

# Macroeconomic effects of active labour market programmes.

Theoretical aspects and an econometric study.

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# 1. INTRODUCTION

This thesis derives its motivation from the Finnish unemployment dilemma, where seven years of consecutive economic growth between 1994 and 2001 at above the average OECD rate and at the second highest of all EU countries did not improve the labour market situation as could have been expected - and was greatly hoped for. Instead, the unemployment level has stabilised at just above 9 %<sup>1</sup>. Until the end of the 1980's Finnish unemployment was not an issue, as unemployment was stable at around 5 %- and, at that, clearly below the European average. From 1991 on the unemployment rate climbed uninterrupted for three years, reaching a staggering 19 % in 1994. Recovery got underway fairly quickly after this (negative) peak had been reached, but it took the form of a dramatic restructuring of the productive sector of the economy. New jobs were formed in completely different sectors than from which jobs had been lost during the recession. This resulted inevitably in an expansion of matching difficulties in the labour market. The effect was exacerbated by regional factors as the country faced a great relocation drive when people moved to the capital area and other regions where new jobs were appearing.

Also the character of Finnish unemployment changed clearly during the recession years. Until the onset of the crisis long-term unemployment was practically non-existent at around 10 %. It needs to be acknowledged here though that until 1992 municipalities were committed by law to employ or in other ways activate long-term unemployed individuals. The proportion of long-term unemployment rose to one third of total unemployment during the recession and has remained at that level ever since.

The Finnish governments of the past decade have spent a considerable proportion of GDP (well above 5 % of GDP in each of the five years 1992-1996, for example<sup>2</sup>) on a variety of active labour market measures (ALMPs) in order to ease the restructuring of the economy

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<sup>1</sup> February 2004

<sup>2</sup> Source: OECD

as well as to keep the open unemployment figures down. The question has arisen, whether this money has been well spent. The immediate effects at the microeconomic level, on an individual unemployed jobseeker's life, can be observed in a fairly straightforward manner. As the question is now of a very large number of participants and a considerable economic investment, the effects can also be expected to show on the macroeconomic level, but with some lag.

It was recently openly acknowledged by the Ministry of Labour that active labour market programmes are not only about updating the skills of the workforce and improving the matching process in the labour market, but can be used as social policy devices. According to this opinion, their sole aim is not to improve the functioning of the labour market, in contrast to what perhaps traditionally is expected. Therefore the effectiveness of ALMPs in terms of money spent and new regular jobs generated, important an issue as this is, may be too restricted an approach in the analysis of the programmes' total contribution to the welfare of the society. So far, labour economists have diligently researched the microeconomic effects and cost effectiveness of different programme types. Generally, the results have not been satisfactory, indicating that society's resources may be wasted on inefficient policies. For example Räsänen (2003) has written about how the quality of the programmes deteriorated due to their quick expansion as a response to rapid increase in unemployment. Perhaps surprisingly, in view of these micro level results and theoretical macroeconomic considerations, the empirical macroeconomic aspect has been as good as neglected. The empirical study undertaken in this thesis is the first of its kind in Finland.

As pointed out above, the approach to active labour market policies in this thesis is macro economical, since the microeconomics of ALMPs has already been under thorough investigation in Finland and elsewhere (see, for example, Hämäläinen (1999), Kluge & Schmidt (2002), chapter 4.5 in Räsänen (ed.)(2002)). Some theoretical studies on the macroeconomics of ALMPs from the previous decade aimed at predicting the effect of active labour market programmes within a framework of labour market flows and a union wage setting mechanism (e.g. Calmfors & Forslund (1991), Holmlund & Lindén (1993)).

The approach of this thesis is based on a well structured union wage bargaining model by Lars Calmfors and Harald Lang (1995). The results of this theoretical model provided the inspiration for attempting an estimation of a real wage equation for Finland, in order to see whether the active labour market programmes have had an effect on the macroeconomic level via the wage determination process as predicted by the model, which shows how in theory widely applied ALMPs may have adverse effects on employment. The null hypothesis in this thesis, based on the Calmfors & Lang model, is therefore that ALMPs have had a wage-raising effect in Finland.

In their model of labour markets, Calmfors and Lang introduce one important element of unemployment that has not been taken account of in other aspects similar studies, namely the duration dependence of unemployment. Duration dependence means that the longer an individual spends in unemployment, the less likely his unemployment spell is to end in regular employment. This dimension of the unemployment question is of great significance especially for any country where the incidence of long-term unemployment is high. Large variations in the share of the long-term unemployed in total unemployment currently exist between OECD countries. For example in a few countries such as Ireland, where the overall unemployment rate is relatively low, the majority is formed by the long-term unemployed. According to this data Finland appears relatively speaking not to even have a significant problem with long-term unemployment, for the above mentioned share stands currently at approximately 30 % (OECD 2002, 192). Simultaneously, the average share of long-term unemployment in the 15 European Union countries is approximately 50 % (Talouden rakenteet 2002, 62).

The composition of unemployment can have an effect on wage setting due to factors such as the long-term unemployed losing competitiveness in the labour market, as was effectively argued by Layard et al. (1991). Their hysteresis theory -based analysis was rooted in Blanchard & Summers (1986), who found empirical evidence for their hypothesis that the hysteresis phenomenon explained the evolution of unemployment in Europe (though what was the cause of hysteresis remained unclear). Indeed, Eriksson et al. (1990)

did find evidence for their hypothesis according to which long-term unemployment does not exert negative pressure on real wages in Finland. The data on the evolution of the duration of unemployment spells in Finland over the past almost two full decades however point to a significant structural change that has occurred after this study's sample period 1960-1985. According to a graph printed in Koskela and Uusitalo (2003) the share of long-term unemployment has moved in an anti-clockwise manner, having first fluctuated between 10-15 % in the early 1980's and then after having briefly been below 5 % during the boom years of the end of the decade shooting right up to just above the level of today, at around 30 %.

Blanchard and Diamond (1994) introduced a duration dependence model of unemployment that can be expected to bear significance also in partially explaining Finnish unemployment. In this so-called ranking model of unemployment employers rate job applicants according to the length of the applicants' unemployment spells, and always hire the applicant with the shortest preceding unemployment spell. In Finland, a statistics by the Ministry of Labour has shown that the re-employment probability of an unemployed person to regular employment<sup>3</sup> (the so called hazard rate) declines dramatically, by approximately 17 percentage points, when the unemployment spell has lasted for 12 consecutive weeks (Työvoima 2020 loppuraportti, 57). The hazard rate does of course decline further, the longer the spell lasts, but these changes are nowhere near as dramatic as this. Koskela and Uusitalo (2003) did obtain results consistent with the ranking model in their estimations of employment hazards with Finnish data.

From the unemployed individual's perspective, the longer he is unsuccessful in his job applications, the less effort he is going to invest in any new application process, given the level of unemployment insurance and other benefits. In the long run, he may become a so-called discouraged worker, and eventually stop looking for work completely. In Calmfors and Lang's study those unemployed who drop out from the labour force can not return into it. If active labour market programmes do have, as hypothesised, an unexpected negative

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<sup>3</sup> Defined here as the probability to obtain regular employment within the following month.

effect on employment via the wage-setting mechanism, it means that opposite to their original expected effect, ALMPs lead to the less-employable workforce being priced out of the labour market.

This thesis is structured as follows. The second chapter provides a survey by Lars Calmfors (1994) of the theoretical effects of active labour market policies that employs the familiar Nickell-Layard framework. This analysis serves as a motivation for the provision of the programmes in general, depicting a wealth of possible positive outcomes. It was deemed important to introduce these very basic theories here, because they may provide for an understanding of the rationale behind the great investment in active labour market policies undertaken by the Finnish society over the past decade. Also, the concept of active labour market policy that is used in the model introduced in chapter 3 does require clarifying. Otherwise it might be difficult to justify why exactly do ALMPs enter the model with the effects they show. In reality, of course, the complexity of the labour market, which is contributed to by the institutional setting and individual participants' decision-making characteristics, provides for unexpected results of different ALMP policies.

In the third chapter the theoretical model by Calmfors and Lang (1995) is introduced, and by this the case for an empirical investigation of the macroeconomic developments that takes into account the breadth of the provision of the active labour market policies is justified. The fourth chapter concentrates on the approach to the effects of ALMPs by surveying the existing related literature. The chapter also introduces some existing wage equation estimations, none of which however have used the same approach as this thesis. In the fifth chapter the data set used in the estimation is discussed, and a few alternative specifications for the wage equation are provided. The results are discussed at the end of the chapter. The fifth chapter concludes the thesis. For learning from past experience in both good and bad, and in order to be able to avoid unintended consequences in the future, evaluation studies of ALMPs are of great importance. Therefore the lack of macroeconomic level studies of effects of ALMPs is surprising. It is hoped that this thesis



can provide new information and perhaps prove valuable in the assessment of Finnish ALMPs. Finally, there are concluding remarks in chapter six.

## 2. EFFECTS OF ACTIVE LABOUR MARKET POLICIES - A SURVEY

Despite the objective of this thesis being an estimation of a wage equation for Finland, whereby it is to be determined whether active labour market policies have had any effect on wage setting and therefore on the overall labour market equilibrium, this chapter is devoted to a discussion of the expected effects of active labour market policies (ALMPs). In this chapter the analysis of the effects of ALMPs on various aspects of the labour market is based on the so called Nickell-Layard framework, which was developed in the late 1980's by Layard and Nickell (1986), Johnson and Layard (1986), and Layard, Nickell and Jackman (1991). Before their contribution to the subject, labour market policy on the macroeconomic level was typically thought of in terms of the Phillips curve, where there exists a straightforward trade-off between inflation and unemployment. (Phillips 1958). Lars Calmfors (1994) criticises this traditional approach for its failure to explain the fundamental determinants of an economy's natural rate of unemployment, without the understanding of which it is difficult if not impossible to intentionally improve the above mentioned trade-off. This chapter's analysis of the effects of active labour market policies on the labour market as introduced by Calmfors (1994) is based on the Nickell-Layard framework which is described in detail below.

## 2.1 The Nickell-Layard framework

In the Nickell-Layard framework for explaining the behaviour of the labour markets the real wage and the level of employment are related to each other in two ways (graph 1). First, there exists the so called employment schedule that slopes downwards in the employment-real wage space and describes the relation of employment as a proportion of labour force to the real wage. This schedule can be thought of as equalling labour demand (or price-setting curve) in the economy. The other, upward-sloping schedule is the wage-setting schedule that depicts the inflationary pressures on real wages created by high aggregate employment. The labour market equilibrium exists where these two schedules intersect. The full employment outcome is depicted by a vertical line. The horizontal distance between this line and the equilibrium point describes the amount of involuntary unemployment in the economy ( $u_0$ ).

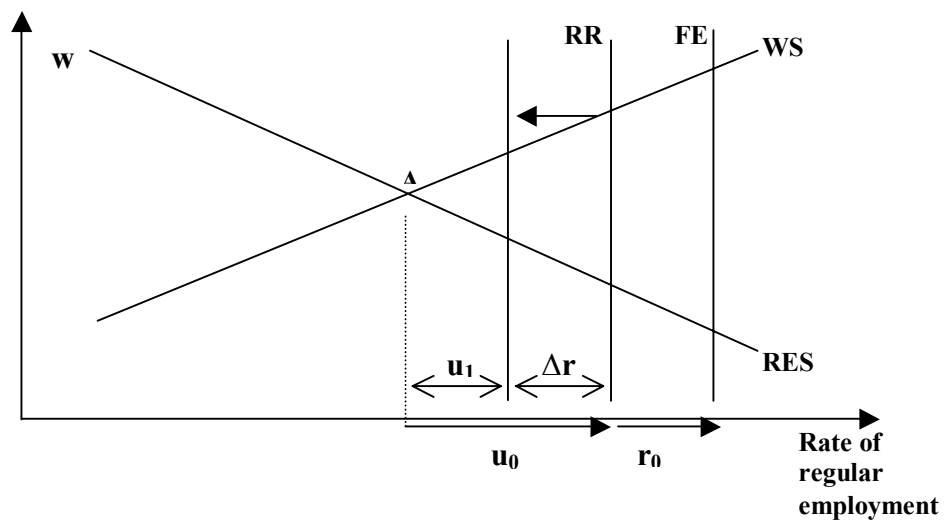
As is immediately clear from the illustration, the wage setting curve shows how high aggregate employment causes pressure for higher real wages. The motivation for this type of illustration of the labour markets can be found in different wage-setting mechanisms. Simply resorting to reasoning, one can predict that a labour union which is concerned with both the real incomes and the employment levels of its members will find its aversion to higher real wage demands weakened in a situation, where employment is high and it is relatively easy for any laid-off worker to find new employment. Also from the employers' point of view, high employment may lead to higher pay offers, as competition for skilled work force intensifies and it may also become more difficult to exert optimum effort from the work force.

The introduction of active labour market policies to the framework require the concepts *employment* and *unemployment* that were sufficient before to be distinguished from *regular employment* and *open unemployment*, respectively. Participation in labour market programmes counts as "irregular" employment as it is induced by government actions and typically constitutes a form of employment or other activity such as vocational training that

would be absent in free market conditions. Open unemployment hence does not include those unemployed individuals who are placed in a manpower programme, be it subsidised employment, training, or any other type of scheme. With these modifications in mind, figure 1 is finalised (Calmfors 1994, 11).

In the framework, there now exists a vertical line RR representing full employment less active labour market programme participation. This demonstrates the difference that government measures can create in the labour market. Participation in the programmes as a fraction of the labour force is given by  $r_0$ , the difference between full employment and the proportion of the labour force not placed in any programmes, RR. Open unemployment is now given by  $u_0$ , the difference between the equilibrium point and the RR schedule.

Figure 1. The revised Nickell-Layard model.



Legend:

W = real wage

RR = schedule indicating full employment less programme participation

FE = full-employment schedule

WS = wage-setting schedule

RES= regular-employment schedule

A change in the scope of labour market programmes, depicted by  $\Delta r$ , leads to a corresponding change in the number of openly unemployed people. If more resources are directed to active labour market measures so that the number of unemployed taking part in different schemes increases, then *ceteris paribus* the *RR* line will move to the left, and open unemployment will be reduced from  $u_0$  to  $u_1$ . As briefly discussed above in chapter 1, however, this gross effect is a simplification that does not take into account the various indirect effects that labour market programmes may have on the behaviour of the labour market participants, which may lead to a different outcome altogether. In the analysis below of the effects of labour market programmes on various aspects of the labour market we will only consider the gross effect on employment.

## **2.2 The expected effects of active labour market policies**

In this paragraph the expected effects of active labour market policies will be discussed in the Nickell-Layard framework. These effects are theoretical only and refer to a *ceteris paribus* situation where there is one once-and-for-all introduction of labour market measures into labour markets where none previously exist. The labour market phenomena and concepts that are assumed affected by the introduction of ALMPs and are analysed below are the matching process, the size and composition of the labour force, and deadweight, substitution, and crowding-out effects.

### **2.2.1 Effects on the matching process**

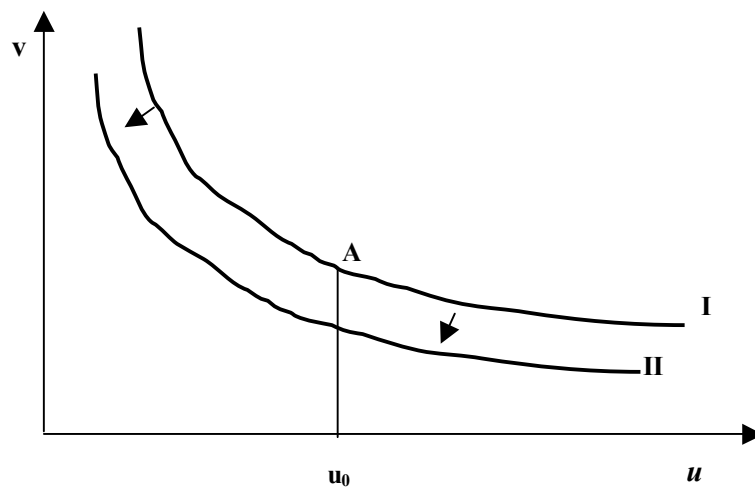
Matching in the labour market, i.e. the birth of new work contracts, is traditionally modelled as a Cobb-Douglas function, such as in equation 1 below.

$$(1) \quad M=m(U,V)$$

The above function gives the flow of jobs formed in a given discrete time interval,  $M$ , as a function of the stock of unemployed people looking for work,  $U$ , and the stock of vacant jobs in the market,  $V$ . In this conventional expression the matching function is assumed increasing in both of its arguments and concave, and typically also homogeneous of degree 1. (Petrongolo & Pissarides 2001, 392). The function (1) can equally well be applied to continuous time models, as in Pissarides (2000, 6).

The matching function is graphically depicted as the so-called Beveridge curve which traces the relationship between vacancies and unemployment in the vacancy-unemployment space. Along the curve new matching of jobs with workers exactly equals the termination of job contracts so that total employment in the economy remains constant. The Beveridge curve will slope downward if the outflow from unemployment is given by the matching function (Petrongolo & Pissarides 2001, 393). An illustration of a possible Beveridge curve, I, is shown in figure 2 below. Point A coincides with the point A in figure 1.

Figure 2. The Beveridge curve.



The matching process in the labour market typically arouses interest in connection with *mismatch*. Mismatch is according to Petrongolo and Pissarides “an empirical concept that measures the degree of heterogeneity in the labour market” (Petrongolo & Pissarides 2001, 399). Heterogeneity in the labour market results from for example skills differences between workers and the differences in geographical location of various types of jobs as well as industrial sectors, and labour mobility between both of these. If heterogeneities were nonexistent, matching of jobs with workers would be instantaneous and the matching function would not exist.

Active labour market policies typically aim at improving the matching process in the labour market. First of all, educational programmes for the unemployed (as well as the employed part of the labour force) are designed to be of assistance in improving the matching process by eliminating frictions between sub-markets for labour. Job seekers are thus better adapted to the structure of labour demand. Active labour market programmes can also improve the matching process by encouraging more active search behaviour on the part of the job seekers. A positive impact of this type of job search assistance is for Finland documented by Tuomala (2001), who found that employment probability for the participants increased by 4,3 %-points relative to non-participants. Different types of work experience programmes on the other hand provide means to the employers in their screening of suitable job applicants.

When analysing the impact of active labour market programmes in the Beveridge curve framework, we require that the horizontal axis measures the total number of job searchers without a regular job, both openly unemployed and those placed in the programmes. The impact of improved matching is depicted in figure 2 above as the shift of the Beveridge curve to the left (curve II in graph 2). Calmfors (1994) notes that for this illustration two assumptions need to be fulfilled. Firstly, regular job openings can be filled either from the stock of openly unemployed job seekers or from the stock of programme participants. Secondly, the authorities responsible for running the programmes need not post vacancies,

but can place unemployed job seekers in a programme. (Calmfors 1994, 11). The latter is likely to simplify the matching process.

Improved matching means that vacancies become filled more quickly, and the expected cost to the employer of opening a vacancy declines which encourages further opening of vacancies. This effect is equivalent to an increase in labour demand. In terms of figure 1, employment schedule (RES) moves rightward. Also easier hiring reduces the need for the employers to increase wages in order to attract work force, which can be expected to lead to a downward shift of the wage-setting curve. Together these effects work towards an increase in regular employment, as the wage-setting curve and the regular employment schedule both move to their right, establishing a new equilibrium with higher employment. In effect, higher labour participation restricts inflationary pressures, and complementarily, wage moves to a more favourable position. However, Calmfors (1994, 13) points out that the sign of the real-wage effect is nevertheless unclear.

More efficient job searchers' assistance in job centres and other government agencies, such as CV writing and interview technique courses or compulsory attendance at individual talks with counsellors, typically improve matching in the labour market. This favourable outcome of an increased investment in the functioning of the labour market may be counteracted by the so-called locking-in effect, where an individual's job seeking effort is reduced while he is participating, or even just aware of the increased availability of placements, in ALMPs. For example Sianesi's research (2001) confirms this initial effect of programme participation, but she concludes nevertheless that after the programme has ended, the participant will have a better labour market outcome than if he had waited longer in open unemployment.

### 2.2.2 Effects on the labour force

One significant effect of high unemployment is its tendency to reduce the overall size of the labour force, which consists of all 16 to 65 year old individuals who, if not already employed, are able to accept a job at two week's notice and are not partaking in full-time education, nor on a parent leave. This effect was very noticeable in Finland in the early 1990's, when the labour force reduced from 2,58 million to 2,44 million in the period between the second half of 1990 and the first half of 1994, whilst unemployment increased from 2.8 % to 17.4 % (OECD data). The Finnish Ministry of Labour (2002) has concluded that the reappearance of these discouraged workers in the labour force, as well as the entry of a new generation, is one explanation for why the unemployment rate did not decline as forecasted during the years of rapid economic growth from 1994 to 2000. Also the then by government aggressively promoted early retirement gateway reduced the size of the labour force. Promoting early retirement of course is one way to conduct labour market policy, but it is counterintuitive to ALMP's target of maintaining labour force participation during times of high unemployment. Johansson (2002) was able to show a robust positive effect for Swedish ALMPs in maintaining the size of the labour force during business cycles.

The proportion of the regularly employed to the whole of the labour force, at each wage level, naturally is the smaller the larger the labour force, since each wage is associated with given number of employed persons (Calmfors 1994, 16). The expected positive labour supply effect of an introduction of ALMPs can in the Nickell-Layard framework be depicted as a leftward shift of the employment schedule in figure 1. By the laws of demand and supply, the increase in supply when demand remains the same leads to falling prices. In the case of labour market, increased competition for available jobs puts downward pressure on wages. A new equilibrium is established at a point where both wages and the rate of regular employment are lower. However, the situation is not straightforward. Even though a lower proportion of the total labour force is now employed in regular jobs, and thus a larger proportion are either participating in the programmes or openly unemployed, the fall in wages has nevertheless created more jobs and a larger proportion of the *population* as a whole is regularly employed.



Participants in the labour markets who are engaged in productive activity or are only short-term unemployed are often referred to as insiders. This is not to be confused with the same terminology which is used in discussion of unionised wage bargaining, where the term insider refers to an employed member of a labour union. The effects of active labour market programmes that are targeted at the outsiders of the labour market, who typically are either long-term unemployed, youth without work experience, housewives, or immigrants with unsatisfactory language and other skills, fall into the same category of increasing and maintaining labour force participation. Sianesi (2001) has found evidence of this positive labour force effect of ALMPs in her study of the effectiveness of Swedish active labour market programmes. The increase in the labour market competitiveness of the above mentioned outsiders will lower wage pressure in the similar manner as described above and *ceteris paribus* lead to a higher regular employment.

#### **2.2.4 Deadweight effects**

One of the greatest arguments against the adoption of active labour market policies is the deadweight effect, a concept associated with badly designed or implemented policies that result in a loss to the whole society in the form of wasted resources and resource misallocation. Deadweight loss in the context of ALMPs typically occurs with the hiring of such unemployed individuals to government-subsidised jobs who would have found regular employment nevertheless. This may provide private sector enterprises with a subsidy of kind, as they are able to find well qualified workers at a lower cost than the going wage rate. Another example of a deadweight effect in an active labour market context is the substitution effect which is said to occur if employers take advantage of government-subsidised jobs and displace their original regular employees with those participating in the ALMPs.

In the framework we have been employing in the analysis of expected effects, the deadweight and substitution effects can be illustrated as a leftward shift of the employment schedule. This will tend to reduce regular employment, counteracting the fall in open

unemployment. According to Calmfors (1994), this result is most likely in the case of subsidies for private-sector employment of ALMP participants.

### **2.2.5 Crowding-out effects**

In economics, crowding-out effect is said to emerge when a decision taken by a market participant has an adverse effect on the final equilibrium outcome because the decision has convinced other market participants to change their behaviour too, unexpected by the initial mover.

Active labour market programmes are not simply created with the workings of the labour market itself in mind. Increasing the efficiency of matching, improving the productivity of the labour force, and increasing its size are all important goals. In addition, the ALMPs serve also social policy goal setting in that they are expected to improve the quality of life of the participants, reducing the welfare loss resulting from becoming (being) unemployed and furthermore preventing alienation from the surrounding society that in the worst-case scenario does not only affect the unemployed individual but his whole family, leading to extended social problems. This perceived or expected welfare improvement resulting from extended provision of ALMPs relative to open unemployment however does not go unnoticed by the other labour market participants, most notably the regularly employed. This is the reason we can observe the so-called crowding-out effect in this context as well.

The insiders of the job market, or in practice the labour unions, do typically react to the introduction or expansion of ALMPs with increased wage demands, as the relative well-being of their employed members in the labour market as a whole has fallen. This negative relationship between the welfare reduction resulting from a job loss and the wage level is in accordance with the standard union and wage bargaining models, in which unions trade off the wage increases of the employed members against the welfare losses of those members that are made redundant. (Layard et al. 1991.) The risk of ALMP's crowding out regular employment is most significant if the compensation for the programme participants

is higher than the unemployment benefit. The crowding-out effect is reviewed by Ackum Agell and Lundin (2002), who cite a number of Swedish studies preceding the 1990s in support of the crowding out theory. The crowding-out effect is illustrated in the framework by an upward shift of the wage curve.

### **2.2.6 Other effects and the net outcome**

Apart from the effects discussed above in their separate paragraphs, Calmfors (1994) distinguishes a few other effects that ALMPs can be expected to have. For example, it is possible that skill-enhancing educational programmes lead to not only improved matching and thus better use of the society's human capital and other resources, but on the macroeconomic level improve the productivity of the economy as a whole. Not only can ALMPs improve the participants' existing skills, but equally importantly they prevent the deterioration of existing human capital which can result from loss of working habits, and in the worst case alienation from the labour markets and the surrounding society.

Calmfors points out that if it is assumed that labour training increases marginal productivity, which is then viewed as general technological progress, the result is higher employment as the employment schedule shifts right (Calmfors 1994). This approximation is however sensitive to the assumption about how technological progress enters the production function. If technological progress is labour augmenting, then output depends on the size of effective labour and the growth rate of output per worker depends solely on the rate of technological progress (Romer 1996). In this case there need not be any positive labour market effects. On one hand, the unit cost of effective labour falls, which may encourage expansion of output by increasing employment. On the other hand, though, the given level of output can be produced with less, but more efficient, workforce. All in all, the net effect is unclear.

The increase in effectiveness of labour can be expected in light of the wage bargaining and efficiency wage theories, in which the wage is used as an incentive device to control the

effort level of employees, to lead to an upward shift in the wage schedule. Combined with the rightward shift of the employment schedule this will leave employment rate unchanged. Calmfors points out that even if the net effect regarding regular employment was zero, higher productivity of the workforce will increase the total output of the economy and leave everyone better off (Calmfors 1994, 20).

Active labour market policies can be expected to interact with other so-called labour market institutions, of which most important are the tax system and the unemployment benefit system. In Finland, as recently documented by Holm et al. (1999), it can be the case that these institutions can cause severe disincentives to joining regular employment. As already argued above, the wage negotiation system is another labour market institution that can be expected to react to a change in the ALMP structure and availability with a negative employment outcome. On the other hand, the corporatist wage negotiation system used in for example Finland has received acclaim for its stability and thus employment and growth-promoting characteristics (Daveri & Tabellini 2000, Calmfors & Driffill 1988). Calmfors (2001) lauds the Finnish “social pact” (among others) for its qualities that were helpful or even necessary for wage moderation before joining the EMU and in preparation for the expected changes in the economic environment. Koskela & Uusitalo (2003) are able to report support for this; centralised bargaining has indeed moderated wage formation in Finland. Calmfors states however that there might be a risk that an increased emphasis on active labour market policy could weaken the incentives for more thorough-going institutional changes, especially when these are regarded as politically controversial (Calmfors 1994, 25).

Theoretically ALMPs can interact with the tax system with two opposite outcomes. If on one hand the provision of extensive ALMPs promotes regular employment, the tax base from higher employment and output will be larger than otherwise. In this case the programmes will eventually pay for themselves in the form of reduced costs from unemployment benefits and programmes. Calmfors (1994) also suggests that in the longer run increased regular employment will allow for lower tax rates, which will further

reinforce the positive employment and economic growth effects. On the other hand, however, the provision of comprehensive ALMP coverage, perhaps with higher compensation levels than the unemployment benefit, can even lead to higher tax rates. This works towards reducing regular employment. Calmfors hypothesizes though that an increased ALMP coverage can help to reduce costs from early retirement pensions. Thus the net effect from the interaction between ALMPs and the tax system is unclear.

To sum up the second chapter, the only conclusion one can according to Calmfors draw for certain is that most effects of ALMPs discussed above may have a net effect of zero on the macroeconomic level, even though the programme participants can almost certainly be expected to benefit individually. For example, programmes that improve the labour market competitiveness of the disadvantaged proportion of the labour force will undeniably lead to downward pressure on the real wage. The improved welfare offered by ALMP participation as perceived by the employed proportion of the labour force will however counteract this by causing upward pressure on the real wages. All in all, there exists hardly any evidence on the macroeconomic level of the net effects of the active labour market programmes. (Calmfors 1994, 25). This is the motivation for the rest of this thesis, which aims to correct the situation with an estimation of a wage equation that involves a measure of ALMPs.

## 3. THE THEORETICAL MODEL

### 3.1 Introduction

In this chapter a theoretical study by Lars Calmfors and Harald Lang (1995) of the effect of active labour market policies (ALMPs) on the macro economy is introduced at depth.

Calmfors and Lang are interested in the effect ALMPs have on the wage-setting mechanism in a union wage-bargaining framework which in turn will determine the equilibrium employment in the economy. Their results show that if labour market programmes are offered to all unemployed people without discrimination (that is, without targeting to specific groups, typically determined by age or educational level), this will tend to increase wage demands. According to this theoretical study, well-intended policies that may work well on an individual level can on the macroeconomic level bring about counteracting effects that even reduce regular employment. Calmfors and Lang study three separate cases, in which the ALMPs are targeted exclusively at either labour market entrants or the longer-term unemployed, or are open to all independent of unemployment experience. In this thesis only the aspect of untargeted policy is dealt with, because it is assumed to best correspond with the overall policy stance of the Finnish government over the estimation period.

### **3.2 The framework of the model**

Lars Calmfors and Harald Lang (1995) provide this thesis with its theoretical foundation, an static union wage bargaining model. Each employer has its own union, and the unions possess monopoly power over the determination of wages. What makes this model different from a standard wage-setting model is that it distinguishes between three different categories of labour market participants, instead of only two (employed and unemployed) as is more typical.

In the model an individual worker can at any given moment be in one and only one of the alternative labour market states, which are described as regular employment, open unemployment, placement in the ALMPs, and outside the labour force. Government determines the proportion of labour force who partake in the labour market programmes.

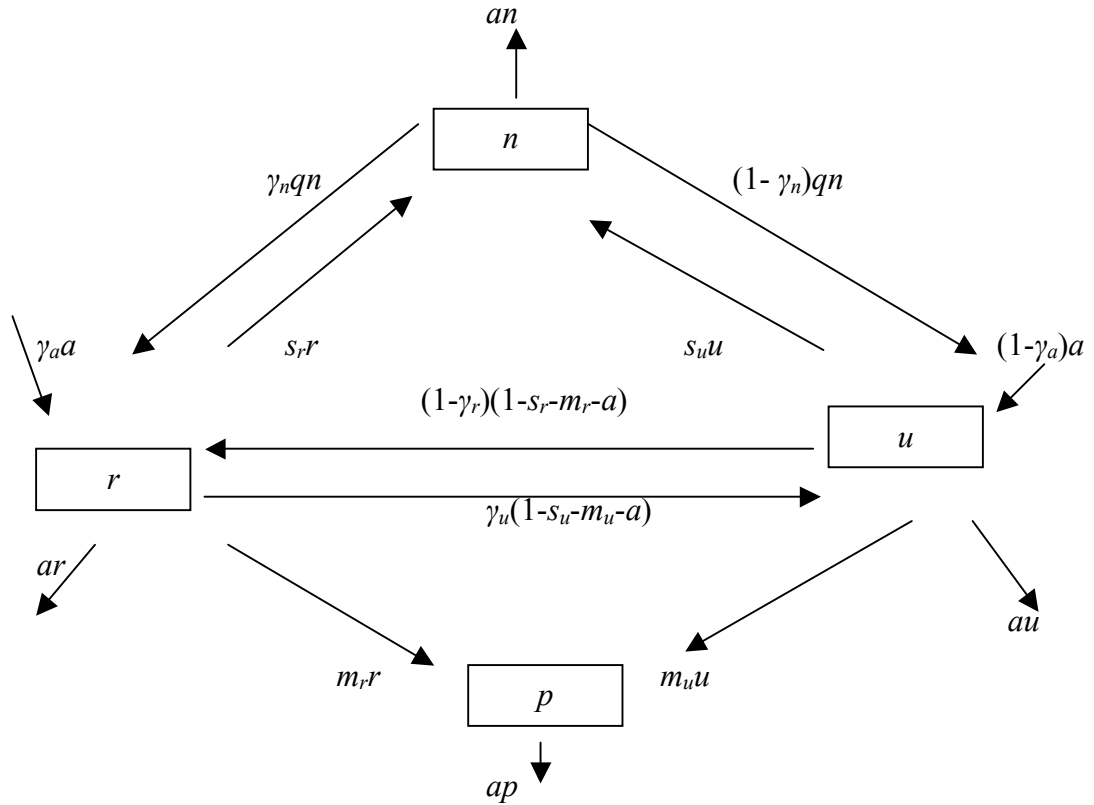
Job search can be conducted by both openly unemployed workers and by individuals placed in active measures.

Duration dependence is introduced in the model so that the aggregate re-employment probability falls progressively with duration. Eventually an unemployed worker can become so discouraged that he leaves the labour force and stops searching for work completely. New entrants to the labour markets join the labour force as either openly unemployed or participants in ALMPs. They can not enter regular employment without spending at least one time period in one of the aforementioned labour market states.

### 3.2.1 Parameters of the model

In the model the population growth rate is zero, and the number of new entrants to the economy  $a$  is exactly equal to the number of perished individuals. The share of employed workers in the population is  $n$ ; therefore, in each time period  $an$  workers leave their job because of death. Additionally  $qn$  workers quit their job, either by their own choice or they are made redundant. They face the same restriction as the new entrants, i.e. they have to spend at least one period in unemployment before starting at a new job. A proportion  $\gamma_n$  of those who quit their job will immediately be placed in an active labour market measure, and the remaining  $1-\gamma_n$  enter open unemployment. Equivalently,  $\gamma_a$  of the new entrants are immediately placed in an ALMP, and  $1-\gamma_a$  enter open unemployment.  $u$  is the proportion of population who are openly unemployed, and  $r$  gives the proportion of individuals taking part in labour market measures. Finally, the rest of the population,  $p$ , have exited the labour force. They have no means of entering the labour force again. The model is graphically demonstrated in figure 3.

Figure 3. Labour market flows in the model.



The probability of an openly unemployed worker to find a regular job is given by  $s_u$ , and the probability for him to fall outside the labour force is  $m_u$ . Thus the probability for him to continue looking for work in the next period is  $1 - s_u - m_u - a$ . If he survives to the next period, the conditional probability for him to enter an active labour market programme is  $\gamma_u$  and the probability that he remains openly unemployed job seeker is  $1 - \gamma_u$ . Similarly, a worker placed in active measures will continue looking for work in the next period with probability  $1 - s_r - m_r - a$ . The conditional probability for him to continue in the ALMPs is  $\gamma_r$  and for moving to open unemployment  $1 - \gamma_r$ . A crucial feature of the model is that exiting the labour force is more likely for the openly unemployed proportion of the labour force than for those who are placed in the ALMPs:  $m_u > m_r$ .



Duration dependence is brought into the model in the following manner. The proportion of the population who have been unemployed for  $t$  periods but is still looking for work is given by  $(1-s_u-m_u-a)^t$ . The proportion of the population who have been without work for  $t$  periods, i.e. including labour force drop-outs, is  $(1-s_u-a)^t$ . The aggregate re-employment rate for the unemployed who have been out of work for  $t$  periods is thus

$$s_u \left( \frac{1 - s_u - m_u - a}{1 - s_u - a} \right)^t.$$

From this it is clear that the re-employment rate is decreasing over time.

### 3.2.2 Steady state conditions

In a steady state by definition all labour market stocks need to be constant. Therefore Calmfors & Lang are able to write the following steady state conditions:

$$(q+a)n = s_u u + s_r r \quad (1)$$

$$[s_u + m_u + a + \gamma_u(1-s_u-m_u-a)]u = (1-\gamma_a)a + (1-\gamma_n)qn + (1-s_r-m_r-a)(1-\gamma_r)r \quad (2)$$

$$[s_r + m_r + a + (1-\gamma_r)(1-s_r-m_r-a)]r = \gamma_a a + \gamma_n qn + (1-s_u-m_u-a)\gamma_u u \quad (3)$$

$$ap = m_r r + m_u u \quad (4)$$

where (1) is the condition for constant employment, (2) the condition for constant unemployment, (3) for constant participation in labour market programmes, and (4) for a

constant stock of labour market drop-outs. All conditions are measured as shares of population.

Condition (1) shows how the flow into employment equals exit: at a given moment in time  $t$ , the outflow consists of  $qn$  quits and  $an$  “deaths”, where  $n$  is the employed labour force,  $q$  the probability of quitting, and  $a$  the attrition (and birth) rate. At steady state, this outflow is matched by entry, which is composed of the unemployed,  $s_u u$ , and ALMP programme participants,  $s_r r$ , who get a (normal) job.  $s_u$  and  $s_r$  are the probabilities for this to happen for the respective groups.

Condition (2) shows in a similar fashion how at steady state open unemployment remains unchanged. Exit flow from open unemployment is made up of those who become employed  $s_u$ , drop-outs (discouraged workers leaving the labour force altogether)  $m_u$ , the fraction  $a$  who die, and the proportion of jobseekers who choose, or are asked or required, to begin participating in an ALMP. This exit flow is matched by entry. Entry is made up of the fraction of new entrants to the labour market  $(1-\gamma_a)a$  (“births”) who are not immediately placed on an ALMP, quitters from regular employment  $(1-\gamma_n)qn$  and the proportion of previous ALMP participants who fail to become openly employed at the end of their programme.

Condition (3) describes the steady-state of constant participation in ALMPs. Exit flow from ALMPs consists of those who become regularly employed  $s_r$ , leave the labour force entirely  $m_r$ , deaths  $a$  and the fraction of the rest who have to leave the programme and become openly unemployed. A fraction of new entries to the labour market  $\gamma_a a$ , quitters of regular jobs  $\gamma_n qn$  and a proportion of openly unemployed who were to remain jobseekers in the next period  $(1-s_u-m_u-a)\gamma_u u$  comprise the inflow.

Condition (4) describes how the stock of labour market drop-outs remains constant. One of the crucial features of this model is that the discouraged workers who leave the labour

force make this decision once and for all. There is no re-entry to the labour market, and the exit from the stock of discouraged workers is through death only.

Finally, a constant ratio between the re-employment probabilities is assumed:

$$s_r = c s_u \quad (5)$$

in which  $c > 1$ . It is important for the working of the model that the re-employment probability for a programme participant be higher than for an openly unemployed worker. (Calmfors & Lang 1995, 604.)

### 3.2.3 The determination of the model

The firms in the model are perfectly competitive in the product market. The labour in each of them is organised by a firm-specific union that has monopoly power over wage-setting. It is a feature of the standard union theory that decentralised bargaining does not take into account externalities resulting from wage negotiation (Layard et al. 1991). Typically these externalities are thought of as negative reactions by the employers to increased wage demands. Centralised bargaining in contrast takes into account positive externalities resulting from moderate wage bargains, such as wider tax base, allowing for the financing of good social security and welfare provisions, infrastructure, and peaceful industrial relations.

The unions aim at maximising rents from unionisation:

$$(2) \quad U^j = N_t^j (V_t^j - V^*)$$

where  $U^j$  is the utility of union  $j$ ,  $V^j$  the expected discounted value of employment for a union member in firm  $j$ ,  $V^*$  is the expected discounted value of being laid off or quitting (assumed equal) for a union member,  $N^j$  is employment in the firm  $j$ , and  $t$  time subscript.

Calmfors and Lang point out that the assumption of a monopoly union is convenient but not crucial (1995, 605).

One of the key elements of Calmfors and Lang's model is the assumption that the welfare of an unemployed worker is higher when placed in a labour market programme than it would be in open unemployment. According to the above assumption employed union members consider an extended ALMP provision as relatively speaking worsening their labour market status: the value of employment to a regularly employed individual is less compared to the value of unemployment, when unemployment becomes a less undesirable labour market option. Similar thinking was employed by Calmfors and Forslund, whose results did strongly suggest that labour market policies provide unemployed workers with a more favourable alternative than open unemployment (Calmfors & Forslund 1991, 1146).

Calmfors and Lang write a set of value functions for the labour market participants (Calmfors & Lang 1995, 605-606). Changes in the policy parameters of the model induce changes in the behaviour of the labour market participants, which is captured by the value equations and is further reflected on the macro economy.

The discounted value for being employed in firm  $j$  at time  $t$  is given by

$$(3) \quad V_t^j = \frac{1}{1+i} \left\{ v(w_t^j) + [qV_{t+1}^* + (1-q-a)V_{t+1}^j] \right\}$$

in which  $i$  stands for the discount rate and  $v$  for the instantaneous utility from employment in firm  $j$ , which depends on the wage  $w^j$ . Parameter  $q$  stands for quits or voluntary leaves from employment, and  $a$  for deaths (births), as before. The term within brackets is the sum of the instantaneous utility of employment and the value of future employment discounted one period ahead. The latter is obtained as a weighted average of the values of quitting voluntarily, dying, and staying on. The value of dying is normalised to zero. (Calmfors & Lang 1995, 695).

The value of quitting is equal to the value of being laid off and can be presented as a weighted value of participating in a labour market programme and of becoming openly unemployed:

$$(4) \quad V_{t+1}^* = \gamma_n V_{t+1}^r + (1 - \gamma_n) V_{t+1}^u$$

where  $V^r$  is the value of participating in a programme,  $V^u$  the value of open unemployment, and the weights are the probabilities of the two alternatives<sup>4</sup>.

The value  $V^r$  is given by:

$$(5) \quad V_{t+1}^r = \frac{1}{1+i} \left\{ v^r(b^r) + \left( \frac{s_r V_{t+2}^n + m_r V_{t+2}^p + (1-s_r - m_r - a)[\gamma_r V_{t+2}^r + (1-\gamma_r) V_{t+2}^u]}{(1-s_r - m_r - a)[\gamma_r V_{t+2}^r + (1-\gamma_r) V_{t+2}^u]} \right) \right\}.$$

This is the discounted sum of the instantaneous utility of the labour market state, plus a weighted average over the values of the alternatives the individual faces in the next period.

Similarly  $V^u$  gives the value of open unemployment:

$$(6) \quad V_{t+1}^u = \frac{1}{1+i} \left\{ v^u(b^u) + \left( \frac{s_u V_{t+2}^n + m_u V_{t+2}^p + (1-s_u - m_u - a)[\gamma_u V_{t+2}^r + (1-\gamma_u) V_{t+2}^u]}{(1-s_u - m_u - a)[\gamma_u V_{t+2}^r + (1-\gamma_u) V_{t+2}^u]} \right) \right\}$$

In the value functions given above  $v^r$  and  $v^u$  represent the instantaneous utilities of programme participation and open unemployment, respectively. These then depend on the

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<sup>4</sup> See appendix 1 for the derivation of  $V^*$ .

ALMP compensation  $b^r$  and unemployment benefit  $b^u$ . Importantly, it is assumed that  $v^r > v^u$ .

$V^n$  represents the value of being employed elsewhere in the economy. This value of re-employment is analogous with equation (3):

$$(7) \quad V^n = \frac{1}{1+i} \left\{ v^n(w) + [qV_{t+3}^* + (1-q-a)V_{t+3}^n] \right\}.$$

Here  $v^n$  is the value of alternative employment, and  $w$  is the respective wage.

Finally, the value of dropping outside the labour force is given by

$$(8) \quad V_{t+2}^p = \sum_{\tau=0}^{\infty} \frac{(1-a)^\tau}{(1-i)^{\tau+1}} v^p(b^p) = \frac{v^p(b^p)}{i+a}$$

where  $v^p$  stands for the instantaneous utility of being outside the labour force, which in turn is a function of the income in that state  $b^{p5}$ .

Calmfors and Lang assume that the wage is set for one period only. Hence the current wage  $w_t^j$  does not influence the value of future employment in the firm  $j$ ,  $V_{t+1}^j$ , so it is exogenous for each individual union. For an analysis of a steady state, time subscripts can be left out. Additionally, in a symmetrical equilibrium  $V^j = V^n$ . Thus from the above equations (2)-(8) we can derive<sup>6</sup> the union target function

$$(9) \quad U^j = N^j (V^j - V^*) = \frac{N^j}{1+i} [v(w^j) - v^*]$$

<sup>5</sup> For the derivation of the discount term see appendix 2.

<sup>6</sup> For the derivation see appendix 3.

where  $v^*$  is the weighted average of the instantaneous utilities in the various labour market states.

The labour unions set the wage by maximising (9). This is done subject to labour demand constraint:

$$(10) \quad w^j = f'(N^j)$$

where  $f'$  is the marginal product of labour.

The first order condition is then given by

$$(11) \quad \phi = N_v^j + \frac{v - v^*}{f''} = 0$$

.

In a symmetrical equilibrium  $w^j = w$  for all  $j$ . Thus equation (11) represents the aggregate wage equation

$$(12) \quad \phi(w, v^*) = 0.$$

In a similar manner, in a symmetrical equilibrium  $N^j = N/F = nM/F$ , where  $N$  stands for aggregate employment,  $F$  for the number of firms (unions), and  $M$  for the size of the population. Therefore (13) gives an equation for aggregate employment:

$$(13) \quad w = f'(nM / F).$$

The model is now given by the steady state conditions, equations (11) and (13), and the equation for  $v^*$ . There are eight endogenous parameters:  $w$ ,  $n$ ,  $u$ ,  $r$ ,  $p$ ,  $s_r$ ,  $s_u$  and  $v^*$ . Exogenous variables  $\gamma_n$ ,  $\gamma_r$ ,  $\gamma_u$  and  $\gamma_a$  represent the labour market policy parameters

determined by the government, and  $b_u$ ,  $b_r$  and  $b_p$  the compensation levels in each of the labour market states. The complete model also features technical parameters  $q$ ,  $a$ ,  $c$ ,  $m_r$  and  $m_u$ , and scale parameters  $M$  and  $F$ .

### 3.3 The theoretical effects of non-targeted labour market policy

Within the above introduced labour market model analyses of various approaches to active labour market measures can be conducted. Within the scope of this thesis only the theoretical analysis of non-targeted labour market policy will be undertaken. In the model's parameters, the non-targeted labour market policy is described as a situation where all the policy parameters acquire the same value:  $\gamma_n = \gamma_r = \gamma_u = \gamma_a = \gamma$ . This means that every individual has an equal chance of being selected to participate in a programme independent of which labour market state he finds himself in.

From steady state conditions (2) and (3) we can derive<sup>7</sup>

$$(14) \quad r = \gamma(r+u)$$

and

$$(15) \quad u = (1-\gamma)(r+u).$$

These conditions mean that the labour market programmes and open unemployment make up constant fractions of the total pool of job seekers. For purposes of defining a steady state for the labour market it is therefore sufficient to describe the condition for a total pool of job seekers. For this we add steady state conditions (2) and (3) and obtain<sup>8</sup>:

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<sup>7</sup> See appendix 4.

<sup>8</sup> See appendix 5.



$$(16) \quad (m+a+s)(r+u) = qn+a.$$

Here

$$s = \gamma s_r + (1-\gamma)s_u = s_u[(c-1)\gamma+1]$$

and

$$m = \gamma m_r + (1-\gamma)m_u$$

describe the aggregate probabilities for a job seeker of finding a new job and of dropping out of the labour force respectively.

The equations for constant employment and a constant stock of labour market drop-outs can be derived from steady state conditions (1) and (4) by simplification:<sup>9</sup>

$$(1a) \quad (q+a)n = s(r+u)$$

and

$$(4a) \quad ap = m(r+u).$$

Furthermore, (16) and (1a) give

$$(17) \quad s = \frac{n}{1-n} \left( q + m + a + \frac{mq}{a} \right) = \frac{n}{1-n} (m+a) \left( 1 + \frac{q}{a} \right).$$

This describes the aggregate re-employment probability. As can be seen, it depends positively on aggregate employment, the quit rate, and the outflow from the labour force.

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<sup>9</sup> See appendix 6.

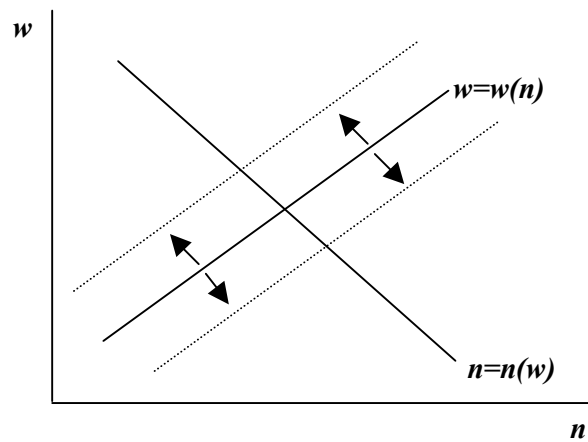
From equations (3)-(9) Calmfors and Lang obtain

$$(18) \quad v^* = \frac{1}{D} \{ \rho(1+i)v^s + [m(q+a-1) + \rho(q+s+a-1)]v^n + m(1+i)v^p \}$$

in which  $v^s = \gamma v^r + (1-\gamma)v^u$  represents the instantaneous expected utility of being a job seeker, and  $D = m(p+q) + p(p+q+s)$ . (Calmfors & Lang 1995, 608).

Calmfors and Lang draw the following graph to illustrate the general equilibrium solution. The solution is at the intersection of the employment and the wage-setting curves in the employment - wage space:

Figure 4. Labour market equilibrium.



The negatively sloped employment schedule is given by (13). The positively sloped wage-setting schedule can be derived from (12), (17) and (18). (Calmfors & Lang 1995, 608).

To analyse the effect of an increase in the proportion of job seekers placed on the measures, it is enough to analyse how the wage-setting schedule reacts to a change in the policy parameter. Thus (12) is differentiated with respect to  $\gamma$ . Holding  $n$  constant Calmfors and Lang obtain

$$(19) \quad \left( \frac{\partial \phi}{\partial w} + \frac{\partial \phi}{\partial v^*} \frac{\partial v^*}{\partial w} \right) dw - \frac{1}{f''} \frac{\partial v^*}{\partial \gamma} d\gamma = 0$$

in which the term within brackets is negative if the wage-setting schedule is positively sloped (Calmfors & Lang 1995, 608).. From this follows that  $dw/d\gamma$  and  $\partial v^*/\partial \gamma$  have the same sign, signifying that the wage-setting schedule moves into the same direction as the weighted alternative utility  $v^*$ . (Calmfors & Lang 1995, 609).

## 4. THE EMPIRICS OF ACTIVE LABOUR MARKET POLICY

### 4.1 Introduction

In this chapter the empirical evidence on different aspects of active labour market policy is surveyed. First we begin with a survey of microeconomic evaluation studies of ALMPs, which are today fairly commonly produced by independent researchers as well as national ministries and inter-governmental institutions such as European Union. These studies show that on an individual level ALMPs may prove very good at increasing employability and competitiveness in the labour market. The generally accepted conclusion regarding the effectiveness of ALMPs is that for a programme to be successful, it needs to be targeted at a specific group. Proceeding from this, a survey of the few existing macroeconomic level empirical studies is provided. Finally, a survey of the empirical wage-setting studies that have provided this thesis with guidance and references is provided.

## **4.2 Microeconomic empirical evidence on the effects and effectiveness of ALMPs**

Active labour market programmes have been diligently researched in the microeconomic context. The motivation for the study of ALMPs on the microeconomic level is two-fold. Firstly, do participants in these programmes benefit from participation relative to non-participation? Secondly, in view of the answer to the first question, do these programmes provide a worthwhile social investment? These evaluation studies of ALMPs have to be scrutinised carefully regarding their choice of econometric methodology. Heckman et al. (1999) have written about this at length. Especially earlier studies in peer-reviewed media often received comments for the appropriateness of choice of evaluation method.

The main problems in the microeconomic study of ALMPS arise due to heterogeneity of the target group for example in terms of age, gender, educational level, and geographical location. Earlier evaluation studies did indeed suffer of inadequacies in their estimation set-up and data quality, which Kluve and Schmidt (2002) attribute partially to the fact that academics have hardly had a chance to contribute to the design and implementation of labour market policies. They also have sensed a certain aversion towards evidence-based policy, suggesting that ALMPs may be enacted partially for political rather than (purely) efficiency and equity reasons.

Kluve and Schmidt (2002) provide a good survey of the newest evaluation literature, which is summed up here. Firstly, the US experience with ALMPs has not proven very satisfactory. There are hardly any positive treatment effects reported by the studies. (It needs to be pointed out that the design of policies in the United States is mainly aiming at lifting participants out of poverty, whereas the European programmes are typically concerned with post-programme employment. This is due to the differing characteristics of the two continent's labour markets.) Subsidised employment in the public sector fails to

show any long-term effects, but training programmes and job search assistance provide at least some target groups with desirable outcome in terms of employment and earnings prospects. Similar results regarding programme effectiveness apply for Europe. Programmes with a large training content seem to be the most likely to improve employment probability, whereas direct job creation and public sector employment subsidies are ineffective.

For Europe, with its maze of differing labour market institutional set-ups, Kluve and Schmidt (2002) also conduct a quantitative analysis in order to find out whether there exist overall evidence for their effectiveness or any patterns in the data. As their sample group they employ 53 national evaluation studies, 28 of which report a positive treatment effect. The data (studies) are from three decades (1970s, 1980s and 1990s) that provide for the timing variable. Different programme types are characterised as either “training-type”, “subsidy-type”, or “job search assistance”, and a (1/0) indicator is added for youth programmes. Another variable of interest is the study design; referring to what was commented upon above, the effectiveness of a programme could bear a reflection to whether it was performed by way of a randomized experiment, aiming at generating valuable data for later evaluation – only four of the studies belong to this category.

Finally, several aggregate variables are used to control for macroeconomic environment in which the programmes were implemented. They are able to conclude the following. Training-type programmes, the base being “subsidy-type treatment”, appear with a positive and significant (at 10% level) coefficient, testifying to the correctness of a general picture obtained from surveys of publications. Also job search assistance obtains a positive coefficient relative the base and only narrowly misses being significant at 10% level. For study design the base was non-experimental evaluation type and the time period covers the 1970s. In this set-up, a positive coefficient indicates positive programme outcome on individuals. Relative to the base, programmes implemented in the 1990s have a negative, significant (at 5% level) coefficient, I comparison to the positive coefficient that the base managed to achieve. This may be an indication of firstly, improved methodology of

conducting evaluation research, and that earlier evaluation results were biased to the positive; and secondly, the law of diminishing returns working also in the world of ALMPs. Only one more variable obtains a statistically significant (at 10% level) coefficient; unemployment rate, one of the variables characterising macroeconomic environment. It has small, positive coefficient. This would suggest that positive programme impacts were typically found when unemployment was high.

#### **4.2.1 Effect on the matching process**

Recent Finnish research does give some encouraging results regarding the improved matching resulting from updating the skills of the unemployed to better suit the needs of the labour market. Tuomala (2002) showed that on average, skill-enhancing programmes did increase the participants' hazard rate (the probability of exiting open unemployment to regular employment) by 14 % relative to otherwise similar openly unemployed individuals, who had not participated. The effectiveness of the participation did vary considerably though with the educational history of the participants, their age, and previous unemployment history. The best effectiveness was achieved in the case of the lowest-skilled, aged participants, and/or with participants who had a patchy employment record with either long unemployment history or frequent short spells in unemployment. Similar results for educational ALMPs, with especially good outcomes for the aged, were reported by Hämäläinen (1999).

#### **4.2.2 The deadweight effect**

The occurrence of misplacing society's resources in active labour market programmes is well documented, for example in Finland by Kangasharju and Venetoklis (2002). Their result was that the marginal effect of participating in a subsidised employment programme for the private sector businesses they studied was only 34 %, i.e. for each extra euro spent in subsidies towards employment in these companies, their aggregate payroll costs increased on average by only 34 cents. Employing workers within an ALMP programme

increased payroll costs in the studied businesses on average by 11 %. Because companies only paid on average 60 % of the costs of employing an extra worker, this result indicates clearly that the companies did not use the subsidy to employ more workers. Instead much of the public funding they received went for example towards financing advertisement and investment.

From another point of view, Aho and Kunttu (2001) and Hämäläinen (1999) report fairly unsatisfactory effectiveness of Finnish subsidised work schemes in increasing the participants' employment probability. Especially placements in the public sector did typically not result in any better labour market outcome than remaining openly unemployed. Also Tuomala (2002) found that the probability of subsequent employment was 15 % smaller for the participants in subsidised job schemes than openly unemployed. More empirical evidence, indicating substantial misallocation of society's resources as the result of (badly planned) subsidised work programmes, is quoted for various countries by Calmfors (Calmfors 1994,18).

### **4.3 Macroeconomic level empirical studies of ALMPs**

ALMPs have often been lauded for their positive (in terms of equilibrium unemployment) impact on wage setting; by increasing the competitiveness of the outsiders, for example, the programmes should in theory exert a wage-moderating effect, as shortly referred to above. There also exists evidence on the contrary, favouring the hypothesis of this thesis that ALMPs have had a wage-raising effect in Finland, as suggested by Calmfors and Lang (1995). An empirical estimation by Lars Calmfors and Anders Forslund (1991) on Swedish time series data did provide support for their hypothesis that labour market policies actually weaken incentives for wage moderation. In essence, they did find evidence in their estimated wage equations that expanded provision of ALMPs actually increased open unemployment.

Holmlund and Lindén (1993) have conducted a numerical analysis based on a less extensive but somewhat similar labour market model as Calmfors and Lang (1995) use. In Holmlund and Lindén's study the measure in which a certain proportion of the unemployed took part was relief jobs (temporary public jobs), and the two parameters that were under inspection and whose values were changed for policy simulations were the search effectiveness of the unemployed and the hiring rate into relief jobs. According to their results, there is always a reduction in unemployment associated with an increase in hiring to relief jobs, but this reduction is very small. However, effects on the duration of unemployment are significantly larger, 20-30 %, when the hiring rate to relief jobs is high. The study also reveals significant crowding-out effects when programme participants are ineffective as job searchers. The wage effect in their model will either offset or reinforce the job placement effect depending on who the programmes are targeted to. Interestingly, if programmes were targeted at improving unemployment outflow, Holmlund and Lindén's results could not rule out that the offsetting effect is so strong that unemployment actually increases when hiring into relief jobs is intensified. (Holmlund & Lindén 1993).

Also OECD have estimated macroeconomic impact of ALMPs on wage setting in the member countries. The framework for the study was a Phillips curve, where real wage growth is determined by the gap between actual and structural unemployment. Structural unemployment is here defined as the unemployment rate that would prevail in equilibrium, that is, if inflation expectations were met and real wages grew in line with productivity advances (OECD 1993, 51). Based on an estimation of wage moderating effects of active labour market measures presented in this study, Finland belongs to the group of 7 countries where the estimated effect of active programmes on wage moderation is statistically insignificant. Meanwhile, for 10 of altogether 19 countries studied the effect was found to be positive and significant, so that expenditures on active programmes exert a beneficial effect on structural unemployment by facilitating wage moderation. The estimation period was 1985-1990, during which the Finnish economy was growing and had full employment. (OECD 1993). In fact, Honkapohja and Koskela (1999) have suggested unemployment was below its equilibrium level during the boom years at the late 1980s.



Based on available evidence the OECD do recommend that it is of extreme importance to interrupt an unemployment spell at a very early stage (OECD 2002, 212). This is where in many western economies the active labour market programmes feature in a significant role, and in certain countries a policy of quick targeting within the first few months of unemployment has been implemented within the framework of the National Action Plans of European Union's European Employment Strategy. In the model by Calmfors and Lang (1995) active labour market programmes can be offered indiscriminately to all, or alternatively just a select group, of the unemployed. This is the decision a government has to make. The Calmfors and Lang model shows one alternative way in which the expansion of the availability of these programmes may affect the economy at the macroeconomic level via the wage setting process. The motivation for this thesis is that it is not inconceivable that the very large investment by the Finnish government in a variety of ALMPs over the past decades has lead to similar wage-setting effects in the Finnish economy. Whether this actually is the case will be studied below, where an econometric estimation of a wage equation is performed.

## 5. ESTIMATION OF A WAGE EQUATION FOR FINLAND

### **5.1 Estimation of wage equations in literature**

In the following paragraphs a review of existing estimations is provided as a background for the following estimation of a wage equation for Finland.

### 5.1.1 Finnish studies of wage setting

Pehkonen (1999) and Eriksson & al. (1990) have attempted to explain Finnish wage development over time with models that also provided a good basis for the simple OLS estimation for the purposes of this thesis. Mainly they provided inspiration for the choosing of appropriate variables to start the estimation work with, but equally their work was valuable for pointing out the different characteristics that time series data typically possess and how it needs to be dealt with. Pehkonen (1999) aimed at explaining unemployment via the wage setting process, and based his model for estimating a wage equation on a framework of markets of imperfect competition as developed by Layard & al. (1991). His purpose for estimation thus deviates slightly from this thesis' which is not concerned with explaining unemployment as such. Pehkonen (1999) employed dynamic modelling techniques, logarithmically transformed variables and a quarterly data set covering the period 1960.1-1994.4, which means that his observations ended just after the very bottom of the deep recession of the Finnish economy. He also introduced some new variables such as home ownership that had not previously been employed in this context for estimations on Finnish data.

Pehkonen's main findings were that firstly, productivity growth is a driving force behind wage development- a result also confirmed by the estimations conducted for this thesis. He employed the K/L ratio to capture a trend in labour productivity. Typically this term enters through the union bargaining theory where capital is an input in the production function and a variable in the profit maximisation of the employer (firm). An increasing K/L share could be expected to worsen labour's negotiation power, as relative efficiency changes to their disadvantage and workers get displaced by machinery. However, it was shown in this study that increasing productivity in fact increases wages, as value added *per worker* improves. Secondly, the results confirmed the standard assumption of a negative long-run relationship between unemployment and wage growth. Thirdly, taxes affected real labour costs and the impact was stronger in the short- than in the long run. Tax variables used in this study were the payroll tax, the average tax rate and a tax progressivity index, rather than one single tax wedge between the producer and consumer wage.

Eriksson & al. (1990) employed a very attractive selection of variables in their estimation of a Finnish wage equation, which they estimate for the period 1960-1985 on annual observations. They decided to leave the time trend out of the final specification for it failed to attain significance, nor did their specifications include a separate measure for technical change. As could be expected, the capital-labour ratio showed up as the fundamental trend factor with a coefficient close to unity. The unemployment rate could be interpreted as affecting the movements of the real wage around this trend. The coefficient for tax wedge of nearly minus unity implied that increases in the wedge were almost completely shifted onto consumption wage for workers. There was no consistency regarding the behaviour for coefficients for working time, union density, and real unemployment benefit variables, which changed signs and significance status depending on what other variables were included. The inclusion of an unemployment variable in the equation was clearly supported. Next, Eriksson & al. took a closer look at this. First they transformed the unemployment variable to logarithmic form, and found that the fit of the model improved. From the new results they also drew the conclusion that the effect of increases in unemployment on real wage becomes the smaller, the higher the level of unemployment actually is.

In further specifications by Eriksson & al. (1990), unemployment was disaggregated and divided up in short, medium and long term unemployment. This was motivated by the assumption that “workers who have been unemployed for a long time are likely to carry less weight in the wage negotiations, or they may experience such loss of skills and morale that they ought to be subtracted from the aggregate supply of labour” (Eriksson & al. 1990:218). The most interesting result of the paper, related to the above statement, was that long-term unemployment (over 6 months) indeed had not exerted negative pressure on wages over the sample period. Short-term unemployment on the other hand had had a strong negative effect.

Honkapohja & Koskela (1999) approached the wage estimation question in a slightly unconventional way, focusing on the effect of financial variables instead of the more typical ones such as benefit replacement ratio or trade union density. They estimated equilibrium unemployment in their study of Finland's depression by following the logic set in Layard et al. (1990), according to whom inflation is stable at equilibrium unemployment which they also call NAIRU (non-accelerating inflation rate of unemployment). This is due to the wage negotiation mechanism where wages are set as a mark-up over producer prices in an imperfectly competitive market situation. Honkapohja and Koskela estimated a logarithmic real-wage equation and a price-setting schedule in order to solve for the equilibrium unemployment rate. The data set was annual and covered the years 1970-1994, and the method employed was two-stage least squares. Based on these results, Honkapohja and Koskela computed the changes in the equilibrium rate of unemployment. According to their computations actual unemployment undershot its equilibrium value before the depression, and conversely significantly overshot it after 1990. Taxes, financial factors such as household indebtedness, and the exchange rate all contributed to some degree to the changes in the equilibrium rate of unemployment. Of these, taxes had the greatest, (unemployment rising) effect.

### **5.1.2 Other estimations of wage-setting**

Macroeconomic effect of ALMPs has not yet been studied in an empirical setting by many researchers, and in context with wage-setting there only exist two studies so far, both from Nordic countries. Forslund & Kolm (2000) have studied the effect of ALMPs on wage setting in Sweden with a contemporary data and a variety of rigorous methods such as canonical co-integrating regressions. They built a model in a similar style to Calmfors & Lang (1995), in which there exist three labour market states in which an individual can be, and the model features associated value functions.

To begin with, Forslund & Kolm (2000) presented results for comparative statics derived from the price- and wage-setting equations defined in the model. According to this the effect of ALMPs on the wage is ambiguous, as suggested also by Nymoen & Rødseth

(2003), who in their study of wage formation in four Nordic countries were just able to suggest that an increase in the supply of ALMPs increases the equilibrium unemployment rate, without truly statistically significant evidence to support this with. The empirical estimations of Forslund & Kolm (2000) arrived at the general, and opposite, conclusion that unlike previously estimated for Swedish data, ALMPs do not seem to have contributed significantly to increasing wage pressures. This contradicts the results obtained by Calmfors & Forslund (1991) according to whom labour market programmes had had a strong wage-raising effect. Forslund & Kolm (2000) employ the accommodation ratio, in the terminology of the previous chapter  $r/(r+u)$  or  $\gamma$ , as a proxy for the availability of different programmes for the unemployed. Their estimations also included the time trend, and all variables presented typical characteristics of first-order integrated processes. Overall, the little existing empirical evidence is not conclusive, so it is worth our while to proceed to estimating a wage equation for Finland. This will be undertaken in the following chapters.

## 5.2 The data set

The data set that was used to estimate the wage equation covers the years 1980-2002 and is annual. The shortness of the estimated period was due to the shortness of the time series on tax wedge. It is acknowledged that such a short time series estimation will not produce as accurate a basis for inference as would be hoped for. However, there was no remedy for the lack of appropriate data, and it has to be acknowledged that the inference needs to be questioned diligently.

The estimation data set was constructed from data obtained from various different sources. The data on the size of the labour force and wages, GDP, productivity and purchasing power parity was provided by the OECD Economic Outlook database. The data on tax wedge is from the OECD Taxing Wages database. As this database only comprised of

biannual observations until 1994, the missing tax wedge observations were averaged over the preceding and the following year's observations. This was considered to be acceptable as there was no stochastic variation that would have been destroyed by this procedure in the series.

Data on the active labour market measures was obtained from the Ministry of Labour's tables, and the replacement ratio for unemployment support was calculated based on data provided by *Vakuutusvalvontakeskus*. The variable representing the magnitude of the active labour market programmes was calculated as the ratio of the unemployed placed on the labour market measures to the number of all unemployed, that is  $r/(r+u)$  in the terminology of the model discussed in chapter 3 and which is known as the accommodation ratio. Bank of Finland supplied the data on the industrial capital base, based on which the capital/labour ratio was calculated. Full details concerning the acquisition and manipulation of the variables are given in the appendix 7.

### **5.3 Variables' characteristics**

The complete data set used for estimation comprised the following variables: real total compensation per employee (endogenous), productivity index, unemployment rate, long-term (12-month) interest rate, purchasing power parity, trade union density, tax wedge, accommodation ratio (ALMP), capital/labour ratio, real total output (for the IV estimation only), and replacement ratio. For the variables measured in real terms the base year was 1995. Additionally, an unemployment dummy was created by multiplying the unemployment rate with an index with value 1 before, and zero after and including 1992. This was to represent the change in legislation enacted that year whereby the municipalities' legal commitment to employ all long-term unemployed individuals was abolished. Upon graphing the data set individually for each variable it was evident by eyesight econometrics that many of the variables exhibited non-stationary characteristics

and a clear (upward) time trend. The unit root tests run on Pcgive for all of the variables did reject the null for unemployment rate and total demand variables at 1 % level. The normality tests for the variables showed a rejection of the null hypothesis of normality for real total compensation per employee and trade union density at 1 % level, and for unemployment rate at 5 % level.

With such strong trends present in much of the data as well as a lack of real stochastic variability in the series for tax wedge and K/L ratio problems with multicollinearity could be expected. For the purposes of estimation the complete data set was first transformed by taking the natural logarithm and then the first difference was taken of the new time series thus obtained. This provided for stationary variables, as well as an opportunity to interpret the results (regression coefficients) in terms of rate of change in percentages.

The data on tax wedge had to be partially manipulated, averaging over two observations in order to obtain a missing value. However, this was not assumed to pose a problem, as there is no real stochastic variation in the time series but tendency towards cyclical variation. More importantly, the series exhibits a significant upward surge after 1991, coinciding with the rapid increase in unemployment and fall in output. The series peaks in 1995, after which there has been a continuous decline. Despite this slight downward trend the tax wedge has remained at a relatively high level compared to the early years of the series, and can not have therefore contributed very much to the variation in real wages.

## **5.4 Specifying the wage equation**

The original selection of suitable variables was determined following the example set in previous studies on wage setting, such as Eriksson & al. (1990) and Pehkonen (1999). The strategy followed in the estimation process was to first determine a strong, parsimonious model which would then be used as a baseline model for instrumental variables estimation.

Instrumental variables estimation was to be used to check the robustness of the model used for OLS estimation, in which serial correlation can pose a problem. Endogeneity problem could also be expected because of the expected two-way relationship between wage-setting and unemployment. Due to the small number of observations (mainly determined by the shortness of the data series for tax wedge and trade union density) it was imperative that the model be concise. Building an autoregressive model was considered justified on the basis of elementary wage setting theory, so the first lag of the endogenous variable *real total compensation per employee* was added, and indeed it proved statistically significant. A good example was provided by Layard & al. (1991, 464). Thus we were looking for a model generalised as

$$(20) \quad \Delta y_t = \alpha \Delta y_{t-1} + \beta_1 x_{1t} + \beta_2 x_{2t} + \dots + \beta_n x_{nt} + u_t.$$

According to this model, the change in the real wage (value of output in perfectly competitive product markets with zero profits) is driven by an autoregressive process and further influenced by a number of variables that need to be determined empirically.

### 5.2.1 Estimation with differenced logarithmic variables

After studying a number of permutations it was decided that variables final demand, productivity index, purchasing power parity, long-term interest rate, trade union density and capital-labour ratio did not add enough useful information to justify being included in the model. Typically their inclusion, alone or in combinations, did lead to an increase in the explanatory power of the model, but the statistical significance of the most important variables determined by the theoretical model, unemployment and ALMP, were sacrificed (see appendix 9 for alternative specifications). Perhaps unexpectedly however the tax wedge proved significant and its presence was important to the two unemployment variables. In all models the signs of the coefficients were correct. Also the positive sign for the unemployment dummy showed up in a consistent manner, but it failed to achieve statistical significance. It was nevertheless considered important with respect to the theory



introduced in this thesis, and was included in the final model. The ALMP variable that was initially the most interesting of all showed in all alternative models to have had a negative impact on wage setting, but also failed to be statistically significant at 5 % level. The final model was determined in the following form:

$$(21) \quad \Delta \ln RTCP E_t = \alpha \Delta \ln RTCP E_{t-1} + \beta_1 \Delta \ln U_t + \beta_2 \Delta \ln U_t I_t(1980-1992) + \beta_3 \Delta \ln ALMP_t + \beta_4 \Delta \ln WEDGE_t + u_t.$$

The arrival at the final model, Model 5, via more parsimonious specifications, is shown in Table 1 below. All models passed the standard tests, i.e. tests for residual serial correlation, constant variance and normality of residuals, residual homoscedasticity and the Ramsey Reset test for functional form misspecification. Because the regression contains a lagged endogenous variable, the Durbin-Watson test statistic is not valid and is thus not reported. Also the constant is omitted from the table for lack of economic significance. Appendix 6 provides similar tables for alternative specifications including the initially interesting variables that were left out of the final model.

**Table 1. Estimations of the wage equation.**

<b>Estimated variable: differenced logarithm of Real Total Compensation per Employee</b>					
<b>Sample: 1980-2002</b>					
<b>t-values in parentheses</b>					
<b>Variable</b>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>	<b>Model 5</b>
Real Total Compensation per Employee_1	0.40 (2.59)	0.39 (2.36)	0.40 (2.40)	0.53 (3.45)	0.55 (3.58)
Unemployment rate	-0.05 (-3.40)	-0.05 (-2.17)	-0.06 (-2.24)	-0.105 (-3.62)	-0.111 (-3.77)
Unemployment rate * Index (1980-1992)		0.006 (0.21)	0.0010 (0.03)	0.073 (2.04)	0.069 (1.91)
ALMP			-0.011 (-0.71)		-0.014 (-1.06)
Tax Wedge				0.462 (2.64)	0.478 (2.72)
<b>R<sup>2</sup></b>	<b>0.57</b>	<b>0.57</b>	<b>0.58</b>	<b>0.69</b>	<b>0.71</b>

### 5.2.2 Instrumental variables estimation

After the final model specification had been arrived at, it was time for instrumental variables estimation. IV estimation was required because with an autoregressive model such as ours there is a great likelihood of the explanatory variable first lag of Real Total Compensation per Employee to be correlated with the error term  $u_t$ , thus violating the assumptions underlying the classical linear regression model and therefore rendering the OLS estimation useless in terms of reliability of statistical inference (Gujarati 1995). An

obvious choice for one instrument was the lag of unemployment. The assumption justifying this was that unemployment can be endogenous in this type of wage equation specification, for unemployment can be expected to not be independent of the real wage rate. For the second instrument a new variable, output, was introduced. This is because it could be hypothesised that the output variable is correlated with the unemployment rate-variable but not with the error term  $u_t$  of the original model, and is independent of the endogenous wage rate variable. The time series for output were obtained from the OECD statistical database, more specifically the national accounts section, and describe the total output of the economy in GDP terms.

The results of the IV estimation are provided below in Table 2. The constant has been omitted from the table for the reason of not containing any relevant information. In all cases it received very small positive values that were statistically significant (at 5 % level) in the first three models. The test row shows the significance of the tests for all coefficients  $\beta=0$ , indicated as “b”, and for normality of the residuals “N”, the stars indicating rejection at 1% and 5% levels for one star and two stars respectively. All of the models shown in Table 2 passed the Chi-square test for correct model specification. Other tests (for autoregressive residuals, autoregressive conditional heteroscedasticity of residuals,  $\chi^2$  and  $\chi^2$ ) were passed by all models.

As can be seen in comparison of the tables 1 and 2, the results for coefficients of the variables of the preferred specification, Model 5, do not differ very much between the two estimation methods. Also the t-values obtain quite similar levels.

**Table 2. Instrumental variables estimation.**

<b>Instrumental variables estimation, logarithmic differenced data</b>					
<b>Instruments: First Lag of Unemployment, Output</b>				<b>Sample: 1980-2002</b>	
<b>Variable</b>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>	<b>Model 5</b>
Real Total Compensation per Employee_1	0,57 (4,24)	0,50 (3,27)	0,55 (3,85)	0,53 (3,43)	0,55 (3,54)
Unemployment rate	-0,066 (-3,50)	-0,107 (-2,52)	-0,105 (-2,50)	-0,086 (-2,66)	-0,094 (-2,81)
Unemployment rate*Index (1980-1992)		0,061 (1,30)	0,040 (0,88)	0,053 (1,34)	0,051 (1,28)
ALMP			-0,027 (-1,16)		-0,012 (-0,91)
Tax Wedge				0,39 (2,06)	0,405 (2,16)
<b>Tests</b>	b** / N**	b** / N*	b** / N*	b**	b**

### 5.3 Discussion of the results

The results of the estimations of the wage equation, depicted in Table 1 above, can be summarised as follows. First of all, the explanatory power of the model is fairly good, our preferred specification managing to explain 71 % of the variability in the real wage over the estimation time period. This is satisfactory considering the small number of observations that directly limited the size of the model. Secondly, unemployment rate has, as was assumed, exerted negative pressure on real wages during our estimation period 1980-2002. The effect of a one percent change in unemployment has in our preferred specification had a -0.11 % effect on the change of wages. In other specifications the effect is even smaller. However, in all models the coefficient of unemployment was clearly statistically significant, and always negative, as also was expected.

The lag of the endogenous variable was also always statistically significant. Its coefficient showed a correlation with change of the real wage of 0.55 in our preferred model. Centralised incomes policies negotiations have taken place in Finland since 1968, but only the ones conducted in the aftermath of the deep recession at the beginning of the 1990s did agree to restrain wage growth in an effort to preserve jobs. Only once before the period 1991-1994 does the time series of differenced logarithm of real wage show negative change. This was in 1976-1978, when unemployment also rose considerably. Of previous studies of aggregate wage setting, in Pehkonen (1999, 89) a rather remarkably similar coefficient for the lag of real wage was obtained. In his estimation on differenced logarithmic data, which benefited of a longer estimation period and included twice as many parameters as our model, he obtained a coefficient of 0.53 for the lag of real wage. Based on his work Pehkonen was also able to conclude that taxes do affect real labour costs and that this impact is stronger in the short run. He used a variety of different tax variables. Nevertheless the one used in our specification, the tax wedge, also showed to have had a significant wage-raising effect, with a coefficient close to 0.5.

The other unemployment variable included in our specification was the unemployment rate multiplied by an index that took the value one until 1991 and zero after. This variable was included in the model for testing of the hypothesis that the end of artificial employment of long-term unemployed in municipalities has had a wage-raising effect. This hypothesis has its foundations in the theory of the screening model, according to which long-term unemployed lose their attractiveness in the labour market as potential employees and therefore cease exerting downward pressure on wages. Indeed we do find a positive coefficient for this variable. However it seems to possess a strong relationship with the tax wedge, as only the inclusion of this result in a statistically significant estimate. The coefficients obtained are small but the inclusion of the tax wedge increases them to a more meaningful level. In our preferred specification the coefficient obtains a value of 0.07. This numerical result is however rather difficult to elaborate in a sensible manner in this context, and we can be contented with the estimate having obtained a “correct” sign.

Our most interesting variable considering the motivation for this study is of course the ALMP variable, that is, the share of the unemployed on the labour market programmes of total unemployment. Disappointingly, the estimate failed to be statistically significant in any specification. However, it did obtain a negative sign in a very consistent manner in all but a very few specifications, which for other reasons were deemed unsuitable and are not presented here. It is nevertheless a pleasing result that the behaviour of the variable was consistent, and although it is impossible to draw a statistically meaningful conclusion regarding the effect of ALMPs on wage-setting, we can assume that ALMPs have exerted some sort of coherent effect over time. This merits further investigation which would benefit of more appropriate data and elaborate econometric techniques.

Finally, the instrumental variables estimation results, presented in Table 2, do lend good support to the estimation results presented in Table 1. The only upset is due to the unemployment dummy which completely loses its statistical significance in the IV estimation. In all other respects the IV estimation coefficient estimates are remarkably similar to the estimates obtained by the standard OLS technique and also the significance

of different variables in the specifications are very close to those of the OLS estimates'. This is very encouraging, and we can therefore conclude that our model has been relatively successful in explaining real-wage determination in Finland.

## 6. CONCLUSIONS

This thesis has provided a thorough introduction to the world of active labour market programmes by first introducing the reader to a survey of the theoretical effects in the second chapter. These showed in the familiar Nickell-Layard framework a variety of channels through which ALMPs can potentially have beneficial effects on the functioning of the labour market. Then, in the third chapter an elaborate and rigorous union wage-bargaining model by Lars Calmfors and Harald Lang (1995) was introduced, which arrived at a conclusion that a non-targeted labour market policy can lead to increased wage demands and thus maintain, or even worsen, the unemployment situation; quite opposite to the motivation for providing the ALMPs.

The fourth chapter was devoted to an introduction to the existing empirics of active labour market policies, in the form of a survey of recent research. The microeconomic literature had generally arrived to the overall conclusion that often ALMPs did not perform in improving participant's chances of becoming regularly employed as the had been expected to, nor in a satisfactory manner considering the large investment made by western economies in the past decades. There exist also a few other studies of the effects of active labour market policies in the macro economy, and these were also reviewed. Many theoretical and empirical studies had arrived at the conclusion that the ALMPs are quite likely to have unexpected negative effects via the wage-setting mechanism (see e.g. Calmfors and Forslund (1991), Holmlund & Lindén (1993), Nymoén & Rødseth (2002)).

Interestingly, these are all by researchers from the Nordic countries, where the labour markets share many characteristics such as fairly strong nominal wage rigidity and corporatist bargaining structure. In these countries too, ALMPs command a rather large share in the public investment. Prior to this thesis, there however did not exist any studies of Finnish ALMPs in the macroeconomic setting. The research on the microeconomics, most typically evaluation studies of effectiveness, has for some reason commanded more interest. Both Finnish and international micro studies were reviewed so as to familiarise the reader with the breadth and scope of ALMPs and the real-life effectiveness of well-intentioned policies. Based on the evidence it could be concluded that ALMPs had proven less effective than hoped for, and had therefore not represented a cost-effective policy in many cases. If, on top of these disappointments, also the macroeconomic impact had proven negative, it would have provided a real incentive to improve the design and targeting of the policies for the government.

The thesis then proceeded to the de-facto estimation of the wage equation for Finland in chapter five. The hypothesis set based on the Calmfors & Lang model was that the ALMPs have had a wage-raising effect in Finland. Although the model represented an economy where wages are negotiated at the firm level, where each firm has its own union, it was still considered a suitable description of the highly centralised Finnish bargaining system. The most interesting characteristic of the model was duration dependency of unemployment, which means that the unemployed face an increasing probability of falling outside the labour force completely and for good, and which is attractive from the Finnish point of view: The number of such individuals, the “hard core” of Finnish unemployment, has been estimated at around 50 000 individuals. There also exists empirical evidence for the standard hypothesis that not only the level but also the structure of unemployment matter, as for Finland in Eriksson et al. (1990). According to the evidence reviewed in the earlier chapters, wages are only responsive to changes in unemployment and not the level. So there was a lot of motivation to look at how ALMPs had affected the Finnish macro environment.



The conclusion from the estimations performed unfortunately was not able to support the null hypothesis that ALMPs and real wages have had a positive correlation in Finland. In fact, the ALMPs appeared to hardly have had an effect, for the coefficient obtained by the ALMPs variable was very small, and never even remotely close to being statistically significant. Also, opposite to what was expected, the coefficient showed up with a negative sign. Nevertheless, due to the shortness of the time series employed in the study and other data issues, as well as the contention with the most basic empirical estimation techniques, this investigation can not in any way be claimed to have provided a fool-proof result. It would rather be suggested that further research with a similar approach be undertaken that employs high quality data and more rigorous econometric methodology.

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## APPENDIX 1 Deriving $V^*$

We derive equation for  $V^*$  from equations (2)-(8). As we are concerned with a symmetrical steady state, we can drop all subscripts regarding time  $t$ , and individual firms,  $j$ .

Starting from equation (7):

$$V^n = \frac{1}{1+i} \left\{ v^n(w) + [qV_{t+3}^* + (1-q-a)V_{t+3}^n] \right\}, \text{ from which we get}$$

$$V^n = \frac{1}{1+i} v^n(w) + \frac{qV^*}{1+i} + \frac{(1-q-a)V^n}{1+i}$$

$$\Rightarrow V^n - \frac{(1-q-a)V^n}{1+i} = \frac{v^n(w)}{1+i} + \frac{qV^*}{1+i}$$

$$\Rightarrow (1+i)V^n - (1-q-a)V^n = v^n(w) + qV^*$$

$$\Rightarrow (i+q+a)V^n = v^n(w) + qV^*$$

$$\Rightarrow V^n = \frac{1}{(i+q+a)} (v^n(w) + qV^*).$$

Then we also have  $V^p$  as given in equation (8):

$$V_{t+2}^p = \sum_{\tau=0}^{\infty} \frac{(1-a)^\tau}{(1+i)^{\tau+1}} v^p(b^p) = \frac{v^p(b^p)}{i+a}.$$

Substituting  $V^n$  and  $V^p$  in the equation for  $V^*$  (5) gives



$$\begin{aligned}
V^r &= \frac{1}{1+i} \left\{ v^r(b^r) + \frac{s_r}{i+q+a} (qV^* + v^n(w)) + m_r \frac{v^p(b^p)}{i+a} + (1-s_r - m_r - a)\gamma_r V^r + \right. \\
&\quad \left. (1-s_r - m_r - a)(1-\gamma_r)V^u \right\} \\
\Rightarrow V^r - \frac{(1-s_r - m_r - a)\gamma_r V^r}{1+i} &= \frac{1}{1+i} \left\{ v^r(b^r) + \frac{s_r}{i+q+a} (qV^* + v^n(w)) + m_r \frac{v^p(b^p)}{i+a} + \right. \\
&\quad \left. (1-s_r - m_r - a)(1-\gamma_r)V^u \right\} \\
\Rightarrow \left( 1 - \frac{(1-s_r - m_r - a)\gamma_r}{1+i} \right) V^r &= \frac{1}{1+i} \left\{ v^r(b^r) + \frac{s_r}{i+q+a} (qV^* + v^n(w)) + m_r \frac{v^p(b^p)}{i+a} + \right. \\
&\quad \left. (1-s_r - m_r - a)(1-\gamma_r)V^u \right\} \\
\Rightarrow V^r &= \frac{1+i}{(i+s_r + m_r + a)\gamma_r} \times \frac{1}{1+i} \left\{ v^r(b^r) + \frac{s_r}{i+q+a} (qV^* + v^n(w)) + m_r \frac{v^p(b^p)}{i+a} + \right. \\
&\quad \left. (1-s_r - m_r - a)(1-\gamma_r)V^u \right\} \\
\Rightarrow V^r &= \frac{1}{(i+s_r + m_r + a)\gamma_r} \left\{ v^r(b^r) + \frac{s_r}{i+q+a} (qV^* + v^n(w)) + m_r \frac{v^p(b^p)}{i+a} + \right. \\
&\quad \left. (1-s_r - m_r - a)(1-\gamma_r)V^u \right\}.
\end{aligned}$$

We will henceforth denote  $\left\{ v^r(b^r) + \frac{s_r}{i+q+a} (qV^* + v^n(w)) + m_r \frac{v^p(b^p)}{i+a} + \right. \left. (1-s_r - m_r - a)(1-\gamma_r)V^u \right\}$  by A.

Next we substitute  $V^n$ ,  $V^p$  and  $V^r$  into the equation for  $V^u$  (6):

$$V^u = \frac{1}{1+i} \left\{ v^u(b^u) + s_u \frac{qV^* + v^n(w)}{i+q+a} + m_u \frac{v^p(b^p)}{i+a} + \right. \\
\left. (1-s_u - m_u - a)\gamma_u \frac{1}{(i+s_r + m_r + a)\gamma_r} A + (1-s_u - m_u - a)(1-\gamma_u)V^u \right\}$$

$$\begin{aligned}
\Rightarrow V^u - \frac{(1-s_u - m_u - a)(1-\gamma_u)V^u}{1+i} &= \frac{1}{1+i} \left\{ \begin{aligned} &v^u(b^u) + s_u \frac{qV^* + v^n(w)}{i+q+a} + m_u \frac{v^p(b^p)}{i+a} + \\ &\frac{(1-s_u - m_u - a)\gamma_u}{(i+s_r + m_r + a)\gamma_r} A \end{aligned} \right\} \\
\Rightarrow \left( 1 - \frac{(1-s_u - m_u - a)(1-\gamma_u)}{1+i} \right) V^u &= \frac{1}{1+i} \left\{ \begin{aligned} &v^u(b^u) + s_u \frac{qV^* + v^n(w)}{i+q+a} + m_u \frac{v^p(b^p)}{i+a} + \\ &\frac{(1-s_u - m_u - a)\gamma_u}{(i+s_r + m_r + a)\gamma_r} A \end{aligned} \right\} \\
\Rightarrow \left( \frac{i + (s_u + m_u + a)(\gamma_u - 1)}{1+i} \right) V^u &= \frac{1}{1+i} \left\{ \begin{aligned} &v^u(b^u) + s_u \frac{qV^* + v^n(w)}{i+q+a} + m_u \frac{v^p(b^p)}{i+a} + \\ &\frac{(1-s_u - m_u - a)\gamma_u}{(i+s_r + m_r + a)\gamma_r} A \end{aligned} \right\} \\
\Rightarrow V^u = (i + (s_u + m_u + a)(\gamma_u - 1)) &\left\{ \begin{aligned} &v^u(b^u) + s_u \frac{qV^* + v^n(w)}{i+q+a} + m_u \frac{v^p(b^p)}{i+a} + \\ &\frac{(1-s_u - m_u - a)\gamma_u}{(i+s_r + m_r + a)\gamma_r} A \end{aligned} \right\}.
\end{aligned}$$

Finally, we substitute  $V^n$ ,  $V^p$ ,  $V^r$  and  $V^u$  in the equation for  $V^*$  (4):

$$\begin{aligned}
V^* &= \gamma_n \frac{(1-s_u - m_u - a)\gamma_u}{(i+s_r + m_r + a)\gamma_r} A + \\
(1-\gamma_n)(i + (s_u + m_u + a)(\gamma_u - 1)) &\left\{ \begin{aligned} &v^u(b^u) + s_u \frac{qV^* + v^n(w)}{i+q+a} + m_u \frac{v^p(b^p)}{i+a} + \\ &\frac{(1-s_u - m_u - a)\gamma_u}{(i+s_r + m_r + a)\gamma_r} A \end{aligned} \right\}.
\end{aligned}$$

## APPENDIX 2 The discount factor of equation 8

$$V_{t+2}^p = \sum_{\tau=0}^{\infty} \frac{(1-a)^\tau}{(1+i)^{\tau+1}} v^p(b^p) = \frac{v^p(b^p)}{i+a}$$

Now,

$$\frac{(1-a)^r}{(1+i)^{r+1}}$$

summed from zero to infinity represent a geometric series:

$$\begin{aligned} & \frac{1}{(1+i)} + \frac{(1-a)}{(1+i)^2} + \frac{(1-a)^2}{(1+i)^3} + \dots \\ &= \frac{1}{(1+i)} \left\{ 1 + \frac{(1-a)}{(1+i)} + \frac{(1-a)^2}{(1+i)^2} + \dots \right\} \\ &= \frac{1}{(1+i)} \left\{ \frac{1}{1 - \frac{(1-a)}{(1+i)}} \right\} \\ &= \frac{1}{(1+i)} \left\{ \frac{1+i}{1+i-1-a} \right\} \\ &= \frac{1}{(1+a)} \end{aligned}$$

## APPENDIX 3 The union target function

When the union sets its target it takes into account the labour demand constraint, which in turn is determined by the profit function of the companies:

$$\Pi = f(N^j) - w^j N^j.$$

Maximising this with respect to employment gives

$$\Pi_{N^j} = f' - w^j = 0.$$

Thus labour demand is in accordance with the standard condition of marginal product equating marginal cost:

$$w^j = f'(N^j).$$

## APPENDIX 4 Derivation of equations 14 and 15

Deriving equations (14) and (15) from steady state conditions (2) and (3):

$$[s_u+m_u+a+\gamma_u(1-s_u-m_u-a)]u = (1-\gamma_a)a+(1-\gamma_n)qn+(1-s_r-m_r-a)(1-\gamma_r)r \quad (2)$$

$$[s_r+m_r+a+(1-\gamma_r)(1-s_r-m_r-a)]r = \gamma_a a+\gamma_n qn+(1-s_u-m_u-a)\gamma_u u \quad (3)$$

In our condition we have  $\gamma_a=\gamma_n=\gamma_u=\gamma_r=\gamma$ .

Let us denote

$$s_u+m_u+a = U$$

and

$$s_r+m_r+a = R.$$

Then

$$[U+\gamma(1-U)]u = (1-\gamma)(a-qn) + (1-R)(1-\gamma)r \quad (2a).$$

$$[R+(1-\gamma)(1-R)]r = \gamma(a+qn) + (1-u)\gamma u \quad (3a).$$

Rewriting gives

$$(1-\gamma)(a-qn) = [U+\gamma(1-U)]u - (1-R)(1-\gamma)r \quad (2b).$$

$$\gamma(a+qn) = [R+(1-\gamma)(1-R)]r - (1-U)\gamma u \quad (3b).$$

Multiplying (2b) by  $\gamma$  and (3b) by  $(1-\gamma)$  allows the equation of the right hand sides of the equations to give

$$\gamma[U+\gamma(1-U)]u - \gamma(1-R)(1-\gamma)r = (1-\gamma)[R + (1-\gamma)(1-R)] - (1-\gamma)(1-U)\gamma u \quad (A).$$

Collecting the terms gives

$$\gamma [U+\gamma(1-U)]u + (1-\gamma)(1-U)\gamma u = (1-\gamma)[R+(1-\gamma)(1-R)]r + \gamma(1-R)(1-\gamma)r.$$

The left hand side of the above equation then simplifies in the following manner:

$$\begin{aligned} \gamma [U+\gamma(1-U)]u + (1-U)(1-\gamma)\gamma u &= \gamma Uu + \gamma\gamma(1-U)u + (1-U)\gamma u - \gamma\gamma(1-U)u \\ &= \gamma Uu + \gamma\gamma(1-U)u + (1-U)\gamma u - \gamma\gamma(1-U)u \\ &= \gamma Uu + (1-U)\gamma u \\ &= \gamma Uu + \gamma u - \gamma Uu \\ &= \gamma u. \end{aligned}$$

In a similar fashion, the right hand side can be simplified:

$$\begin{aligned} (1-\gamma)[R+(1-\gamma)(1-R)]r + \gamma(1-R)(1-\gamma)r &= (1-\gamma)Rr + (1-\gamma)(1-\gamma)(1-R)r + \gamma(1-R)(1-\gamma)r \\ &= (1-\gamma)Rr + (1-\gamma)(1-R)r - \gamma(1-\gamma)(1-R)r + \gamma(1-\gamma)(1-R)r \\ &= (1-\gamma)Rr + (1-\gamma)r - (1-\gamma)Rr \\ &= (1-\gamma)r. \end{aligned}$$

From (A) we thus have

$$\gamma u = (1-\gamma)r$$

$$\gamma u = r - r\gamma \tag{B}$$

$$r = \gamma(r+u) \tag{14}.$$

Substitution gives

$$\gamma u = (1-\gamma)\gamma(r+u)$$

$$u = (1-\gamma)(r+u) \tag{15}.$$

## APPENDIX 5 Deriving equation 16

We have steady state conditions

$$[s_u+m_u+a+\gamma_u(1-s_u-m_u-a)]u = (1-\gamma_a)a+(1-\gamma_n)qn+(1-s_r-m_r-a)(1-\gamma_r)r \quad (2)$$

and

$$[s_r+m_r+a+(1-\gamma_r)(1-s_r-m_r-a)]r = \gamma_a a + \gamma_n qn + (1-s_u-m_u-a)\gamma_u u \quad (3).$$

By rearranging we get

$$[s_u+m_u+a+\gamma_u(1-s_u-m_u-a)]u - (1-\gamma_a)a-(1-\gamma_n)qn-(1-s_r-m_r-a)(1-\gamma_r)r = 0 \quad (2a)$$

and

$$[s_r+m_r+a+(1-\gamma_r)(1-s_r-m_r-a)]r - \gamma_a a + \gamma_n qn - (1-s_u-m_u-a)\gamma_u u = 0 \quad (3a).$$

Adding (2a) and (3a) and canceling terms gives

$$(s_u+m_u+a)-a-qn+ (s_r+m_r+a)r = 0.$$

Finally,

$$(m+a+s)(r+u) = a+qn$$

in which

$$s = \gamma s_r + (1-\gamma)s_u = s_u[(c-1)\gamma + 1]$$

and

$$m = \gamma m_r + (1-\gamma)m_u. \text{ (Calmfors \& Lang 1995, 607).}$$

## APPENDIX 6 Alternative specifications

Dependent variable: differenced logarithm of Real total compensation per employee. t-values in parenthesis

<b>Variable</b>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
Real total compensation per employee _1	0,471 (2,78)	0,20 (1,30)	0,144 (0,87)	0,242 (1,17)
Unemployment rate	-0,044 (-3,03)	-0,076 (-4,87)	-0,094 (-3,83)	-0,075 (-4,59)
Unemployment rate*Index (1980-1992)			0,025 (0,97)	
ALMP				
Tax Wedge				0,051 (0,32)
Productivity Index	0,230 (1,01)			
K/L				
PPP				
Interest rate, long term		-0,237 (-2,60)	-0,249 (-2,69)	-0,225 (-2,21)
Trade union density				
R <sup>2</sup>	0,59	0,74	0,76	0,74



<b>Variable</b>	<b>Model 5</b>	<b>Model 6</b>	<b>Model 7</b>	<b>Model 8</b>
Real total compensation per employee _1	0,212  (1,36)	0,231  (1,48)	0,218  (1,36)	0,213  (1,36)
Unemployment rate	-0,083  (-4,73)	-0,070  (-4,20)	-0,084  (-4,63)	-0,080  (-4,88)
Unemployment rate*Index (1980-1992)				
ALMP			-0,009  (0,58)	
Tax Wedge				0,051  (0,32)
Productivity Index			0,014  (0,53)	0,020  (-0,86)
K/L				
PPP				
Interest rate, long term	-0,220  (-2,35)	-0,260  (-2,78)	-0,256  (-2,18)	-0,282  (-2,67)
Trade union density				
R <sup>2</sup>	0,75	0,76	0,76	0,75

t-values in parentheses

Dependent variable: differenced logarithm of Real total compensation per employee

Variable	Model 9	Model 10	Model 11	Model 12
Real total compensation per employee _1	0,361 (2,25)	0,377 (2,54)	0,481 (2,80)	0,366 (2,26)
Unemployment rate	-0,062 (-2,87)	-0,043 (-3,18)	-0,052 (-2,96)	-0,071 (-2,93)
Unemployment rate*Index (1980-1992)				
ALMP			-0,012 (-0,82)	-0,013 (0,86)
Tax Wedge				
Productivity Index			0,241 (1,05)	
K/L	0,155 (0,84)			0,164 (0,88)
PPP		0,227 (0,14)		
Interest rate, long term				
Trade union density				
R <sup>2</sup>	0,59	0,62	0,61	0,61

t-values in parentheses

Dependent variable: differenced logarithm of Real total compensation per employee

<b>Variable</b>	<b>Model 13</b>	<b>Model 14</b>	<b>Model 15</b>	<b>Model 16</b>
Real total compensation per employee _1	0,283 (1,47)	0,476 (2,75)	0,407 (2,49)	0,555 (3,46)
Unemployment rate	-0,102 (-2,26)	-0,068 (-2,63)	-0,174 (-3,93)	-0,111 (-3,63)
Unemployment rate*Index (1980-1992)	0,032 (0,81)	0,033 (0,87)	0,011 (2,67)	0,070 (1,84)
ALMP	-0,009 (-0,60)	-0,009 (-0,56)	-0,011 (-0,90)	-0,014 (0,98)
Tax Wedge			0,506 (2,97)	0,461 (2,18)
Productivity Index		0,402 (1,36)		0,046 (0,15)
K/L	0,296 (1,19)		0,387 (1,88)	
PPP				
Interest rate, long term				
Trade union density				
R <sup>2</sup>	0,63	0,62	0,77	0,71

t-values in parentheses

Dependent variable: differenced logarithm of Real total compensation per employee

<b>Variable</b>	<b>Model 17</b>	<b>Model 18</b>	<b>Model 19</b>	<b>Model 20</b>
Real total compensation per employee _1	0,368 (1,81)	0,522 (3,58)	0,604 (2,86)	0,506 (2,703)
Unemployment rate	-0,123 (-4,29)	-0,108 (-3,90)	-0,111 (-2,88)	-0,069 (-2,91)
Unemployment rate*Index (1980-1992)	0,063 (1,73)	0,073 (2,16)	0,070 (1,70)	
ALMP	-0,012 (-0,89)	-0,012 (-0,92)	-0,015 (-1,03)	-0,017 (-1,16)
Tax Wedge	0,355 (1,63)	0,477 (2,90)	0,520 (2,33)	0,212 (1,39)
K/L				0,062 (0,32)
PPP		0,221 (1,81)		
Interest rate, long term	-0,165 (-1,65)			
Trade union density			-0,099 (-0,318)	
R <sup>2</sup>	0,81	0,76	0,77	0,65

t-values in parentheses

## APPENDIX 7 Data description

Here is a table describing the variables used in the modelling process. All data was manipulated for the estimation purposes by first taking the logarithm and then the first difference of the logarithmic series.

Variable	Explanation	Data source	Manipulation and other comments
RTCpE	Real total compensation per employee; Index, 1995=100	OECD Economic Outlook: Finland	
UE%	Unemployment, %	OECD Economic Outlook: Finland	
UEIND	Unemployment % * Index (1980-1992)		
ALMP	Active labour market programmes; the share of activated persons in total unemployment, $r/(r+u)$	Ministry of Labour; OECD Economic Outlook: Finland	Own calculation based on MoL numbers of persons on different measures and OECD <i>Unemployment</i> variable
WEDGE	Tax wedge, difference between producer and consumer prices	OECD Taxing Wages database for Finland	Data available for only every other year prior to 1994. For missing observations, a

			value was obtained as an average over the tax wedge for the year before and the year after.
UNION	Unionisation rate, %	OECD Economic Outlook: Finland	
RR	Unemployment insurance replacement rate	Vakuutusvalvontakeskus supplied the €/day values. Average over male and female recipients.	Own calculation based on a daily wage derived from WRBS/240, i.e. assuming 4 weeks of holiday per year.
UEMEM	Unemployed members of insurance funds	Bank of Finland	
PRODI	Productivity index, 1995=100	OECD Economic Outlook: Finland	
K/L	Capital-labour ratio	OECD Economic Outlook: Finland for both variables	Own calculation based on the <i>Capital stock</i> , <i>business</i> , and <i>Labour Force</i> , total variables
OUTPUT	Total final output in GDP terms	Source OECD, National Accounts	