual is a woman, 0 otherwise.

Age: Age of individual in the particular year, based on the year of birth.

Experience: Total experience based on the month and year the individual started work.

Univ: Dummy equals 1 if individual can be assumed to have university education, 0 otherwise.

Wage variables:

Daytime: Base wages paid for daytime work. Only individuals receiving base wages are included in the sample.

Fulltime: Base wages paid for daytime work adjusted for share of daytime work. Base wages for daytime work if the share was 100.

Total: Total earnings. Base wages along with any other type of payment, overtime or other.

Share: Daytime work as a share of full-time work. Only those with share from 0.2 to 1.2 are included in the sample.

Rdaytime: Base wages paid, 2004 prices.

Rfulltime: Base wages calculated per full-time equivalent, 2004 prices.

Rtotal: Total earnings, 2004 prices.

Lrdaytime: Log of base wages paid, 2004 prices.

Lrfulltime: Log of base wages calculated per full-time equivalent, 2004 prices.

Lrtotal: Log of total earnings, 2004 prices.

Workplace variables:

Instit: The institute where the individual works. The number of institutes in the sample is from 320–330.

Labamt: The number jobs at the institute.

Sizeinst: The number of individuals working at the institute.

Budget: The budget allocated to the institute.

Ministry: The ministry to which the institute belongs. There are 16 ministries in the sample.

m0-m88: Dummy, equals 1 for the ministry in question. Based on the variable *Ministry*.

Union variables:

Union: The union to which the individual belongs. The number of unions 47.

Uxxxx: Dummy, equals 1 if the individual belongs to the union in question, 0 else, where each union is identified by a four digit number. Based on the variable *Union*.

Womensh: The share of women in the union.

Partsh: The share of part time employees in the union.

Size: The size of the union, i.e. individuals belonging to the union.

Federation: Variable that takes the values “bhm,” “ki,” “bsrb” or “outside” depending on to which federation the union belongs. Based on the variable *Union*.

Bhm: Dummy, equals 1 for those that belong to the Association of Academics, BHM, 0 else.

Bsrb: Dummy, equals 1 for those that belong to the Federation of State and Municipal Employees, BSRB, 0 else.

Ki: Dummy, equals 1 for those that belong to the Teachers’ federation, KI, 0 else.

Outside: Dummy, equals 1 for those that are outside the federations, 0 else.

Cfederation: Federation adjusted for changes between periods. Used when applying direct comparison of federations between periods.

Cbhm: Bhm adjusted for changes between periods. Used when applying direct comparison of federations between periods.

Cbsrb: Bsr adjusted for changes between periods. Used when applying direct comparison of federations between periods.

Cki: Ki adjusted for changes between periods. Used when applying direct comparison of federations between periods.

Coutside: Outside adjusted for changes between periods. Used when applying direct comparison of federations between periods.

Bargaining unit:

Bargunit: Identification number for each set of institute and union in bargaining.

Location variables:

Municip: The municipality where the institute is located.

Country: Dummy, equals 1 for those that work outside the capital area, 0 else. Based on the variable *Municip*.

Close: Dummy, equals 1 for those that work close to the capital area, 0 else. Based on the variable *Municip*.

Time variables:

Year: 1994–1997 or 2001–2004.

Yxxxx: Dummies that take the value 1 in a particular year, 0 else. The years are 1994–1997 and 2001–2004.

Contractual variables:

Arbxx: Dummy which takes the value 1 if the union in question went into arbitration in the year specified, where xx takes value from 94–97 or 01–04, 0 else.

Arb1: Dummy which takes the value 1 if the union in question went into arbitration in any of the years 1994–1997, 0 else.

Arb2: Dummy which takes the value 1 if the union in question went into arbitration in any of the years 2001–2004, 0 else.

Thrstrxx: Dummy which takes the value 1 if the union in question threatened to strike in year xx, where xx takes value from 94–97 or 01–04, 0 else.

Thrstr1: Dummy which takes the value 1 if the union in question threatened to strike in any of the years 94–97, 0 else.

Thrstr2: Dummy which takes the value 1 if the union in question threatened to strike in any of the years 01–04, 0 else.

Strikexx: Dummy equals 1 if the union in question went on strike in year xx, where xx takes the value 94–97 or 01–04, 0 else.

Strike1: Dummy which takes the value 1 if the union in question went on strike in any of the years 94–97, 0 else.

Strike2: Dummy which takes the value 1 if the union in question went on strike in any of the years 01–04, 0 else.

Lstrxx: Dummy equals 1 if the union in question went on a long strike in year xx, where xx takes the value 94–97 or 01–04, 0 else. A long strike is defined as a strike lasting over 40 days (there were no strikes of length between 10 and 40 days).

Lstr1: Dummy which takes the value 1 if the union in question went on a long strike in any of the years 94–97, 0 else.

Lstr2: Dummy which takes the value 1 if the union in question went on a long strike in any of the years 01–04, 0 else.

Nostrike: Dummy which takes the value 1 if the union or employees of the institute in question is not allowed to strike, 0 else.

Wages system:

Newwage97: Dummy equals 1 if the union entered the new wage system in 1997, 0 else.

Newwage01: Dummy equals 1 if the union entered the new wage system in 2001, 0 else.

Oldwage: Dummy equals 1 if the union did not enter the new wage system, 0 else.

Alternative wages:

Altfullwage: Base wages in alternative job as estimated using data from Statistics Iceland. Base wages for full-time job. See below.

Alttotwage: Wages in alternative job as estimated using data from Statistics Iceland. Total earnings. See below.

APPENDIX 2.E: VARIABLES IN THE ALTERNATIVE WAGE DATA SET

id: id number to identify individuals within the sample. Individuals can be traced within each sample but not between samples.

jobxxxx: Dummies for the type of job according to the Icelandic standard ISTARF95, which is based on the International Labour Organisation (ILO) International Standard Classification of Occupations 1988 (ISCO-88). The job types chosen are those most comparable to the jobs in the public sector: Physical, mathematical and engineering science professionals and life science and health professionals (job2122), other professionals (job24), technicians and associate professionals (job3), clerks (job4), models, salespersons and demonstrators (job52). Job types in the data set for the earlier period are clerks and office workers.

age: Age of individual. Based on the birth year.

daywage: Wages paid for daytime work, fullwage adjusted for share.

fullwage: Wages paid for regular work, full-time equivalent.

totalwage: Total earnings for all work.

rdaywage: real daywage, 2004 prices.

rfullwage: real fullwage, 2004 prices.

rtotwage: real totwage, 2004 prices.

lrdaywage: log of rdaywage.

lrfullwage: log of rfullwage.

lrtotwage: log of rtotwage.

share: Share of full-time work.

workhrs: Total work hours.

yxxxx: year dummies for each of the years 1994–1997 and 2001–2004.

country: dummy equals 1 if the individuals lives in the countryside.

female: dummy equals 1 if the individual is a woman, 0 otherwise.

univ: dummy equal to 1 if the profession requires university education, 0 otherwise. Job types 2122, job24 and job3 get the value 1 in the data set for 2001–2004.

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CHAPTER THREE: ESTIMATING A MODEL OF COLLECTIVE BARGAINING IN THE PUBLIC SECTOR

Abstract

In this chapter I develop a model of collective bargaining as a two-stage process in the manner of Manning (1987). In the first step, the employer and the union bargain over wages, and in the second step, they bargain over employment, and the equilibrium is derived by solving the model using backward induction. The resulting two-equation nonlinear structural model is then applied to the central government in Iceland, estimated both without restrictions and with the different restrictions implied by the different bargaining models, in order to determine whether the collective bargaining structure has changed along with the changes in the collective bargaining agreements.

1. Introduction

How much and in which way did the changes in the collective bargaining structure change the wage structure? The previous chapter indicated that there might not be a fundamental change in the wage structure. To explore this matter further, I introduce a model of collective bargaining and later test the model on data from the public sector in Iceland.

Several models have been developed to describe the bargaining process between firms and unions. In the monopoly union model, the union sets the wage level unilaterally subject to the firm's labor demand curve, thus acting as a monopoly. When the wage has been set by the union, the firm reads off the labor demand curve how many workers to hire at the given wage (Booth, 1995). Therefore, no bargaining is involved

in the monopoly union model. This model thus represents an extreme case. A more realistic case is the right-to-manage model, in which the firm and the union are assumed to bargain over any surplus in order to determine wages. As in the monopoly union case, the employment level is determined by the firm. In fact, the monopoly union case is a special case of the right-to-manage model in which the firm has no bargaining power. Neither of the two models is Pareto efficient, as either party to the agreement can be made better off without making the other worse off by bargaining also over employment. This brings us to the efficient bargaining model; in this model both wages and employment are determined simultaneously in the bargaining process and, unlike the other two models, this model is efficient.

Traditionally the two competing models of bargaining, monopoly union and efficient bargaining, have been treated as separate models (see, for example, McDonald and Solow, 1981). In this chapter I make use of the collective bargaining model set forth by Manning (1987) and Abowd and Lemieux (1993). In his paper, Manning introduces a sequential framework for bargaining in the private sector, bargaining separately over wages and employment. In his formulation it is possible to distinguish between the different collective bargaining models discussed above: monopoly union, right to manage, and efficient bargaining.

In his sequential-bargaining framework, Manning considers the model in which the two parties bargain first over employment and then over wages as well as the model in which the bargaining is first over wages and then over employment. Manning shows that when the union and employer bargain first over employment, the level of employment will be such that the marginal product of labor equals the alternative wage, and thus, the contract is socially efficient. If the union and employer bargain

over wages first and then over employment, the result of the bargaining can be classified as monopoly union, right-to-manage, efficient bargaining, or even inefficient bargaining, depending on the parameters of the model. If the result of the bargaining does not qualify for any of the other results, Manning labels the result inefficient bargaining. In the model formulation, the bargaining power parameters are allowed to differ between the wage bargain and the employment bargain. A special case of efficient bargaining is strong efficiency, as described by Brown and Ashenfelter (1986), which implies that employment is based only on the alternative wage.

Although bargaining first over employment and then over wages yields a socially efficient outcome, bargaining in reverse order can be considered more realistic in the case of the public sector in Iceland, as the contract duration is usually around 3 years, whereas employment fluctuates throughout the duration of the contract. All union contracts stipulate wages, but only a handful make any stipulations about employment levels. Thus it is reasonable to assume that union bargaining power for wages and for employment may be different.

Trade union models usually focus on bargaining in the private sector, where the employers' objectives are profit maximizing. Few attempts have been made to model bargaining in the public sector, and there is no universally accepted model of how unions and government engage in bargaining (Hosken and Margolis, 1997). A few papers in the literature have extended the general model of collective bargaining to the public sector such as Currie (1991), Hosken and Margolis (1997), and Falch (2001).

Many models of bargaining rely on the presence of a threat point for both the employer and the union in the determination of the equilibrium contract. The threat points are usually the zero-profit level for the firm and the value of time evaluated at the alternative wage for union workers (Abowd and Lemieux, 1993). However, in the public sector it is not clear that such a firm threat point exists for the employer. Instead, outlays in the public sector depend on a budget allocated each year. Thus, there is little incentive to bargain tough with the unions, and therefore wages might be higher than they would otherwise be, as the budget can be sidestepped. Profit maximization is unlikely to be the objective of institutions or ministries in the public sector. Total available income limits production in the public sector as opposed to product or service demand in the private sector. Public-sector employees are also voters and through the political process might seek to increase the demand for their services. The effect of strikes in the public sector, however, may be less than in the private sector, as governments continue to receive tax revenues, whereas in the private sector no revenue is received while production is halted (Freeman, 1986).

2. Related research

A few papers have been published that estimate the structure of collective bargaining in the public sector. Eberts and Stone (1986) and Currie (1991) both look at teachers: Eberts and Stone in New York State, and Currie in Canada. Falch and Stöm (2006) look at the effects of decentralization of bargaining in local governments in Norway. Falch (2001) expands the Manning sequential bargaining model to include a third step, which is the determination of the public-sector budget.

Eberts and Stone (1986) use an efficient bargaining framework to test collective bargaining agreements made by teachers in New York State. The data are from the

New York Department of Education for the school years 1972–1973 and 1976–1977. They set up two competing models, a demand constraint model and a contract curve model. The results show strong support for the contract curve model.

In her paper, Currie (1991) studies the contracts of school teachers in Ontario, Canada. She uses contract data from 1975–1983 and estimates different versions of her model, both a standard model and a reduced form model, with and without fixed effects. The results suggest that employment contracts are strongly efficient. However, she is not able to reject the monopoly union model.

Falch and Ström (2006) study decentralization of wage agreements in local governments in Norway. Decentralization of wage bargaining should, according to the competitive model, increase pay differences and enhance efficiency as decentralized decisions on pay issues move local wages toward their competitive levels. However, according to Falch and Ström, observation and previous research suggest that public-sector labor markets are not well described by the competitive model. Union influence and monopsony power are often considered important factors in the public sector. Thus, the outcome of decentralization in the public sector is an empirical question.

Using individual earnings equations, they find that with decentralization, a larger budget means higher wages. Thus, the effect of budget size on wages increases as wage-setting is decentralized. They also find that wage differences increase somewhat as wage-setting is decentralized and that local wages become more responsive to local budgets.

Falch and Ström conclude their paper by conjecturing that common arguments on the expected efficiency gains from increased local flexibility in wage-setting in public institutions may be exaggerated, as the actual wage-setting process seems to be influenced by local unions, local interest groups, and local monopsony power, as well as by pay-equality norms, which change only slowly, over time.

Falch (2001) follows the Manning model of sequential bargaining in a theoretical paper, applying it to the public sector. He uses a model with two inputs, labor and nonlabor, and a Cobb-Douglas production function. Instead of two-stage bargaining in the manner of Manning, he adds a third stage and solves with backward induction. The third bargaining stage occurs when the government budget is determined. Then, he looks at different regimes. In the first regime the first stage of bargaining is where the union and the employer bargain over employment, in the second stage they bargain over wages, and in the third stage the budget is determined. The second regime he discusses is one in which employment is determined first, the budget second, and wages last. Finally, Falch looks at the case in which the budget is determined first, employment second, and wages last.

The first regime is shown to lead to efficient bargaining, as the outcome is on the contract curve. In the second regime, wages increase as budgets increase, which was shown empirically to be the case in Falch and Ström (2006). In general, the sign of the slope of the contract curve is independent of the timing of the budget decision.

Furthermore, wages are independent of the timing of the budget decision as long as nothing happens between the wage and employment bargains, and if the budget is determined before bargaining, the employment level is lower than it otherwise would be.

The two-stage bargaining model has been developed further, with applications to both the private sector and the public sector. Using the private sector, Alogoskoufis and Manning (1991) propose a test on the two-stage bargaining introduced by Manning (1987). They divide the independent variables into four categories, X1, X2, X3, and Z, where X1 are variables that affect only the profit function of the firm, X2 are variables that affect both the profit function of the firm and the utility function of the union, X3 are variables that affect only union utility, and, finally, Z are variables that affect neither the profit function nor the utility function. By running regressions on employment using 2SLS they show that it is possible to use this division of variables to test the model against the labor demand model and the efficient bargaining model. The test in the paper is on macro data, and both models are rejected. The authors recommend that the test be used on industry or establishment data.

Hosken and Margolis (1997) use Manning's model to test collective bargaining agreements of teachers in public schools in New York State in 1983, 1986, and 1989. Using two stage sequential bargaining over employment and wages on public-sector data, they estimate union power over wages and employment. According to their findings, union power varies depending on the bargaining model applied, that is, whether it is assumed to be monopoly union, right to manage, efficient bargaining, or inefficient bargaining. In the least constrained case, Hosken and Margolis find that the union bargaining power of wages is 0.53, while the union bargaining power over employment is higher, or 0.71.

According to their results, teachers in public schools in New York State do not engage in monopoly union or right-to-manage style bargaining. Most of them do not engage

in efficient bargaining, either. Thus, the results suggest that the outcome of the bargaining is not Pareto-efficient.

3. The model

In the manner of Manning (1987), collective bargaining is modeled here as a two-stage process. In the first step, the employer and the union bargain over wages, and in the second step they bargain over employment. The equilibrium is derived by solving the model using backward induction. First the equilibrium employment level, L , is found (the second stage) conditional on the outcome of the negotiated wage level, w , (the first stage). Then the equilibrium wage bargain is derived given that both parties know how this wage will affect the subsequent employment bargain.

Using a formal representation, in the second stage of the bargain when the wage, w , has already been determined, employment, L , will be chosen to solve the following problem:

$$\max_L (1 - q) \log V(w, L) + q \log U(w, L) \quad (1)$$

where q is the union power over the employment determination, $0 \leq q \leq 1$, V is the objective function of the employer, U is the objective function of the union, w is the wage level, and L is the employment level. This problem will yield a solution $L(w, q)$, which is assumed to be unique.

In the first stage of the sequential bargain, when the wage level is determined, w will be chosen to solve

$$\max_w (1 - p) \log V[w, L(w, q)] + p \log U[w, L(w, q)] \quad (2)$$

where p is the union power over the wage determination, $0 \leq p \leq 1$.

The model could be set up the other way around, so that employment is determined first, followed by wages. However, it is more common for wages to be determined in advance of employment as most contracts are valid for 2 to 3 years, whereas employment can be adjusted throughout the term of the contract. The model assumes that union power can vary between the wage determination and employment determination, that is, p does not have to equal q .

All of the different outcomes of the bargaining process can be incorporated into this model. In the monopoly union model, the union acts as a monopoly and unilaterally decides on wage levels, subject to the employer's labor demand curve, and thus no bargaining takes place. In the framework of this model, this means that the union has all the bargaining power over wages and no bargaining power over employment. Thus, $p = 1$ and $q = 0$. The model then becomes

$$\max_L \log V(w, L) \quad (3)$$

$$\max_w \log U[w, L(w)] \quad (4)$$

In the right-to-manage model, the union and employer bargain over wages, and then the employer chooses the employment level. In terms of the model, this implies that $0 < p < 1$ and $q = 0$. Thus, the model is now

$$\max_L \log V(w, L) \quad (5)$$

$$\max_w (1 - p) \log V[w, L(w)] + p \log U[w, L(w)] \quad (6)$$

In the case of efficient bargaining, the union has equal power over the wage determination and the employment determination. In that case, $p = q$ and the model becomes

$$\max_{w,L} (1 - p) \log V[w, L(w, p)] + p \log U[w, L(w, p)] \quad (7)$$

The model cannot be estimated without assuming some functional form for the objective functions for the employer and the union. The results are therefore not independent of the assumptions made on the functional forms. Here, the employer is the central government of Iceland, and the union is one of the public-sector unions.

In the absence of a universally accepted form for the employer's objective function in the public sector, I borrow the employer's objective function from the private sector and use a Cobb-Douglas production function and the objective of profit maximization, similar to Hosken and Margolis (1997) and Falch (2001). Thus, the employer's objective function is defined as

$$V(w, L) = f(L) - wL \quad (8)$$

where $f(L)$ is assumed to be Cobb-Douglas, with labor, L , being the only input.

$$V(w, L) = \gamma L^\alpha - wL \quad (9)$$

where L is the employment level, γ is a constant, and α is the returns to scale. A value of α between 0 and 1 implies decreasing returns to scale, while $\alpha = 1$ implies constant returns to scale and $\alpha > 1$ suggests increasing returns. Here, γ is assumed to be a function of employment characteristics. As the model will be applied to the public sector, an option would have been to add the budget and thus the third stage to the bargaining in the manner of Falch (2001). However, in the case of the public sector in Iceland, collective bargaining takes precedence over the budget. Thus, if the total cost of the bargain exceeds the allocated budget, the difference will be added to the budget.

The union objective function is defined as

$$U(w, L) = L^\varphi (w^\tau - b^\tau) \quad (10)$$

where b is the alternative wage or opportunity wage of a union member, φ signifies how much unions care about the employment level, L , and τ is an indicator of risk aversion. This form allows for risk-averse ($\tau < 1$) or risk-loving ($\tau > 1$) preferences of the union members.

Using backward induction, equilibrium is found by solving first for employment and then for wages. The equilibrium level of employment (L) conditional on the negotiated wage (w) is found by solving the Nash cooperative bargaining game over employment, which is equivalent to solving

$$\max_L (1 - q) \log V(w, L) + q \log U(w, L) \quad (11)$$

or, substituting the functional forms above,

$$\max_L (1 - q) \log(\gamma L^\alpha - wL) + q \log(L^\varphi (w^\tau - b^\tau)) \quad (12)$$

This can be solved for L , and given the solution we can close the model by solving the Nash cooperative bargaining game over wages. This is equivalent to solving

$$\max_w (1 - p) \log V[w, L(w, q)] + p \log U[w, L(w, q)] \quad (13)$$

or, using the functional forms above,

$$\max_w (1 - p) \log(\gamma L(w, q)^\alpha - wL(w, q)) + p \log(L(w, q)^\varphi (w^\tau - b^\tau)) \quad (14)$$

where the solution to the second stage is substituted in for L and p is not necessarily equal to q .

The level of employment that satisfies the first-order conditions for an interior solution of equation (12) is

$$L = \left(\frac{w}{\gamma(\alpha - q\alpha + q)} \right)^{\frac{1}{\alpha-1}} \quad (15)$$

Solving the Nash cooperative bargaining game over wages given the employment level gives

$$w = b \left[\frac{\alpha (1 - p) + p\varphi}{\alpha(1 - p) + p\varphi + p\tau(\alpha - 1)} \right]^{\frac{1}{\tau}} \quad (16)$$

Note that q , the bargaining power over employment, is not a factor in the wage equation. Furthermore, the wage, w , is an increasing function of the alternative wage, b . The wage, w , is also increasing in p , when $\tau = 1$ and $\alpha < 1$.

Finally, substituting equation (16) into equation (15) yields

$$L = \left[b \frac{1}{\gamma} \frac{\left[\frac{\alpha (1 - p) + p\varphi}{\alpha(1 - p) + p\varphi + p\tau(\alpha - 1)} \right]^{\frac{1}{\tau}}}{(\alpha - q\alpha + q)} \right]^{\frac{1}{\alpha-1}} \quad (17)$$

4. Implications of the model

The different collective bargaining models discussed above are special cases of the model above depending on the values of the parameters p and q .

The monopoly union model implies that $p = 1$ and $q = 0$ and thus, the solution takes the form

$$L = \left(\frac{w}{\gamma\alpha} \right)^{\frac{1}{\alpha-1}} \quad (18)$$

which is the labor demand curve that corresponds to the objective function given in equation (9), and

$$w = b \left[\frac{\varphi}{\varphi + \tau(\alpha - 1)} \right]^{\frac{1}{\tau}} \quad (19)$$

The right-to-manage model implies that $p < 1$ and $q = 0$, giving the solution

$$L = \left(\frac{w}{\gamma\alpha} \right)^{\frac{1}{\alpha-1}} \quad (20)$$

and

$$w = b \left[\frac{\alpha(1-p) + p\varphi}{\alpha(1-p) + p\varphi + p\tau(\alpha-1)} \right]^{\frac{1}{\tau}} \quad (21)$$

If $p = q$ the contracts are efficient, that is, the negotiated agreement is on the contract curve given by the government's and the union's preferences. In the efficient bargaining model, the solution is

$$L = \left(\frac{w}{\gamma(\alpha - p\alpha + p\gamma)} \right)^{\frac{1}{\alpha-1}} \quad (22)$$

and

$$w = b \left[\frac{\alpha(1-p) + p\varphi}{\alpha(1-p) + p\varphi + p\tau(\alpha-1)} \right]^{\frac{1}{\tau}} \quad (23)$$

If $p \neq q$ we observe inefficient bargaining, that is, the wage/employment combination is off the contract curve and off the demand curve as well, and the solution is identical to the original solution to the problem shown in equations (16) and (17).

5. Assumptions for estimating the model

To estimate the model, equations (16) and (17) are transferred into log form and an error term is added:

$$\log L = \left(\frac{1}{\alpha - 1} \right) \left[\log b - \log \gamma - \log(\alpha - q\alpha + q) + \frac{1}{\tau} \log(\alpha - \alpha p + p\varphi) - \frac{1}{\tau} \log(\alpha - \alpha p + p\varphi + p\tau\alpha - p\tau) \right] + \varepsilon \quad (24)$$

and

$$\log w = \log b + \frac{1}{\tau} \log(\alpha - \alpha p + p\varphi) - \frac{1}{\tau} \log(\alpha - \alpha p + p\varphi + p\tau\alpha - p\tau) + \xi \quad (25)$$

Where ε and ξ are statistical errors uncorrelated with the analysis variables on the right-hand side of equations (24) and (25). Before the model can be estimated, some simplifying assumptions have to be made. The variables p , q , and γ are not directly observable. Therefore, some assumptions have to be made in order to estimate these variables. The following approximating functions are defined to estimate the variables using observable characteristics. As p and q take values between 0 and 1, the functional form as shown in equations (26) and (27) is chosen so as to generate values between 0 and 1.

$$p = \frac{e^{z_1\beta_1}}{1 + e^{z_1\beta_1}} \quad (26)$$

$$q = \frac{e^{z_2\beta_2}}{1 + e^{z_2\beta_2}} \quad (27)$$

The functions allow the bargaining power for wages and employment to vary. As there is no a priori reason to believe that there are factors that affect the bargaining power

over employment and not the bargaining power over wages or vice versa, the vector of variables used to explain p and q will be the same in the estimation. Thus,

$$z_1 = z_2 \tag{28}$$

Here, union power is defined as a function of the size of the union, the share of women in the union, the share of part-time employees in the union, the average age of union members in the workplace in question, dummy variables indicating the union federation, a dummy variable indicating whether the union has the right to strike or not, the size of the institute, the budget per employee in the institute, dummy variables indicating the years, and a dummy variable *choice* indicating whether alternative employment options are readily available or not.¹

The employment characteristic γ is approximated using a vector of characteristics, x .

$$\gamma = x' \delta \tag{29}$$

The variables used here are the age of the union members in the workplace in question and dummy variables indicating the years.

Another simplifying assumption is that ϕ , the variable that signifies how much unions care about the employment level, is set equal to unity.

¹ The values assigned to the variable *choice* are described in Appendix 3.A.

$$\varphi = 1 \quad (30)$$

Finally, union members are assumed to be risk-neutral, and thus τ is set equal to 1.

$$\tau = 1 \quad (31)$$

Thus, the structural model that is estimated is

$$\log L = \left(\frac{1}{\alpha - 1} \right) [\log b - \log \gamma - \log(\alpha - q\alpha + q) + \log(\alpha - \alpha p + p) - \log(\alpha)] + \varepsilon \quad (32)$$

$$\log w = \log b + \log(\alpha - \alpha p + p) - \log(\alpha) + \xi \quad (33)$$

The error terms in the equations represent omitted variables, for instance missing information on the individuals, especially better information on education; measurement error in the included variables; unobserved heterogeneity on both the individuals and the institutes as well as any effects if functional form is not correct and assumptions given before the estimation do not hold.

6. Data

The data is described in detail in Section 4 of Chapter 2. The data on individuals is transformed into data on each bargaining unit. The bargaining unit is defined as each pair of union and institute that signs an institutional agreement. There can be many unions in a single institute, and a single union can be present in many institutes. There are 3,780 bargaining pairs in the period 1994–1997 and 3,963 in the period 2001–2004. Table 3.1 shows the mean and standard deviation of the variables used in the regressions.

Table 3.1. Descriptive statistics.

	1994-1997		2001-2004	
	Mean	St.dev.	Mean	St.dev.
log base wages	11.7828	0.2018	12.2985	0.2591
log total earnings	12.0470	0.4700	12.4411	0.4306
log alternative base wages	12.0322	0.3007	12.2416	0.5932
log alternative total earnings	10.6708	0.2766	12.4585	0.3628
age	43.5183	8.7840	44.9403	8.0864
year 1	0.2394	0.4268	0.2549	0.4358
year 2	0.2537	0.4352	0.2602	0.4388
year 3	0.2513	0.4338	0.2526	0.4346
year 4	0.2556	0.4362	0.2324	0.4224
size of union	606.6677	585.4782	788.3169	955.3626
female share in union	57.1280	29.4580	60.1208	25.7892
part time share in union	26.6909	19.8418	26.1546	19.1058
choice	0.7069	0.4553	0.7552	0.4300
federation bsrb	0.4503	0.4976	0.3954	0.4890
federation bhm	0.4257	0.4945	0.4855	0.4999
federation ki	0.0386	0.1927	0.0353	0.1846
outside federations	0.0854	0.2796	0.0838	0.2771
no strike	0.1336	0.3403	0.1408	0.3479
size of institute	51.9267	72.6559	65.5686	89.7195
average budget	5.3707	7.5520	13.4282	35.6798
N	3,780	-	3,963	-

7. Estimating the model

Before estimating the nonlinear structural model developed in the previous section, I start by estimating a linear model of employment to give me an indication of the results of the bargaining model and of whether to expect a difference between the two time periods.

If the labor demand model is the appropriate model, the alternative wage should be insignificant in determining employment and the relationship between inside wages and employment should be negative. The strong-form efficient bargaining model suggests that employment is fixed based on the alternative wage alone and, therefore, the inside wage should be insignificant in determining employment. Also, the relationship between employment and the alternative wage should be negative. The other forms of contracting, weakly efficient bargaining and inefficient bargaining, do not imply testable relationships on the employment regression.

The results of the employment regressions are shown in Appendix 3.B.

Looking at base wages, we see some indication of the strong-form efficient model in the period 1994–1997, with a negative relationship between the alternative wage and employment. For the period 2001–2004, the reverse is true, as the relationship between the inside wage and employment is negative, thus giving support to the labor demand model.

Looking at total earnings for the period 1994–1997, we see that the alternative wage is significant, which weakens the case for the labor demand model. The evidence for strong-form efficient contracts is also weak, as the inside wage is significant, although there is a negative relationship between the alternative wage and employment in the regressions. In the period 2001–2004, the inside wage and employment have a positive relationship, and thus the likelihood of the labor demand model is slim. The case for a strong-form efficient contract is also weak, given the significant inside wage and the positive relationship between the alternative wage and employment.

Although the results do not show a strong support for either the labor demand model or the strong-form efficient bargaining, the results support the theory that the changes in the contracting environment led to changes in the contracting outcome.

7.1. Estimating the nonlinear bargaining model

The structural equations (32) and (33) in the last section are estimated using feasible generalized nonlinear least squares on a system of nonlinear equations (nlsur in Stata). The model is estimated using a different set of restrictions to match the different bargaining models as well as the simplifying assumptions described in the previous section.

In addition to estimating the unconstrained model, the model is estimated under the restriction of the monopoly union or right-to-manage model, that is, one in which the union power over employment, q , is set equal to zero. The model is also estimated using the restriction of efficient bargaining, that is, with the bargaining power over wages set equal to the bargaining power over employment, or $p=q$. Finally, the unrestricted model is estimated after dropping the variable *choice*, which is a somewhat arbitrarily defined variable that indicates whether union members can easily move between jobs in the public sector and the private sector (see Appendix 3.A). This is done to determine whether the variable *choice* has a significant effect on the outcome of the model.

The structural model is estimated for both wage measures, base wages adjusted for full-time work and total earnings. The model is also estimated for each of the two time periods in question. Finally, an estimate of p and q is calculated by estimating \hat{p} and \hat{q} for each observation according to equations (26) and (27) and for each restriction on

the model. The estimates of p and q reported here are the mean of the \hat{p} s and the \hat{q} s in each case.

7.2. Unrestricted model

In the first specification of the structural model there are no restrictions on the estimation. Thus, the estimates of p and q are allowed to be different from each other.

The results can be seen in Table 3.2.

Table 3.2. Unrestricted model.

Standard errors in parentheses.

	Base wages		Total earnings	
	1994-1997	2001-2004	1994-1997	2001-2004
alfa	0.6993 (0.0082)	0.0000 (0.0000)	1.1135 (0.0152)	0.9990 (0.0000)
alternative wage (empl. eq.)	0.3874 (0.0236)	-0.9506 (0.0103)	-0.0228 (0.0087)	-0.0009 (0.0000)
constant (γ)	-237.8626 (77.0995)	-35.9576 -	1.1544 (0.0979)	0.9843 -
age (γ)	19.7988 (6.0608)	2.1779 (0.0463)	-0.0243 (0.0029)	0.0003 (0.0000)
age-squared (γ)	-0.2136 (0.0655)	-0.0236 (0.0008)	0.0003 (0.0000)	0.0000 (0.0000)
year 2 (γ)	2.1727 (3.7769)	2.6077 -	0.0041 (0.0040)	0.0000 (0.0000)
year 3 (γ)	2.4417 (3.9059)	1.6489 -	0.0023 (0.0041)	0.0000 (0.0000)
year 4 (γ)	4.8195 (4.2744)	1.9148 -	0.0030 (0.0041)	0.0001 (0.0000)
size of union (q)	0.0086 (0.0013)	0.0004 (0.0000)	0.0059 (0.0011)	0.0042 (0.0004)
female share in union (q)	-0.0553 (0.0164)	-0.0063 (0.0018)	-0.1048 (0.0264)	0.0701 (0.0134)
age (q)	-0.2742 (0.0650)	-0.0192 (0.0099)	-0.4565 (0.1023)	-0.8828 (0.0560)

Table 3.2 (Continued)

	Base wages		Total earnings	
	1994-1997	2001-2004	1994-1997	2001-2004
age squared (q)	0.0024 (0.0008)	0.0001 (0.0001)	0.0049 (0.0012)	0.0129 (0.0009)
part-time share in union (q)	0.0358 (0.0214)	0.0032 (0.0022)	0.1049 (0.0330)	-0.3092 (0.0402)
choice (q)	-6.3952 (0.9885)	-0.3835 (0.0652)	3.8754 (0.8830)	-1.7724 -
federation bhm (q)	1.3452 (0.8171)	-0.7334 (0.0734)	4.2529 (1.0978)	-1.1098 -
federation ki (q)	2.6610 (1.0758)	2.1420 -	9.1787 (1.9524)	6.9170 -
outside federations (q)	4.8787 (1.1936)	-0.5306 (0.1214)	2.4796 (1.2882)	7.6346 -
no strike (q)	368.0194 -	0.4439 (0.0838)	-0.9493 (0.6656)	7.2722 -
size of institute (q)	0.0704 (0.0096)	0.0062 (0.0005)	0.2521 (0.0442)	0.1718 (0.0114)
year 2 (q)	0.0990 (0.5179)	-0.2030 (0.0645)	0.2606 (0.5977)	-0.3207 -
year 3 (q)	0.3887 (0.5158)	-0.1144 (0.0652)	0.4851 (0.5988)	-0.2457 -
year 4 (q)	0.0605 (0.5115)	-0.1248 (0.0679)	0.1101 (0.5962)	-1.1271 -
average budget (q)	0.0287 (0.0213)	-0.0036 (0.0006)	-0.0505 (0.0296)	-0.0613 (0.0265)
size of union (p)	0.0004 (0.0001)	0.0000 (0.0000)	-0.0217 (0.0008)	-0.0086 (0.0009)
female share in union (p)	0.0453 (0.0046)	-0.0008 (0.0005)	0.2653 (0.0208)	-0.0739 (0.0193)
age (p)	-0.0469 (0.0148)	0.0056 (0.0045)	0.3575 (0.0989)	-0.8274 (0.0539)
age squared (p)	0.0002 (0.0002)	0.0000 (0.0000)	-0.0038 (0.0014)	0.0102 (0.0010)
part-time share in union (p)	0.0111 (0.0058)	-0.0033 (0.0006)	-0.1647 (0.0349)	0.1977 (0.0288)
choice (p)	-1.6605 (0.1639)	-0.2021 (0.0263)	19.9100 (1.5873)	4.8331 -

Table 3.2 (Continued)

	Base wages		Total earnings	
	1994-1997	2001-2004	1994-1997	2001-2004
federation bhm (p)	-3.0462 (0.2391)	0.9631 (0.0777)	-3.2639 (1.6358)	19.0179 -
federation ki (p)	-26.8823 -	0.5529 (0.0604)	-0.6792 (1.7987)	9.3542 -
outside federations (p)	-0.0220 (0.2987)	1.5900 (0.2008)	8.8246 (2.0594)	14.6256 -
no strike (p)	2.9887 (0.2757)	-0.0138 (0.0247)	-41.0900 -	-6.5153 -
size of institute (p)	-0.0148 (0.0015)	-0.0006 (0.0001)	-0.1200 (0.0061)	-0.0011 (0.0027)
year 2 (p)	0.2144 (0.1424)	0.1089 (0.0197)	0.3110 (0.8525)	0.4299 -
year 3 (p)	0.0460 (0.1415)	0.1836 (0.0228)	-0.4238 (0.8303)	0.4792 -
year 4 (p)	-0.2970 (0.1403)	0.2166 (0.0266)	-0.0807 (0.8112)	0.5532 -
average budget (p)	-0.0034 (0.0066)	0.0003 (0.0002)	0.0437 (0.0466)	0.1567 (0.0204)
alternative wage (wage eq.)	0.9689 (0.0004)	0.0473 (0.0050)	1.1359 (0.0011)	0.9985 (0.0003)
R-squared				
Employment eq.	0.5809	0.6243	0.6145	0.6630
Wage eq.	0.9998	0.9998	0.9989	0.9996
Estimate of p	0.3287 (0.0215)	0.6622 (0.0291)	0.7098 (0.0267)	0.5016 (0.0177)
Estimate of q	0.3774 (0.0356)	0.2895 (0.0284)	0.6612 (0.0382)	0.2951 (0.0171)

The overall fit is similar between the four regressions. Looking at total earnings, the returns to scale (α) has a value of around one. The alternative wage has a small

negative coefficient in the employment equation, while it has a coefficient close to one in the wage equation, except when looking at base wages in the second period.

Looking first at the bargaining power of unions over wages (p), union size has a positive impact on base wages, but a negative impact on total earnings. Having a larger female share in the union has a positive impact in the first period, but a negative impact in the second period. Having an outside choice reduces the bargaining power over base wages, but it increases the bargaining power over total earnings. Not having the right to strike reduces the bargaining power over wages, except for base wages in the first period. The larger the institute, the lower the bargaining power over wages.

The bargaining power of unions over employment (q) increases with the size of the union. The bargaining power decreases with the share of females in the union and increases with the share of part-time workers. The exception is total earnings in the second period. The explanation could be the correlation between female share and part-time share. Having an outside option for employment reduces the bargaining power over employment, except for total earnings in the first period. Not having the right to strike increases the bargaining power over employment with the same exception. Also, the size of the institute increases the bargaining power over employment.

In this model p and q are allowed to vary; thus there is a difference between the estimated values for p and q . There is also a difference between the estimated values for p and q between base wages and total earnings. Except for base wages in the first period, the bargaining power of unions over wages is larger than their bargaining power over employment. For base wages in the first period, the estimated values of p

and q are quite similar: 0.33 and 0.38, respectively. For total earnings in the first period, the estimated values of p and q are 0.71 and 0.66. Thus, in the first period the bargaining power of unions seems to be higher for total earnings than for base wages. The reverse is true in the second period, when the bargaining power over wages is smaller for total earnings than for base wages (0.50 compared with 0.66). The bargaining power over employment is similar for total earnings and base wages in the second period (0.30 compared with 0.29).

Based on these estimates, it is unlikely that $q=0$. It is, however, possible that $p=q$, especially in the first period. In those two cases, the estimates of p and q are easily within two standard deviations of each other. These possibilities will be explored further in the next two sections, when these restrictions will be imposed on the model.

7.3. Restricting the model to be either monopoly union or right to manage ($q=0$)

In the right-to-manage model and the monopoly union model, the union power over employment, q , is equal to zero. Which model applies depends on the value of p . If p is significantly lower than one, the right-to-manage model applies. However, if p is not significantly different from one, the monopoly union model applies. In this specification, the result of which can be seen in Table 3.3, q is forced to be equal to zero, which is equivalent to imposing a labor demand model on the data.

The overall fit of the model is similar for each of the regressions, while lower than in the unrestricted case with the exception of total earnings in the second period. The returns to scale (α) has a value of around one when looking at total earnings, which is similar to the unrestricted case. The alternative wage has only a small effect in the

employment equation, while the coefficient in the wage equation is close to one, which is also in line with the results of the unrestricted model.

Table 3.3. Restricted model where $q=0$.

Standard errors in parentheses.

	Base wage		Total earnings	
	1994-1997	2001-2004	1994-1997	2001-2004
alfa	0.6944 (0.0071)	8.4E-01 (0.0179)	1.0136 (0.0139)	1.0975 (0.0089)
alternative wage (empl. eq.)	0.5550 (0.0046)	0.0810 (0.0100)	-0.0072 (0.0073)	0.0758 (0.0082)
constant (γ)	-2673.3640 -	-0.6912 (0.7099)	0.9860 (0.0192)	3.5593 (0.4245)
age (γ)	200.0133 (3.7749)	0.2314 (0.0659)	-0.0042 (0.0038)	-0.0699 (0.0121)
age-squared (γ)	-2.1705 (0.0450)	-0.0025 (0.0007)	0.0000 (0.0000)	0.0008 (0.0001)
year 2 (γ)	36.0524 (29.2727)	0.0477 (0.0375)	0.0003 (0.0007)	0.0064 (0.0097)
year 3 (γ)	67.5771 (30.1601)	0.0618 (0.0397)	-0.0005 (0.0008)	0.0044 (0.0097)
year 4 (γ)	112.7157 (30.4947)	0.1055 (0.0478)	-0.0007 (0.0009)	-0.0152 (0.0101)
size of union (q)	-	-	-	-
female share in union (q)	-	-	-	-
age (q)	-	-	-	-
age squared (q)	-	-	-	-
part-time share in union (q)	-	-	-	-
choice (q)	-	-	-	-
federation bhm (q)	-	-	-	-

Table 3.3 (Continued)

	Base wage		Total earnings	
	1994-1997	2001-2004	1994-1997	2001-2004
federation ki (q)	-	-	-	-
outside federations (q)	-	-	-	-
no strike (q)	-	-	-	-
size of institute (q)	-	-	-	-
year 2 (q)	-	-	-	-
year 3 (q)	-	-	-	-
year 4 (q)	-	-	-	-
average budget (q)	-	-	-	-
size of union (p)	-0.0001 (0.0001)	-0.0112 (0.0038)	-0.0214 (0.0007)	-0.0923 (0.0038)
female share in union (p)	0.0447 (0.0044)	-0.1055 (0.0470)	0.1692 (0.0236)	-0.7974 (0.0741)
age (p)	0.0033 (0.0141)	0.6384 (0.2302)	1.0850 (0.0485)	-2.3103 (0.1577)
age squared (p)	-0.0004 (0.0002)	-0.0075 (0.0028)	-0.0119 (0.0008)	0.0389 (0.0023)
part-time share in union (p)	0.0081 (0.0058)	1.5479 (0.5308)	0.1991 (0.0429)	2.2719 (0.1071)
choice (p)	-1.4055 (0.1452)	-9.1306 (3.6872)	2.4800 (0.6762)	26.9748 (1.6167)
federation bhm (p)	-3.3678 (0.2623)	34.2306 (11.8395)	-19.1435 (0.7917)	68.8825 -
federation ki (p)	-10.5869 -	-18.5786 (6.4647)	-27.1805 -	5.3691 -
outside federations (p)	-0.8771 (0.2826)	167.3566 -	-18.9460 (0.9187)	30.5541 (2.4398)
no strike (p)	1.9923 (0.2174)	-8.3576 (3.2409)	-8.9622 (0.6239)	-34.0236 (2.1639)

Table 3.3 (Continued)

	Base wage		Total earnings	
	1994-1997	2001-2004	1994-1997	2001-2004
size of institute (p)	-0.0211 (0.0019)	-0.2738 (0.0931)	-0.1897 (0.0092)	-0.2200 (0.0099)
year 2 (p)	0.2393 (0.1420)	1.3538 (1.1931)	0.1862 (0.6993)	-0.5775 (1.7042)
year 3 (p)	0.1022 (0.1421)	0.8644 (1.1469)	0.2477 (0.7070)	0.2231 (1.6310)
year 4 (p)	-0.2352 (0.1413)	1.9333 (1.3962)	0.7077 (0.7166)	0.8686 (1.6630)
average budget (p)	-0.0116 (0.0069)	0.0023 (0.0378)	0.0295 (0.0443)	1.1227 (0.0564)
alternative wage (wage eq.)	0.9684 (0.0004)	0.9910 (0.0016)	1.1297 (0.0011)	1.0026 (0.0005)
R-squared				
Employment eq.	0.4893	0.5002	0.5629	0.6004
Wage eq.	0.9998	0.9982	0.9989	0.9996
Estimate of p	0.3360 (0.0210)	0.8217 (0.0196)	0.6882 (0.0297)	0.5356 (0.0126)
Estimate of q	- -	- -	- -	- -

The effect of the female share in unions on the bargaining power of unions over wages, given that the bargaining power over employment is zero, is larger for total earnings than for base wages, and it changes sign between the two periods. It is positive in the first period, and negative in the second. Similarly, the effect of a higher share of part-time workers in a union on union bargaining power is larger in the second period than in the first, and also larger for total earnings than for base wages. The effect of having an outside choice for employment is negative on base wages, but positive for total earnings, and not being allowed to strike has a negative impact on the bargaining power of unions over wages, except for base wages in the first period. The

effect of the size of the union on the bargaining power of wages turns out to be negative when restricting q to be zero. On the other hand, the larger the institute, the smaller the union power over wages. The average budget does not affect union power over wages, except in the second period when determining total earnings.

With q being set equal to zero, p is estimated to be 0.34 for base wages in the first period and much higher in the second period, or 0.82. Looking at total earnings, we see that the difference is much smaller, as the bargaining power of unions over wages (p) is estimated to be 0.69 in the first period but falls to 0.54 in the second.

7.4. Restricting the model to efficient bargaining ($p=q$)

In this specification, the bargaining power of unions over wages is set to be equal to the bargaining power of unions over employment. This imposes the efficient bargaining model on the data. The results of this specification can be seen in Table 3.4.

As when using no restrictions on p and q , the overall fit of the model is similar between the different regressions. The R-squared values are lower than in the unrestricted case, and even lower than in the case of $q=0$.

As in the other two specifications on the model, the alternative wage has little effect on base wages in the wage equation, while the coefficient is closer to one in the total earnings regressions. The size of the union has a very small negative effect on union bargaining power. The share of females in the union changes sign between the two periods, from positive to negative, as in the case of $q=0$. Here, however, the coefficients are much smaller. Working part-time has a negative effect on union

bargaining power, except for total earnings in the second period. Having an outside employment option has a negative effect on the union bargaining power. Not having the right to strike increases the bargaining power of unions under the restriction of $p=q$, except in the second period when it comes to base wages. Here the size of the institute has a very little negative effect on union bargaining power.

Table 3.4. Restricted model where $p=q$.

Standard errors in parentheses.

	Base wage		Total earnings	
	1994-1997	2001-2004	1994-1997	2001-2004
alfa	0.0007 (0.0001)	6.46E-06 (0.0000)	0.0127 0.0037	1.8650 (0.0744)
alternative wage (empl. eq.)	-0.0691 (0.0102)	-0.5153 (0.0057)	0.1145 0.0276	0.4791 (0.0052)
constant (γ)	-4033.5100	-2182.9370	-1686.0210	918.2096
age (γ)	267.7689 (2.4371)	139.3654 .	112.9845 2.2870	-37.4103 (0.4598)
age-squared (γ)	-2.9571 (0.0392)	-1.5254 (0.0106)	-1.2491 0.0300	0.4061 (0.0068)
year 2 (γ)	-52.8368 -	37.3454 -	-25.3648 34.2507	0.8034 (3.3893)
year 3 (γ)	-54.9053 -	-22.6138 -	-20.1047 35.8497	0.1889 (3.3940)
year 4 (γ)	43.9986 -	4.6733 -	17.7751 32.2908	-2.4634 (3.3873)
size of union (q)	-0.0003 (0.0001)	0.0000 (0.0000)	-0.0003 0.0001	-0.0024 (0.0006)
female share in union (q)	0.0185 (0.0019)	-0.0002 (0.0006)	0.0047 0.0025	-0.0352 (0.0105)
age (q)	0.0677 (0.0080)	0.0242 (0.0026)	0.0612 0.0091	0.3754 (0.0806)
age squared (q)	-0.0006 (0.0001)	-0.0002 (0.0000)	-0.0007 0.0001	-0.0045 (0.0009)

Table 3.4 (Continued)

	Base wage		Total earnings	
	1994-1997	2001-2004	1994-1997	2001-2004
part-time share in union (q)	-0.0138 (0.0035)	-0.0061 (0.0008)	-0.0241 0.0036	0.3761 (0.0805)
choice (q)	-0.7779 (0.1231)	-0.2555 (0.0324)	-0.1384 0.0813	-6.9432 (1.9380)
federation bhm (q)	0.9199 (0.1279)	1.2667 (0.0447)	-0.0926 0.0885	0.4361 (0.5300)
federation ki (q)	-0.2275 (0.1541)	0.9031 (0.0860)	-0.5043 0.1490	55.9294 -
outside federations (q)	3.8742 (1.6085)	74.8451 -	0.3412 0.2288	12.4401 -
no strike (q)	124.2113 -	-0.0292 (0.0332)	47.2439 -	5.6299 (2.1639)
size of institute (q)	-0.0009 (0.0002)	-0.0004 (0.0001)	-0.0010 0.0003	-0.0017 (0.0011)
year 2 (q)	0.2627 (0.0503)	0.1415 (0.0237)	0.1358 0.0769	-0.4124 (0.2722)
year 3 (q)	0.3230 (0.0528)	0.2342 (0.0250)	-0.0349 0.0754	-0.2241 (0.2951)
year 4 (q)	0.4967 (0.0595)	0.2869 (0.0297)	-0.0533 0.0764	1.0675 (0.4578)
average budget (q)	0.0207 (0.0052)	0.0001 (0.0002)	0.2702 0.0318	-0.0121 (0.0036)
size of union (p)	-0.0003 (0.0001)	0.0000 (0.0000)	-0.0003 (0.0001)	-0.0024 (0.0006)
female share in union (p)	0.0185 (0.0019)	-0.0002 (0.0006)	0.0047 (0.0025)	-0.0352 (0.0105)
age (p)	0.0677 (0.0080)	0.0242 (0.0026)	0.0612 (0.0091)	0.3754 (0.0806)
age squared (p)	-0.0006 (0.0001)	-0.0002 (0.0000)	-0.0007 (0.0001)	-0.0045 (0.0009)
part-time share in union (p)	-0.0138 (0.0035)	-0.0061 (0.0008)	-0.0241 (0.0036)	0.3761 (0.0805)
choice (p)	-0.7779 (0.1231)	-0.2555 (0.0324)	-0.1384 (0.0813)	-6.9432 (1.9380)
federation bhm (p)	0.9199 (0.1279)	1.2667 (0.0447)	-0.0926 (0.0885)	0.4361 (0.5300)

Table 3.4 (Continued)

	Base wage		Total earnings	
	1994-1997	2001-2004	1994-1997	2001-2004
federation ki (p)	-0.2275 (0.1541)	0.9031 (0.0860)	-0.5043 (0.1490)	55.9294 -
outside federations (p)	3.8742 (1.6085)	74.8451 -	0.3412 (0.2288)	12.4401 -
no strike (p)	124.2113 -	-0.0292 (0.0332)	47.2439 -	5.6299 (2.1639)
size of institute (p)	-0.0009 (0.0002)	-0.0004 (0.0001)	-0.0010 (0.0003)	-0.0017 (0.0011)
year 2 (p)	0.2627 (0.0503)	0.1415 (0.0237)	0.1358 (0.0769)	-0.4124 (0.2722)
year 3 (p)	0.3230 (0.0528)	0.2342 (0.0250)	-0.0349 (0.0754)	-0.2241 (0.2951)
year 4 (p)	0.4967 (0.0595)	0.2869 (0.0297)	-0.0533 (0.0764)	1.0675 (0.4578)
average budget (p)	0.0207 (0.0052)	0.0001 (0.0002)	0.2702 (0.0318)	-0.0121 (0.0036)
alternative wage (wage eq.)	0.3829 (0.0099)	0.0511 (0.0049)	0.7394 0.0274	1.0463 (0.0032)
R-squared				
Employment eq.	0.4380	0.4906	0.4401	0.4914
Wage eq.	0.9999	0.9998	0.9991	0.9996
Estimate of p	0.9252 (0.0066)	0.7700 (0.0081)	0.8170 (0.0164)	0.9647 (0.0106)
Estimate of q	0.9252 (0.0066)	0.7700 (0.0081)	0.8170 (0.0164)	0.9647 (0.0106)

Table 3.5. Unrestricted model without *choice*.

Standard errors in parentheses.

	Base wage		Total earnings	
	1994-1997	2001-2004	1994-1997	2001-2004
alfa	0.6374 (0.0124)	0.0000 (0.0000)	0.0161 (73.4800)	1.0950 (0.0091)
alternative wage (empl. eq.)	0.6111 (0.0053)	-0.9517 (0.0095)	-0.0272 (0.0133)	0.0848 (0.0090)
constant (γ)	-4992.9680 -	-34.1874 -	1.2354 (0.1678)	3.8287 (0.4981)
age (γ)	366.9780 (7.2394)	2.0658 (0.0388)	-0.0340 (0.0048)	-0.0720 (0.0138)
age-squared (γ)	-3.9499 (0.0874)	-0.0224 (0.0006)	0.0004 (0.0001)	0.0008 (0.0002)
year 2 (γ)	63.0732 (67.2301)	2.4365 -	0.0024 (0.0051)	-0.0008 (0.0112)
year 3 (γ)	67.1558 (69.2416)	1.5524 -	-0.0032 (0.0051)	0.0012 (0.0113)
year 4 (γ)	109.4459 (68.7772)	1.3611 -	-0.0013 (0.0051)	-0.0087 (0.0117)
size of union (q)	0.0088 (0.0012)	0.0004 (0.0000)	0.0070 (0.0019)	0.0043 (0.0010)
female share in union (q)	-0.1568 (0.0243)	-0.0095 (0.0018)	-0.3903 (0.0966)	0.0691 (0.0223)
age (q)	-0.5564 (0.0823)	-0.0285 (0.0092)	0.6289 (0.1713)	-0.8777 (0.1986)
age squared (q)	0.0052 (0.0009)	0.0002 (0.0001)	-0.0065 (0.0019)	0.0125 (0.0028)
part-time share in union (q)	0.1138 (0.0252)	0.0091 (0.0021)	0.1692 (0.0576)	-0.3560 (0.0863)
choice (q)	- -	- -	- -	- -
federation bhm (q)	11.4184 (1.5948)	-0.6342 (0.0737)	-7.8818 (2.1596)	-0.4006 (0.9110)
federation ki (q)	12.5988 (1.7990)	2.9720 -	-5.0061 (2.0453)	8.5621 (2.1253)
outside federations (q)	10.9867 (1.6801)	-0.5108 (0.1251)	-17.6111 (4.4635)	7.9394 (2.0457)

Table 3.5 (Continued)

	Base wage		Total earnings	
	1994-1997	2001-2004	1994-1997	2001-2004
no strike (q)	5.6020 (0.8954)	0.5351 (0.0866)	-343.5867 -	7.5839 (1.9106)
size of institute (q)	0.1180 (0.0158)	0.0067 (0.0006)	0.2578 (0.0590)	0.1783 (0.0398)
year 2 (q)	-0.2957 (0.4862)	-0.1984 (0.0664)	0.0099 (0.7971)	-0.3442 (0.7390)
year 3 (q)	0.3319 (0.4863)	-0.1142 (0.0673)	0.2000 (0.7934)	-0.3344 (0.7704)
year 4 (q)	0.6142 (0.4986)	-0.0749 (0.0701)	-0.0777 (0.8172)	-0.7305 (0.8095)
average budget (q)	-0.1015 (0.0312)	-0.0040 (0.0006)	-0.5886 (0.1465)	-0.0625 (0.0332)
size of union (p)	0.0005 (0.0001)	0.0000 (0.0000)	-0.0258 (0.0007)	-0.0067 (0.0017)
female share in union (p)	0.0959 (0.0108)	-0.0026 (0.0005)	0.4084 (0.0206)	0.4484 (0.1181)
age (p)	-0.3355 (0.0362)	0.0052 (0.0022)	1.6491 (0.0627)	-4.5014 (0.8873)
age squared (p)	0.0032 (0.0004)	0.0000 (0.0000)	-0.0195 (0.0009)	0.0531 (0.0104)
part-time share in union (p)	-0.0039 (0.0058)	-0.0016 (0.0006)	-0.4452 (0.0329)	-0.4069 (0.1239)
choice (p)	-	-	-	-
federation bhm (p)	-1.5939 (0.1733)	1.1116 (0.0312)	-21.6445 (0.6707)	84.5578 (17.3169)
federation ki (p)	-18.1267 -	0.7802 (0.0510)	-14.9374 (2.6463)	72.1293 (15.4669)
outside federations (p)	2.7045 (0.8389)	1.9283 -	-17.2368 (1.3812)	115.6613 -
no strike (p)	-17.2467 -	0.0641 (0.0260)	-50.8438 -	-14.0294 (3.4385)
size of institute (p)	-0.0154 (0.0018)	-0.0006 (0.0001)	-0.1275 (0.0066)	-0.0066 (0.0040)
year 2 (p)	0.0387 (0.1318)	0.1180 (0.0198)	0.5088 (0.8457)	-0.4139 (0.9587)

Table 3.5 (Continued)

	Base wage		Total earnings	
	1994-1997	2001-2004	1994-1997	2001-2004
year 3 (p)	-0.2095 (0.1351)	0.1998 (0.0208)	1.1398 (0.8345)	-0.7078 (1.0530)
year 4 (p)	-0.5504 (0.1402)	0.2277 (0.0240)	1.3693 (0.8354)	-0.5993 (1.0291)
average budget (p)	-0.0226 (0.0096)	0.0001 (0.0002)	0.0012 (0.0317)	0.3868 (0.0833)
alternative wage (wage eq.)	0.9740 (0.0003)	0.0439 (0.0050)	1.1402 (0.0011)	1.0024 (0.0005)
R-squared				
Employment eq.	0.5882	0.6218	0.5912	0.6615
Wage eq.	0.9998	0.9998	0.9989	0.9996
Estimate of p	0.1209 (0.0136)	0.6967 (0.0089)	0.7159 (0.0262)	0.5198 (0.0176)
Estimate of q	0.3541 (0.0329)	0.3158 (0.0279)	0.5185 (0.0286)	0.3121 (0.0281)

When union bargaining power over employment and wages is restricted to be identical, bargaining power is lower for total earnings than base wages in the first period, while in the second period bargaining power is lower for base wages than for total earnings. Union bargaining power is estimated between 0.77 and 0.96 under the restriction of $p=q$.

7.5. Unrestricted model without the variable *choice*

The fourth specification is identical to the unrestricted model, except one of the variables has been dropped. The variable *choice*, which is a dummy variable indicating the ease with which a union member can move from the public sector to the

private sector, is a somewhat arbitrarily defined variable; thus, the model was also estimated after dropping this variable to see whether it had a significant effect on the outcome of the model. The results are shown in Table 3.5.

After the variable *choice* is dropped, the results do not change much from the original unrestricted model. The largest difference occurs where the variable *no strike* changes sign in the bargaining power over wages from the unrestricted model in the first period. The overall fit is similar to the original unrestricted model, and the estimated values for p and q are similar, except for the value of p for base wages in the first period. The estimated value is 0.12 compared with 0.33 in the original model.

7.6. Structural model estimates

None of the restrictions placed on the model seem to affect the model's explanatory power to any great extent. The estimate of the returns to scale in public services (α) is close to one when looking at total earnings. When looking at base wages, we see that the estimated value in the first period is between 0.6 and 0.7, while it is practically zero in the second period. These estimates hold for the different specifications of the model, except when p and q are restricted to be equal. In that case the estimated value of α is close to zero, except for total earnings in the second period, where the value is 1.87.

The estimated values for p and q can be seen in Table 3.6. In the first period, under the old regime, union bargaining power over wages and employment seems to be higher for total earnings than for base wages, with the exception of the restriction $p=q$. This is reversed in the second period, when the bargaining power over wages and

employment is higher for base wages than for total earnings, with the same exception as in the first period.

Table 3.6. Estimated values for p and q .
Standard errors in parentheses.

1994-1997		no restrictions	q=0	p=q	w/o choice
Base wages	p	0.3287 (0.0215)	0.3360 (0.0210)	0.9252 (0.0066)	0.1209 (0.0136)
	q	0.3774 (0.0356)	- -	0.9252 (0.0066)	0.3541 (0.0329)
Total earnings	p	0.7098 (0.0267)	0.6882 (0.0297)	0.8170 (0.0164)	0.7159 (0.0262)
	q	0.6612 (0.0382)	- -	0.8170 (0.0164)	0.5185 (0.0286)
2001-2004		no restrictions	q=0	p=q	w/o choice
Base wages	p	0.6622 (0.0291)	0.8217 (0.0196)	0.7700 (0.0081)	0.6967 (0.0089)
	q	0.2895 (0.0284)	- -	0.7700 (0.0081)	0.3158 (0.0279)
Total earnings	p	0.5016 (0.0177)	0.5356 (0.0126)	0.9647 (0.0106)	0.5198 (0.0176)
	q	0.2951 (0.0171)	- -	0.9647 (0.0106)	0.3121 (0.0281)

Hosken and Margolis (1997) found that in the most unrestricted case when looking at teachers' wages, the bargaining power over wages (p) was 0.53, and the bargaining power over employment (q) was 0.71, which is contrary to my results, in which I obtain similar values for p and q in the first period and a higher value for p than for q in the second period.

The results for the estimated values of p and q suggest that in the first period, 1994–1997, it is possible that the bargaining power of unions over wages, p , and the bargaining power of unions over employment, q , are equal. If I look at two standard deviations from the estimate for p and q , these ranges coincide. Thus there is a possibility of efficient bargaining in that period. On the other hand, looking at two standard deviations from the estimate in the period 2001–2004, I find that that ranges do not coincide, and therefore it is unlikely that there is efficient bargaining in the second period.

The estimated values for q in all cases in the unrestricted case is more than ten standard deviations from zero; thus it is unlikely that q equals zero, thus reducing the likelihood of the monopoly union or right-to-manage bargaining models. Thus it appears that the collective bargaining model in the public sector in Iceland moved from being close to efficient to inefficient bargaining. Before drawing that conclusion, I will run some tests.

7.7. Testing the results

Some statistical tests are in order to test the results of the regressions and to help determine which of the bargaining models applies to collective bargaining in the public sector in Iceland.

The first test is to jointly determine whether the individual coefficients in the estimation of p and q are equal, that is, whether $\beta_1 = \beta_2$ in equations (26) and (27). A chi-square test is applied to the four regressions in the unrestricted model, and the results are shown in Table 3.7. In each case the null hypothesis of $\beta_1 = \beta_2$ can be rejected.

Table 3.7. Chi-square test on $\beta_1 = \beta_2$

P-values in parentheses.

	1994-1997	2001-2004
Base wages	2362094.13 (0.0000)	2900.15 (0.0000)
Total earnings	9717.21 (0.0000)	1976.31 (0.0000)

This test places strong restrictions on p and q , and p could equal q without $\beta_1 = \beta_2$. Still, this test suggests that $p \neq q$, and the collective bargaining model therefore is not efficient bargaining in any of the cases.

The estimates of p and q presented in Table 3.6 are based on the average over all bargaining pairs. The next step is to determine for which bargaining pairs I can reject the null hypothesis of a monopoly union or right-to-manage bargaining model, that is, whether $q=0$, and for which bargaining pairs I can reject the null hypothesis of efficient contracting, or whether $p=q$.

First I calculate the fitted values for q and the standard deviation in the unrestricted model. I then calculate t-values for each observation. The results are shown in Table 3.8. Looking at base wages, I cannot rule out the possibility of $q=0$ in the first period, while in the second period, the lowest t-value was over 3, and therefore I can conclude with 99% certainty that when bargaining over base wages in 2001–2004, the bargaining power of unions over employment is significantly different from zero. The tables are turned when it comes to total earnings, as 75% of the bargaining units in the first period have an estimated value for q that is significantly different from zero,

while in the second period only 40% of the bargaining units showed a t-value above 1.96.

Table 3.8. T-tests on estimated q for each bargaining unit for $q=0$.

t-value		$ t < 1.645$	$1.645 < t < 1.96$	$1.96 < t $
1994-1997	Base wages	50	7	42
	Total earnings	30	3	75
2001-2004	Base wages	0	0	100
	Total earnings	52	8	40

Thus, only in the case of bargaining over base wages in the second period can I reject the labor demand model. It seems to have some merit when bargaining over base wages in the first period and total earnings in the second period. Hosken and Margolis (1997) are able to reject the null hypothesis of $q=0$ with 99% certainty in all cases.

Looking at the relationship between p and q in the unrestricted case, we see that the correlation between the two estimates changes signs between the two periods. During the period 1994–1997 the correlation between p and q when bargaining over base wages is 0.1554, and for total earnings is 0.0404. In the period 2001–2004 the correlation is negative: -0.3776 for base wages and -0.1539 for total earnings.

To test for the restriction of $p=q$ I use bootstrap techniques as the t-distribution is not necessarily appropriate to test whether $p-q=0$. The results can be seen in Table 3.9.

The estimates were made for $p-q$ using 1000 replications clustering over bargaining unit. Three confidence intervals are reported; N signifies normal confidence interval, P

a percentile confidence interval, and BS a bias-corrected confidence interval. The estimate for $p-q$ is similar for base wages in both periods, -0.15 in 1994–1997 and -0.16 in 2004–2007. The estimated standard error on both cases is quite large and thus it cannot be ruled out that $p=q$. The estimated coefficient for $p-q$, although similar for base wages between the two periods, changes for total earnings between the two periods. While an estimated -0.29 in the first period, it is 0.75 in the second period; thus it is much less likely that $p=q$ in the second period than in the first when it comes to total earnings. This further supports the earlier findings that the collective bargaining seems to be less efficient in the second period than in the first period.

Table 3.9. Bootstrap analysis of $p-q$.

	Coef.est.	Bias	Std. err.	90% confidence interval		
<u>1994-1997</u>						
Base wages	-0.1504	0.0036	0.4789	-0.9381	0.6374	N
				-0.9696	0.6220	P
				-1.0000	0.3322	BC
Total earnings	-0.2977	0.1899	0.5655	-1.2279	0.6324	N
				-1.0000	0.9608	P
				-1.0000	0.0239	BC
<u>2001-2004</u>						
Base wages	-0.1619	0.4760	0.2841	-0.6293	0.3055	N
				-0.1753	0.6517	P
				-0.5146	-0.1542	BC
Total earnings	0.7538	-0.6823	0.7106	-0.4150	1.9225	N
				-1.0000	0.9999	P
				-0.0402	1.0000	BC

8. Conclusion

In this chapter, I developed a model of sequential bargaining over wages and employment in the public sector. Solving the model led to a set of structural equations for wages and employment. To be able to estimate the model, I first defined functional forms for the union objective function and the employer objective function. In addition, some simplifying assumptions were made.

Based on those structural equations, the model was estimated using data from the central government of Iceland on base wages adjusted for full-time work as well as total earnings. The model was estimated using various restrictions implied by the different bargaining models. The unions seem to have greater bargaining power over employment than over wages, while bargaining power over wages seems to be much larger for base wages than for total earnings.

Based on the mean of the estimates of p and q , the bargaining power of unions over wages and employment, respectively, under various restrictions, we can reject the monopoly union and right-to-manage bargaining models. When looking at individual bargaining units, these models cannot be completely rejected. Although the mean estimates of p and q in the first period indicate that there could be efficient bargaining, the tests suggest that this is probably not the case.

Although the results are not clear-cut in terms of the bargaining models applied, I can safely conclude that the decentralization of bargaining and the change in the collective bargaining agreements has changed the bargaining structure in the public sector in Iceland.

Going forward, it would be interesting to analyze whether there is a pattern in the bargaining units in each of the cells in Table 3.8 and Table 3.9. Also, one of the federations, BHM, changed its wage system again in 2004–2005; thus it would be interesting to analyze whether the bargaining structure has changed again in the most recent period.

APPENDIX 3.A: THE VARIABLE *CHOICE*

The variable *choice* is a dummy variable that indicates whether comparative alternative employment options are readily available for the public sector employees in the private sector. The value for the variable is assigned by union, where the value 1 signifies that outside opportunities are available while the value 0 means that outside options are not readily available. The table below shows the values assigned to each union.

BHM Association of Academics

u5129 Icelandic Veterinary Association	1
u5171 Union of Library and Information Scientists	1
u5184 The Society of Broadcast Journalists	1
u5192 The Union of University Teachers	1
u5193 The Union of University Teachers in Akureyri	1
u5196 The Association of University Graduates Ministry Employees	1
u5225 The Society for Icelandic Studies	0
u5232 The Icelandic Nurses' Association	0
u5243 The Union of Natural Scientists	0
u5252 The Union of Physiotherapists	1
u5307 The Union of Engineering College Teachers	1
u5313 Icelandic Social Science Association	0
u5366 Icelandic Occupational Therapy Association	0
u5397 The Teachers' Association of the Iceland University of Education	0
u5406 Union of Economists	1
u5414 The Icelandic Midwives' Association	0
u5440 Union of Nutrition Scientists	1
u5445 Biomedical Scientists' Union	0
u5469 The Icelandic Society of Radiographers	0
u5477 Union of Psychologists in Iceland	1
u5580 The Icelandic Association of Social Workers	1
u5582 The Lawyers Union	1
u5641 The Union of University Graduates	1
u5740 Association of Social Educators	0

BSRB Federation of State and Municipal Employees

u5177 Union of Public Employees in Aviation	1
u5303 The Union of Government Ministries' employees	1
u5405 The Policemen's Union	0
u5479 The Icelandic Union of Practical Nurses	0
u5535 Reykjavik Municipal Employees' Association	1
u5546 State Radio and Television Employees' Association	1
u5573 Union of Public Servants, technicians	1
u5574 Union of Public Servants, office workers	1
u5575 Union of Public Servants, health sector workers	1
u5627 Icelandic Customs Officers Union	0
u8001 Various local unions with a common contract 1994-1997	1
u8002 Various local unions with a common contract I 2001-2004	1
u8001 Various local unions with a common contract II 2001-2004	1

KI The Icelandic Teachers' Union

u5321 The Association of Teachers in Preschools	1
u5341 The Association of Teachers in Upper Secondary Schools	0
u5343 The Association of Teachers in Upper Secondary Schools	0
u5400 The Association of Teachers in Upper Secondary Schools	0

UTAN Outside federations

u5195 Union of Employees of Althingi	1
u5222 Icelandic Air Traffic Controllers' Association	0
u5404 The Icelandic Society of Engineers	1
u5412 Icelandic Actors' Association	1
u5418 The Icelandic Medical Association	0
u5536 Union of Employees of the National Audit Office	1
u5576 Union of Members of the Symphonic Orchestra	0
u5732 Society of Chartered Engineers	1
u7581 Pharmaceutical Society of Iceland	1

APPENDIX 3.B: ESTIMATING THE LINEAR EMPLOYMENT MODEL

Before estimating the structural model, I estimated a linear model of employment as discussed in section 7 above. This gives me an indication of the results of the bargaining model and whether to expect a difference between the two time periods. The employment equations are estimated using both inside and alternative wages, where the wages are either total earnings or base wages. The equations are estimated using both OLS and IV estimation where the lagged inside wage is used as an instrument.

If the labor demand model is the appropriate model, the alternative wage should be insignificant in determining employment, as all the relevant information is already reflected in the inside wage. Also, the labor demand model implies that the relationship between inside wages and employment should be negative. The strong-form efficient bargaining model suggests that employment is fixed based on the alternative wage alone and that, therefore, the inside wage should be insignificant in determining employment. Strong-form efficient bargaining also implies that the relationship between employment and the alternative wage should be negative. The other forms of contracting, weakly efficient bargaining and inefficient bargaining, do not imply testable relationships on the employment regression.

Appendix Table 3.B.1 shows the results of the linear employment regressions using base wages for full-time work for both the alternative wage and the inside wage. Both the OLS and IV regressions are shown, as well as regressions for both time periods.

Looking at base wages, we see that both the alternative wage and the inside wage are significant. This holds for both periods and for the OLS regression as well as the IV

regression. There is some indication of the strong-form efficient model in the period 1994–1997, as both regressions show a negative relationship between the alternative wage and employment. For the period 2001–2004, the reverse is true, as the relationship between the inside wage and employment is negative, thus giving support to the labor demand model.

Appendix Table 3.B.1. Employment regressions—Base wages.

Dependent variable: log(share)	1994-1997		2001-2004	
	OLS	IV	OLS	IV
constant	-0.5364	-4.5554	-0.3118	-0.3409
log base wages	0.1717	0.6642 *	-1.1683 *	-1.1475 *
log alternative wage	-0.6461 *	-0.7967 *	0.7301 *	0.7133 *
age	0.3418 *	0.3441 *	0.3263 *	0.3304 *
age squared	-0.0038 *	-0.0038 *	-0.0036 *	-0.0036 *
year 2	0.0039	-0.0187	0.0587	-0.0273
year 3	0.0301	0.0021	0.0875	-0.0069
year 4	0.0594	0.0788	0.0853	(dropped)
size of union	0.0005 *	0.0005 *	0.0002 *	0.0002 *
female share in union	-0.0081 *	-0.0098 *	-0.0050 *	-0.0053 *
part-time share in union	-0.0060 *	-0.0041	-0.0019	-0.0013
choice federation	-0.2045 *	-0.1250	-0.2582 *	-0.2589 *
bhm federation	0.0592	0.0720	-0.3658 *	-0.3496 *
ki	0.3028 *	0.3523 *	1.0296 *	1.0589 *
outside federations	-0.2878 *	-0.3370	-0.2682 *	-0.2724
no strike	0.3991 *	0.3767 *	0.2790 *	0.2765 *
size of institute	0.0054 *	0.0058 *	0.0029 *	0.0031 *
average budget	-0.0067 *	-0.0077 *	-0.0030 *	-0.0028 *
R-squared	0.2981	0.3103	0.3758	0.3735
N	3,780	2,647	3,963	2,776

* significant at 5% level.

Appendix Table 3.B.2 shows the same regressions as Appendix Table 3.B.1, this time using total earnings instead of base wages for both the inside wage and the alternative wage.

Looking at total earnings for the period 1994–1997, we see that both the OLS and the IV regressions show a similar result. Both the inside and the alternative wages are significant. This weakens the case for the labor demand model, as in that case, the alternative wage should be insignificant. Furthermore, the relationship between the inside wage and employment here is positive. The evidence for strong-form efficient contracts is also weak in the period 1994–1997, as the inside wage is significant, although there is a negative relationship between alternative wages and employment in the regressions.

In the period 2001–2004, the inside wage and the alternative wage are significant in both regressions, with a positive sign. Given that the inside wage and employment have a positive relationship, the likelihood of the labor demand model is slim. The case for a strong-form efficient contract is also weak, given the significant inside wage and the positive relationship between the alternative wage and employment.

There is however, a difference between the two periods, as the relationship between alternative wages and employment in the first period is negative, while it is positive in the second period, and the coefficient on the inside wage is lower in the second period. In both periods the inside wage has a positive sign. The alternative wage, on the other hand, is negative in 1994–1997 and positive in 2001–2004.

Although the results do not show a strong support for either the labor demand model or the strong-form efficient bargaining, the results support the theory that the changes in the contracting environment led to changes in the contracting outcome.

Appendix Table 3.B.2. Employment regressions—Total earnings.

Dependent variable: log(share)	1994-1997		2001-2004	
	OLS	IV	OLS	IV
constant	-8.7582 *	-9.9077 *	-18.8131 *	-18.4671 *
log total earnings	0.8545 *	1.0612 *	0.4777 *	0.7270 *
log alternative wage	-0.6381 *	-0.7882 *	0.6525 *	0.3492 *
age	0.2879 *	0.2935 *	0.2909 *	0.3020 *
age squared	-0.0032 *	-0.0032 *	-0.0033 *	-0.0034 *
year 2	-0.0436	-0.0300	-0.0072	0.0250
year 3	-0.0255	-0.0318	-0.0210	0.0087
year 4	-0.0570	-0.0073	-0.0336	(dropped)
size of union	0.0005 *	0.0005 *	0.0002 *	0.0002 *
female share in union	-0.0059 *	-0.0064 *	-0.0015	-0.0013
part-time share in union	0.0008	0.0031	-0.0033 *	-0.0033
choice	-0.1497 *	-0.0934	-0.1463 *	-0.1278
federation bhm	-0.0805	0.0001	-0.8958 *	-0.8077 *
federation ki	0.2787 *	0.3754 *	0.6820 *	0.7855 *
outside federations	-0.3782 *	-0.3083 *	-0.9006 *	-0.8426 *
no strike	0.3758 *	0.3768 *	0.2513 *	0.2453 *
size of institute	0.0051 *	0.0054 *	0.0032 *	0.0033 *
average budget	-0.0091 *	-0.0104 *	-0.0032 *	-0.0032 *
R-squared	0.3502	0.3545	0.3468	0.3382
N	3,780	2,647	3,963	2,776

* significant at 5% level.

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