

# Macroeconometric evaluation of active labour-market policy – a case study for Germany

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# **Macroeconometric evaluation of active labour-market policy – a case study for Germany**

**Reinhard Hujer, Marco Caliendo, Christopher Zeiss**

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## **Abstract**

Most evaluation studies of active labour-market policies (ALMPs) focus on the microeconomic evaluation approach using individual data. However, as the microeconomic approach usually ignores impacts on non-participants, it should be seen only as a first step to a complete evaluation to be followed by analysis at macroeconomic level.

Our study evaluates the impact of active labour-market programmes in Germany on the whole economy. The evaluation focuses on vocational training and additionally on subsidised employment programmes in order to compare them to vocational training. To do this we outline the institutional structure of ALMPs in Germany and conduct a theoretical discussion that enables us see how ALMP might influence the whole economy. This framework serves as a starting point for the empirical analysis, which uses regional data from 175 German labour office districts and a dynamic panel data estimator to evaluate the impacts of ALMP in Germany from 1999 to 2001.

The empirical analysis relies on the Beveridge curve relationship, explaining total unemployment as a function of vacancies and ALMP activity. With this empirical model we are able to estimate the overall effect of ALMP on the economy. We use a dynamic specification that enables us to control for the highly persistent pattern of German unemployment. Since the usual estimation methods are not appropriate in dynamic panel data models, we use a system generalised method of moments (GMM) estimator that was found to perform well in the case of highly persistent data.

Within the system GMM framework we account for the inherent simultaneity problem resulting from the fact that ALMP would normally be determined by a policy reaction function, i.e. the decision on how much is spent on ALMP is driven by the economic situation. This would result in a causal link from the dependent variable (unemployment or employment) to the ALMP measures which would result in misleading estimates.

Our results indicate different pictures in East and West Germany. Whereas in West Germany we find a positive result for vocational training, the results in East Germany do not look

favourable. The results for East Germany should be treated with caution since adequate estimators cannot be implemented due to a too small number of regional units. Comparing vocational training programmes in West Germany with job creation schemes (*Arbeitsbeschaffungsmaßnahmen*, JCS), we additionally find that vocational training is the more efficient measure in reducing unemployment.

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# 1. Executive summary

We were interested in estimating the net effects of ALMP in Germany. As microeconomic evaluations usually ignore impacts on non-participants, we used a macroeconomic approach to analyse the effects of JCS, structural adjustment schemes (*Strukturanpassungsmaßnahmen*, SAS), only for East Germany, and continuing vocational training (*Förderung der beruflichen Weiterbildung*, FbW) on employment in Germany from 1999 to 2001.

Our analysis starts with an overview of the institutional structure of ALMP in Germany. Labour-market policies in Germany are organised by the Federal Employment Service (*Bundesanstalt für Arbeit*). Up to 1998, the legal basis for policy has been the work promotion act (*Arbeitsförderungsgesetz*, AFG), established in 1969. From that point, the new social welfare code SGB III (*Sozialgesetzbuch*) took over this role. Changes have been made both in objectives, such as a more intensive focus on problem groups in the labour market, and also in the institutional organisation of labour-market policy, leading to decentralisation and more flexibility in the regional allocation of resources to different measures.

Since our data ranges from 1999 to 2001, we focus only on SGB III which was created in an economic situation with high unemployment rates and narrow budget constraints. The most important goal of ALMP within the framework of SGB III is the (re)integration of problem groups in the regular labour market while using resources in an efficient way. With respect to the organisational set up of ALMP, SGB III allows local labour offices to allocate their budgets relatively freely to different measures. This leaves the decision on the mix of instruments to the relevant regional branch of the Federal Employment Service (Brinkmann, 1999). Therefore, any evaluation of the efficiency of labour-market policy must give more consideration than before to regional flexibility.

In terms of spending, we find that FbW is the most important ALMP measure for both East and West German regions, followed by traditional JCS. In West Germany there is a big difference between spending on FbW and JCS, whereas in East Germany the situation is much more balanced. Finally, we also consider structural adjustment schemes which are similar to traditional JCS but with less severe eligibility criteria. Since structural adjustment schemes are of minor importance in West Germany they are only evaluated for East Germany.

As a starting point for our empirical analysis we present a theoretical framework which aims to identify the various channels through which ALMP might influence the whole economy. Leaving aside the traditional way of ‘cheating the Phillips curve’, i.e. improving the unemployment-inflation trade-off and thereby reducing the non-accelerating inflation rate of unemployment, a model is needed that explains the relevant labour-market variables (e.g. regular employment or unemployment) and is also capable of incorporating ALMP.

The most important requirement of a macroeconomic model used to analyse ALMP is that it is able to explain a positive equilibrium unemployment rate. Theoretical considerations of

ALMP are, therefore, mostly based on the Layard and Nickell framework or the search model framework.

Considering the traditional aim of ALMP, and especially vocational training programmes, to overcome structural imbalances in the labour market, the search model framework seems most advantageous for analysing impacts. The basic mechanism within the search model framework is that ALMP helps to increase the searching efficiency of participants and thus lowers unemployment for a given set of vacancies, i.e. it improves the matching process. This might also affect labour demand since vacancies become more profitable if they are filled more quickly. Other important effects are reduced welfare, productivity effects and effects on labour force participation. Since data limitations do not allow estimates of structural relationships we cannot analyse these effects separately.

Flow data is required in order to estimate the effects of ALMP on the matching process. Unfortunately such data is not available so we are utilising the Beveridge curve relationship for our empirical analysis. The Beveridge curve can be used as an indirect way of estimating matching efficiency since it is the steady state relationship between unemployment and vacancies resulting from the matching process.

For our empirical analysis we use a revised Beveridge curve that relates job seekers, i.e. the unemployed and programme participants, to vacancies. Using the revised Beveridge curve is important since it avoids estimating the bookkeeping effect and thus focuses on the net effect of ALMP.

Immense differences are found in terms of previous empirical findings from macroeconomic evaluations for Germany. As Calmfors and Skedinger (1995) note, the exact specification and the methods of estimation seem to be crucial to the results of a macroeconomic evaluation. This may result from the fact that ALMP only have marginal impacts on the whole economy since they are mostly designed to affect a particular group in the labour market.

The availability of quarterly data allowed us to use a dynamic panel data model, i.e. to take dynamics and persistency in the labour market into account. In order to control for the problems arising in the dynamic panel data context we applied a system GMM estimator where we also accounted for the inherent simultaneity problem of ALMP. In order to solve the simultaneity problem we use lagged levels of the ALMP measures as instruments. Although this choice of instruments may not be the best, it is a valid option. Other appropriate sets of instruments are not available since they are either endogenous or suffer from too little variation.

The fact that there are major differences between the East and the West German labour markets made a separate estimate necessary for both areas. But since the number of regions available for East Germany is too small, the system GMM estimator cannot be implemented. Therefore our analysis for East Germany relies only on the within estimator (see box in Chapter 6) and should be treated with caution since the within estimator does not account for endogeneity of the lagged dependent and the ALMP measures.

## 2. Introduction

In view of the immense spending on ALMPs in Germany (about DEM 43 billion in 2000) and their debatable success, evaluation literature has been growing in recent years <sup>(1)</sup>. Most studies focus on the microeconomic approach using individual data. The importance of this approach is straightforward and the framework for such an analysis is well developed (Heckman et al., 1999). However, as the microeconomic approach usually ignores impacts on non-participants it should only be seen as a first step to a complete evaluation, to be followed by a macroeconomic analysis. Instead of looking at the effect on individual performance, we would like to know if ALMP represent a net gain to the whole economy. This is likely to be the case only if the total number of jobs is positively affected by ALMP.

Two major strands of literature on how to estimate macroeconomic effects can be distinguished. First are the structural, general equilibrium models (e.g. Davidson and Woodbury, 1993; or Heckman et al., 1998). The advantage of these studies is that they make explicit assumptions about the mechanism generating the general equilibrium effects and also provide a framework that allows estimates of many evaluation parameters (Smith, 2000). One obvious disadvantage, however, lies in the strong identifying assumptions they require <sup>(2)</sup>. Second, authors like Forslund and Krueger (1994) prefer to use variation in programme scale across regional units (jurisdictions) combined with data at the regional level to estimate the effects. This can, in principle, also be done at national level with cross-country data, even though such an analysis might suffer from the heterogeneous policy measures between the countries (e.g. Jackman et al., 1990).

As we want to evaluate the effects of ALMP in Germany for recent years, the second strand seems more appropriate and will be described in Chapter 4. In 1998 the legal basis for the labour-market policy in Germany changed to the new social welfare code SGB III. Changes have been made not only in the objectives, such as a more intensive focus on problem groups of the labour market, but also in the institutional organisation of labour-market policy, leading to decentralisation and more flexibility in the regional allocation of resources to different measures. This decentralisation allows an adjustment to the situation in local labour markets

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<sup>(1)</sup> See Hagen and Steiner (2000) or Hujer and Caliendo (2001) for extensive overviews regarding micro- and macroeconomic evaluations of ALMP in Germany.

<sup>(2)</sup> Those studies of the general equilibrium effects of ALMP are based on a general equilibrium model of the whole economy. Behavioural equations that are obtained from standard micro foundations describe the general equilibrium of the economy. The effects are obtained by calibrating the model, i.e. by imposing explicit functional forms for the basic equations and numerical values for the exogenous parameters. Solving the model allows the effects of ALMP to be estimated.

Problems arise for the following reasons: first, the assumptions the model is built on must be correct; second, the imposed functional forms must be correct, e.g. should a utility function impose risk aversion or should it impose risk neutrality; third, the true values for the exogenous parameters must be used. Hypothetically these parameters should be estimated with econometric methods, but this often fails due to data limitations. Therefore, often arbitrary choices on those parameters are made and thus the estimated effects of ALMP are questionable.

while requiring any evaluation to give more consideration to regional flexibility than before. The importance of suitable data, allowing regional heterogeneity to be taken into account, has to be stressed. This is especially problematic in Germany due to permanent adjustments in the regional delimitations of the labour office districts (*Arbeitsamtsbezirke*). In contrast, in other evaluation studies this is not problematic because no such changes occurred in the time under consideration.

The aim of the study is to add a new perspective to the evaluation of ALMP in Germany. This is done by using regional data to obtain macroeconomic or net effects of these measures. Therefore we focus especially on training programmes and compare these with the alternative ALMP programmes JCS and SAS.

The remainder of this paper is organised as follows. In the next chapter we give an overview of ALMP in Germany before we present some theoretical issues on the macroeconomic evaluation of ALMP, which also includes a short comparison between micro- and macroeconomic evaluation approaches. Highlighting the advantages and shortcomings of each approach makes clear their necessity as additional ingredients to a complete evaluation. Furthermore we will present macroeconomic theory on ALMP that is needed to build up the econometric model. Following that, we review previous empirical findings of macroeconomic evaluations in Germany before we offer our empirical analysis, where we will briefly present the methods of estimating and the results from separate estimates for East and West Germany.

### 3. ALMPs in Germany

Labour-market policies in Germany are organised by the Federal Employment Service (*Bundesanstalt für Arbeit*). Up to 1998, the legal basis for labour-market policy in Germany was the work promotion act, established in 1969. From 1998 the new social welfare code SGB III took over this role. Changes have been made both in the objectives, such as a more intensive focus on problem groups in the labour market, and also in the institutional organisation of labour-market policy, leading to decentralisation and more flexibility in the regional allocation of resources to different measures.

Since the data we analyse ranges from 1999 to 2001, we focus on SGB III and discuss AFG very briefly. A good overview of AFG's historical evolution can be found in Staat (1997) <sup>(3)</sup>. The improvement of the labour force structure, i.e. the adjustment of the labour supply to the changing labour demand, was the primary goal in the early years. It was intended to deal with the continual growth of the economy that changed the labour-market conditions permanently, with a continuous adjustment to the labour force structure to fulfil the new requirements. A shortage of jobs with specific (high-level) skills and an excess of jobs requiring low skills was to be avoided.

These goals had to be quickly revised at the end of 1973 when sharply rising unemployment, connected to the first oil price shock, refocused attention. This becomes clear when we look at ALMP participation. In the early 1970s, less than 15 % of all participants had been unemployed before participation, whereas in the 1980s this was the case for almost 80 %.

After some innovations and amendments, AFG had been replaced by SGB III in 1998. A good overview of the most relevant reforms can be found in Fitzenberger and Speckesser (2000) who present an extensive discussion of the new SGB III, especially regarding the responsibility of employees for their own labour-market success. Fertig and Schmidt (2000) explain and classify the different measures of employment promotion and explicitly distinguish between non-discretionary and discretionary measures. Brinkmann (1999) discusses aspects of decentralisation and regionalisation as well as the now mandatory output evaluations.

Whereas the AFG was implemented under full employment conditions, SGB III came into being in a harsher economic climate with labour-market policy affected by narrower budget constraints. Some of the AFG's objectives, such as securing a high employment rate and the avoidance of low-quality employment, were dropped. The most important goal (Paragraph 7.3, SGB III) is the (re)integration of problem groups into the regular labour market while using resources in an efficient way (*Grundsatz der Wirtschaftlichkeit und*

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<sup>(3)</sup> The main goals can be found in paragraphs 1,2 AFG and have been: (a) securing high employment; (b) avoidance of low-quality employment; (c) improvement of the structure of the labour force; (d) promotion of mobility; (e) social goals and (f) promotion of target groups.

*Sparsamkeit*). As the government sees itself only in a promoting role, SGB III places particular emphasis on the fact that employees have to act on their own authority regarding their labour-market success. This comes together with a tightening of the ‘reasonableness’ clause (*Zumutbarkeitsklausel*), which makes it harder for the unemployed to turn down job offers.

Besides the change of the objectives, there have also been organisational changes increasing the flexibility of ALMP on a regional and local level. Local labour offices are now allowed to allocate their budgets relatively freely to different measures. According to paragraph 71b, SGB IV, several categories of ALMP must be financed by one single budget item (*Eingliederungstitel*), which is then assigned to the regional labour office. The new feature of SGB III is now that the labour offices are free to set their priorities in relation to different programmes. This leaves the decision on the mix of instruments to the regional branch of the Federal Employment Service (Brinkmann, 1999), allowing adjustment to local labour-market conditions. Furthermore, 10 % of the budget can be used for ‘free promotion’ (*Freie Förderung*, paragraph 10, SGB III), allowing more individualised support. Each labour office has considerable flexibility to act with local focus, e.g. by implementing measures which are custom-made for the local labour market.

Another promising feature is the so-called ‘integration plan’ (*Eingliederungsplan*) to avoid long-term unemployment. Under this new plan, the local labour exchange and the unemployed must, within six months of unemployment beginning, establish which active measures or which action on the part of the unemployed will best avoid a drift into (long-term) unemployment. Other interesting new measures, such as the special programme to combat youth unemployment (JUMP), measures implemented in pathfinder regions aiming to promote employment of low-qualified individuals or the long-term unemployed (CAST), and the reform law regarding the ALMP instruments (JOB-AQTIV), cannot be discussed here. For a comprehensive overview see Fitzenberger and Hujer (2002). Another new point in the SGB III is mandatory output evaluation. Labour offices are now required to draw up integration balances (*Eingliederungsbilanzen*, paragraph 11, SGB III), including, most importantly, the employment status of each participant some time after completion of a measure. Unfortunately the integration balance cannot be seen as a proper evaluation approach, since it does not compare the status of participants with the status of comparable non-participants. Therefore the question of how the participants would have done without the programme cannot be answered with an integration balance.

Any evaluation of the efficiency of labour-market policy must give more consideration than before to regional flexibility and take into account the various support strategies developed by the labour offices (Brinkmann, 1999).

Table 1: Spending on labour-market policies in Germany, 1998-2000

	1998		1999		2000	
	in billion DEM	% of total	in billion DEM	% of total	in billion DEM	% of total
<b>Germany</b>						
Total spending	133.18		135.29		125.96	
Passive labour-market policies	85.32	64.1	81.19	60.0	73.93	58.7
Active labour-market policies	39.40	29.6	45.30	33.5	43.04	34.2
Continuing vocational training (FbW)	12.51	9.4	13.20	9.8	13.31	10.6
Job creation schemes (JCS)	7.43	5.6	7.81	5.8	7.20	5.7
Structural adjustment schemes (SAS)	1.47	1.1	1.84	1.1	1.40	1.1
Sam-East for private firms (SAS-East)	3.13	2.4	3.57	2.5	1.27	1.0
Free support (FS)	0.55	0.4	1.09	0.8	1.13	0.9
<b>West Germany</b>						
Total spending	82.17		83.25		78.14	
Passive labour-market policies	56.26	68.5	53.31	64.0	47.11	60.3
Active labour-market policies	19.29	23.5	22.98	27.6	23.92	30.6
Continuing vocational training (FbW)	7.04	8.6	7.78	9.3	7.94	10.2
Job creation schemes (JCS)	1.98	2.4	2.14	2.6	2.00	2.6
Structural adjustment schemes (SAS)	0.25	0.3	0.25	0.3	0.25	0.3
Sam-East for private firms (SAS-East)	0.07	0.1	0.14	0.2	0.03	0.0
Free support (FS)	0.22	0.3	0.50	0.6	0.54	0.7
<b>East Germany</b>						
Total spending	51.01		52.04		47.83	
Passive labour-market policies	29.06	57.0	27.88	53.6	26.82	56.1
Active labour-market policies	20.11	39.4	22.32	42.9	19.12	40.0
Continuing vocational training (FbW)	5.47	10.7	5.43	10.4	5.37	11.2
Job creation schemes (JCS)	5.45	10.7	5.66	10.9	5.20	10.9
Structural adjustment schemes (SAS)	1.22	2.4	1.23	2.4	1.15	2.4
Sam-East for private firms (SAS-East)	3.06	6.0	3.43	6.6	1.24	2.6
Free support (FS)	0.33	0.6	0.59	1.1	0.58	1.2

Source: Bundesanstalt für Arbeit (2000)

Table 1 shows the spending on labour-market policies in Germany from 1998 to 2000. Whereas in 1998 only 29.6 % of total spending was dedicated to active measures, the proportion rose to 34.2 % in 2000. In West Germany, the proportion of ALMPs rose from 23.5 % to 30.6 %, though it remained relatively stable in East Germany at around 40 %. One obvious reason for the limited success in switching resources into active measures is the constantly high unemployment rate in East Germany (Table 2). As unemployment benefits are entitlement programmes and most active measures are discretionary in nature, the former

increase automatically with a rising unemployment rate, whereas the latter are more easily discarded.

Table 2: Unemployment rate in Germany, 1994-2000

	1994	1995	1996	1997	1998	1999	2000
Germany	10.6	10.4	11.5	12.7	12.3	11.7	10.7
West Germany	9.2	9.3	10.1	11	10.5	9.9	8.7
East Germany	16	14.9	16.7	19.5	19.5	19	18.8

Source: Bundesanstalt für Arbeit (2000)

The most important measures in 2000 were the promotion of further FbW with DEM 13.31 billion and subsidised employment, consisting of traditional JCS with DEM 7.2 billion and SAS with DEM 2.67 billion.

In principle, public vocational training under AFG comprised three types of training measures, namely further training (*Fortbildung*), retraining (*Umschulung*) and training to familiarise with a new occupation (*Einarbeitung*)<sup>(4)</sup>. The first two types have been summarised in one item (paragraphs 77-96, 153-159, 517, SGB III). The latter is now part of employment subsidies and will not be discussed here<sup>(5)</sup>. The Federal Employment Service pays the costs of the training measures and a subsistence allowance (*Unterhaltsgeld*) to the participants, which amount to 60 % (67 % with one or more children) of the previous net income (equal to unemployment benefit). The main goals are to reintegrate the unemployed by improving their skills and to avert the danger of unemployment for employees at risk.

The German subsidised employment programmes consist of JCS and SAS. JCS is the more important programme in East and West Germany, with expenditure in 2000 of DEM 7.2 billion. JCS (paragraphs 260-271, SGB III) are normally only available to non-profit organisations. They should support activities which are of value to society and additional in nature, that is without the subsidy they could not be executed. Priority is given to projects which improve the chance of permanent jobs, that support structural improvement in social or environmental services or that aim at the integration of extremely hard-to-place individuals. SAS (paragraphs 272-279, SGB III) is particularly prominent in East Germany, with spending amounting to DEM 2.4 billion in 2000. Their goal is, analogous to JCS, integration into regular employment, but less severe eligibility criteria apply to participants, so both the unemployed and individuals threatened by unemployment may participate. The SAS consist of a wage subsidy equal to the average amount of unemployment allowance or assistance (including contributions to the social security system) paid in the Federal territory.

<sup>(4)</sup> See Hujer and Wellner (2000) for an overview of vocational training under the AFG.

<sup>(5)</sup> See Hujer et al. (2001) for an overview.

Looking at the distribution of spending on different measures, considerable differences between East and West Germany become clear. The main measure used in the West is FbW, where expenditures amount to DEM 7.94 billion, corresponding to a share of 10.16 % of total spending. The next important measures are JCS with a share of 2.56 % and SAS with 0.36 %. In East Germany, the situation is much more balanced. Again, FbW is the most important programme (DEM 5.37 billion, 11.24 %) but JCS (DEM 5.2 billion, 10.87 %) follow closely.

The discrepancy between both parts also becomes clear in Figures 7 and 8 in the annex. They show the number of participants in the three most important programmes for East and West Germany from April 1997 to April 2000. In West Germany, an average of 200 000 individuals participated in FbW in every quarter, 50 000 in JCS and around 8 000 in SAS. The ratio of participants to unemployed is 1:10.

As expected, the situation in East Germany is different. First, participation in the different measures is more balanced. The most important measures are JCS with 143 000 participants on average, followed by SAS with 137 000 and FbW with 134 000. The ratio of participants to unemployed is 1:3.

After looking at spending on the different measures and the participating individuals, it is also interesting to look at the average duration of the measures. This should give us important hints on the lag structure for our latter analysis. The average duration for the measures under consideration in 1999 is between 8 and 10 months. JCS have the shortest duration with 8.3 months, followed by FbW (8.4 months) and SAS with 9.8 months (*Bundesanstalt für Arbeit*, 2000).

## 4. Theoretical issues on the evaluation of ALMP

The ideal evaluation process consists of three steps. First, the impact of the programme on the participating individual should be estimated. Second, it should be examined whether the impacts are large enough to yield net social gains. Finally, it should be determined if this is the best outcome that could have been achieved for the money spent (Fay, 1996).

The main question of microeconomic evaluation is whether the particular outcome variable for an individual is affected by participation in an ALMP programme. That being so, the direct gain can be compared with the associated costs and the success of the programme can be judged. However, microeconomic approaches estimate, in nearly all cases, the effect of treatment on the treated. One important concept in this context is the stable unit treatment value assumption (SUTVA) (Rubin, 1980). One implication of SUTVA is that the effect of the intervention on each individual is not affected by the participation decision of any other individual, i.e. the treatment effect for each person is independent of the treatment of other individuals. This assumption guarantees that average treatment effects can be estimated independently of the size and composition of the treatment population. Among other things SUTVA excludes cross-effects or general equilibrium effects. Even though its validity facilitates a manageable formal setup, in practical applications it is frequently questionable whether it holds. If one looks at the immense amounts spent on ALMP in Germany and the large scale of the programmes, spill-over effects on non-participants are very likely. Therefore the microeconomic approach is partially analytical and should only be seen as one step in a complete evaluation or, as Heckman (1999) puts it, microdata are no panacea and must be used in conjunction with aggregate time-series data to estimate the full general-equilibrium consequences of policies.

Important negative effects that a microeconomic evaluation ignores are deadweight losses and substitution effects<sup>(6)</sup>. If the outcome of the programme is not different from what would have happened in its absence, we talk about a deadweight loss. A common example is the hiring from the target group that would have occurred also without the programme. If a worker is taken on by a firm in a subsidised job instead of an unsubsidised worker who would have been hired otherwise, we talk about a substitution effect. In this context it is also possible that a worker is dismissed and replaced by a subsidised worker. The net short-term employment effect in this case is zero. Such effects are likely in the case of subsidies for private-sector work. There is always a risk that employers hold back ordinary job creation in order to be able to take advantage of the subsidies. Another problem might be that ALMP crowd out regular employment. This can be seen as a generalisation of the so-called displacement effect. This effect typically refers to displacement in the product market, e.g. where firms with subsidised workers increase output but displace (reduce) output among firms that do not have subsidised workers. Calmfors (1994) also stresses the importance of tax

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<sup>(6)</sup> For details see Hujer et al. (2002).

effects in the sense that programmes have to be financed by taxes which distort the choices of both participants and non-participants.

To see how problems can arise if one neglects such effects let us discuss an example. As the outcome variable of interest in Germany is usually employment for participants, we consider a wage subsidy programme that aims to increase the employment probability of the long-term unemployed by giving employers a subsidy if they hire an individual out of the target group. The usual microeconomic approach analyses the effects on the labour supply side of the market by looking at the individual's performance. Where the individual got a job because of the subsidy, the programme was a success. The shortcoming is, however, the possible occurrence of substitution or displacement effects, e.g. if an unsubsidised worker is fired to hire a subsidised worker. Hujer et al. (2001) suggest estimating the success of wage subsidies on the labour demand side of the market by looking at the employment situation within the firm. In this way, substitution effects within the firm already 'net out' and give a clearer picture of the net effects. Displacement effects between firms, however, cannot be detected with this approach. Clearly, these effects have to be taken into account if one intends to make statements about the net effect of ALMP.

As the outcome variable in a macroeconomic evaluation is an aggregated variable, substitution and displacement effects plus the deadweight losses can be taken into account.

Estimating the effects on aggregate variables is not straightforward and, compared to the amount of micro-analysis, existing literature is relatively small. This might have several causes, such as the inherent simultaneity problem or the availability of suitable data. The issue of simultaneity arises because spending on ALMP should influence the labour-market situation but might also be determined by it. The major obstacle, however, is the absence of an obvious theoretical framework within which to couch the analysis. Leaving aside the traditional way of 'cheating the Phillips curve', i.e. improving the unemployment-inflation trade-off and thereby reducing the non-accelerating inflation rate of unemployment (Baily and Tobin, 1977), a model is needed that explains the relevant labour-market variables (e.g. regular employment or unemployment) and is also capable of incorporating ALMP.

The most important requirement of a macroeconomic model used to analyse ALMP is that it has to be able to explain a positive equilibrium unemployment rate. Theoretical considerations on ALMP are, therefore, mostly based on the Layard and Nickell framework or the search model framework (e.g. Pissarides, 2000). Both models differ in their primary reason for equilibrium unemployment. In the framework presented by Layard and Nickell (1986), unemployment is generated through a wage setting process that pushes wage rate over the equilibrium rate generated by labour demand and supply. One possible explanation for these wage distortions is the power of unions in the wage bargaining process or efficiency wages. Search models on the other hand assign the cause of unemployment to a time and cost consuming matching process. Theoretical considerations on the impacts of ALMP in these two frameworks are given for example by Calmfors and Lang (1995) and by Holmlund and

Lindén (1993). Additionally, both frameworks can be combined to approximate usual labour-market situations more realistically (Calmfors and Lang, 1995).

Considering the traditional aims of ALMP, and especially vocational training programmes, to overcome structural imbalances in the labour market, the search model framework seems most advantageous for analysing the impacts of ALMP. The core element of these models is a matching function that determines the number of new recruitments with respect to the stock of the effective job seekers and the stock of vacancies. Effective job seekers are mostly defined as the weighted sum of the programme participants and the unemployed, where the weights are given by the search efficiency of the respective group (Holmlund and Lindén, 1993) (Calmfors and Lang, 1995). Search efficiency can be thought of as a parameter that summarises various characteristics that determine the efficiency of job seekers in finding a successful match. This includes search intensity, i.e. how much effort a job seeker puts into actively searching for a job, or the level of education or experience in the occupational career of the job seeker. If ALMP is able to improve the search efficiency of the group of participants and if this group is large enough, the programme would be able to improve the matching process, i.e. to increase the number of new recruitments for a given stock of vacancies and job seekers.

Calmfors (1994) gives three explanations of how ALMP can help to improve search efficiency. First, ALMP can increase the search intensity of programme participants by encouraging them to search more actively. Second, ALMP can upgrade the skills of participants and adjust them to labour demand. Third, participation can serve as a substitute for regular work experience which can reduce the employer's uncertainty about the employability of the job applicant.

However, there are also negative effects on search efficiency if the programme implies full time engagement. In the case of full time employment, ALMP programmes should be expected to reduce search efficiency because the effective time available for an active job-search would be reduced. But this locking-in effect reduces the search efficiency only when participants are in the programme. After the programme expires, the search efficiency of participants should be higher relative to other unemployed.

The usual strategy for evaluating the effect of ALMP on the matching process would be to estimate the matching function itself, i.e. to regress new recruitments against the number of unemployed, programme participants and vacancies. Unfortunately, no reliable data on new recruitments are available to allow for unbiased estimates for the parameters of the matching function. Furthermore, an estimate of the matching function would not deliver a complete picture of the effects of ALMP, as it only considers the effects on inflows into employment; the effects of ALMP on existing jobs are omitted. If, for example, ALMP helps to increase the level of hiring, we do not know if such hiring only replaces existing jobs, leaving employment constant.

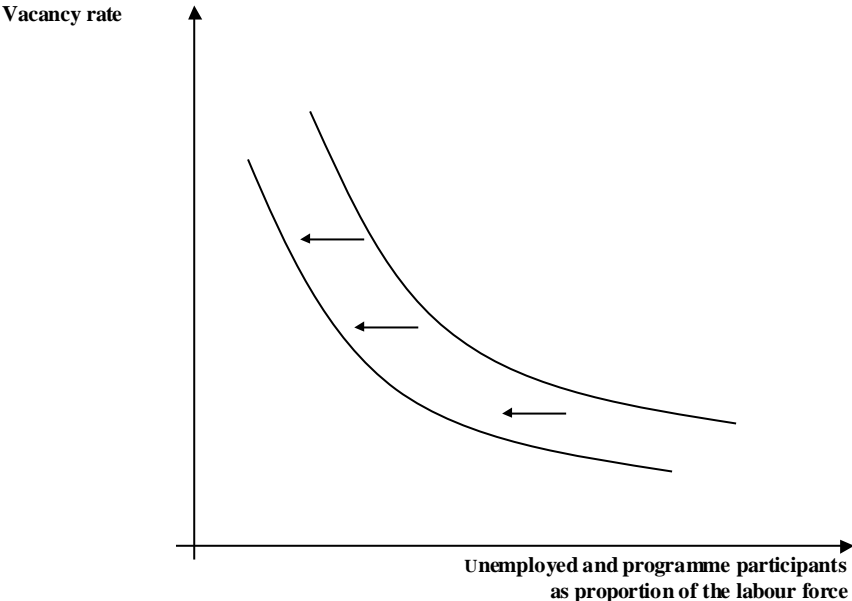
The Beveridge curve (i.e. the unemployment-vacancy relationship) can be used to circumvent this problem. The Beveridge curve is a steady state condition where the outflow from employment equals new intake. Since the matching function ensures the simultaneous coexistence of unemployment and vacancies, the Beveridge curve results directly from the

existence of the matching function. Therefore, as Petrongolo and Pissarides (1999) note, the Beveridge curve can be used as an indirect way estimating matching efficiency.

For our empirical analysis we will follow Calmfors (1994) and use the revised Beveridge curve which relates job seekers, i.e. the unemployed and programme participants to vacancies. The utilisation of the revised Beveridge curve is important since it avoids estimating the bookkeeping effect. In particular, a rise in programme participation is usually associated with a proportional decrease in the unemployed <sup>(7)</sup>. Therefore, an application of the conventional unemployment vacancy relationship would lead to an overestimation of the effects of ALMP. The revised Beveridge curve (i.e. the relationship between the vacancies and the sum of openly unemployed and programme participants) therefore allows an estimate of the net effect of ALMP.

In Figure 1 we have plotted the revised Beveridge curve, i.e. the relationship between the unemployed plus the programme participants and the vacancies. If the programme participants come from the unemployed, a programme expansion would not lead to a shift of the revised Beveridge curve in Figure 1.

Figure 1: The revised Beveridge curve



But if ALMP improves search efficiency, and therefore matching efficiency, there would be a shift of the revised Beveridge curve to the origin because the number of vacancies and job seekers is reduced simultaneously.

But there may also be consequences for existing jobs, in that ALMP can tend to increase wages or to change productivity <sup>(8)</sup>. The most important effects of ALMP with respect to

<sup>(7)</sup> Note that this depends if unemployment is an eligibility criteria for being placed into a programme.

<sup>(8)</sup> See Calmfors (1994) for an extensive theoretical discussion of the effects of ALMP.

wages are reduced welfare losses where ALMP participation is associated with an expected higher income compared to being unemployed, so the welfare losses of being unemployed are reduced. The expected higher income might result from a higher compensation level compared to unemployment benefits and/or from better job opportunities resulting from programme participation. In a wage bargaining process between workers and firms the expected higher income leads to an increase in wage claims of workers, and so to higher wage rate.

The productivity effect of ALMP programmes may be assigned to the fact that participation serves as a substitute for work experience. In the case of training programmes that are aimed at improving skills, an impact on the productivity is part of the objectives.

An important point in this context is that productivity effects depend heavily on the type of participant. If the skill level of participants is relatively low, a training programme has greater effects on productivity than if the skill level of participants is relatively high.

Since the effects on productivity and wage rate also affect the Beveridge curve we cannot observe the pure effect resulting from changes in the matching process. Implementing the revised Beveridge curve as an econometric model relates more to a reduced form model which can be used to estimate the overall effect. In theory, the important effects of ALMP besides the effect on the matching process are reduced welfare losses of unemployment, effects on productivity and labour force participation. Since data limitations do not allow for the estimation of structural relationships we cannot analyse these effects separately.

## 5. Previous empirical findings for Germany

We will now give a brief overview of empirical findings from macroeconometric evaluations for Germany on a regional level.

Büttner and Prey (1998) use yearly data (from 1986 to 1993) from 74 planning regions of West Germany to evaluate the effects of training programmes and public sector job creation on labour-market efficiency. They use a disequilibrium approach and their results suggest that training programmes have no effect and job creation programmes have a significant positive effect on matching efficiency.

Prey (1999) extends this work by additionally controlling for regional age structure and recipients of welfare assistance and estimating separately for men and women. She finds that vocational training increases (decreases) the mismatch for women (men), whereas JCS decrease the mismatch for men. Thus she finds an opposite effect for men and women.

Pannenberg and Schwarze (1998) use the data from 35 local labour office districts to evaluate training programmes in East Germany. They use monthly data from 1992 to 1994 and find that the programmes have negative effects on regional wages.

Steiner et al. (1998) examine the effects of vocational training on labour-market mismatch using data from 35 local labour office districts in East Germany. They observe only very small effects on matching efficiency which disappear in the long-run.

Schmid et al. (2000) use yearly data from 142 local labour office districts to estimate the effects of further training, retraining, public sector job creation and wage subsidies on long-term unemployment from 1994 to 1997. They find that job creation programmes reduce only 'short' long-term unemployment (6-24 months), whereas vocational training reduces long-term unemployment (>24 months).

Hagen and Steiner (2000) evaluate vocational training, JCS and SAS in East and West Germany using data from local labour office districts. The time period under consideration differs and ranges from 1990 to 1999. The estimated net effects are not very promising as all measures increase unemployment in West Germany. Only SAS reduces the unemployment rate slightly in East Germany, whereas JCS and vocational training increase it.

Blien et al. (2002) analyse the effects of ALMP on the development of regional employment in Eastern Germany and find positive impacts. They use detailed data from employment statistics covering 1993 to 1999. Their regional units are 112 districts (*Landkreise/ kreisfreie Städte*). Their method is an econometric equivalent to conventional shift-share analysis (based on constrained regression), which is extended to include many determining variables.

These studies demonstrate immense differences in the results. The inherent simultaneity problem of ALMP may serve as an explanation, since it is not evident how to tackle this problem. Furthermore all empirical models relate to different theoretical backgrounds, i.e.

they use different specifications for the empirical analysis. As Calmfors and Skedinger (1995) note, the exact specification and the methods of estimation seem to be crucial for the results of a macroeconometric evaluation. This may result from the fact that ALMP have marginal impacts on the whole economy, since they are mostly designed to affect a particular group in the labour market. Therefore, it is not only an appropriate econometric model that is necessary to identify the effects of ALMP on the whole economy but also appropriate methods of estimating.

## 6. Estimation methods

The empirical analysis undertaken by the authors exploits a pooled time-series cross-section data set for the German labour office districts. This data was taken from administrative processes in the Federal Employment Service. The cross section in this data set comes from the administrative areas of the local offices of the Federal Employment Service in Nuremberg. Putting East and West Germany together we have 175 regional units. As discussed in Chapter 3, the immense differences between the East and the West German labour markets make it necessary to analyse both areas separately. The number of cross sections for West Germany are N=141 and N=34 for East Germany <sup>(9)</sup>.

The time span ranges from the first quarter 1999 to the fourth quarter 2001, leaving us T=12 observations for each labour office district. The basic equation we want to estimate is given by

$$c(L)s_{it} = a_0 + b_1(L)v_{it} + b_2(L)\Psi_{it} + b_3(L)X_{it} + u_{it},$$

where  $s_{it}$  denotes the total rate of job seekers (JSR) at time t for region i, that is defined as the sum of unemployed and participants in ALMP programmes relative to the labour force.  $v_{it}$  is the vacancy rate (VR), i.e. the number of vacancies relative to the labour force.  $\Psi_{it}$  is a vector containing the measures for the activity of ALMP programmes JCS, SAS and FbW. ALMP activity is measured with so-called accommodation ratios that are defined as the sum of programme participants relative to the stock of job seekers.  $X_{it}$  is a vector that summarises other explanatory variables, such as national unemployment (NUR) and national vacancy rate (NVR) as well as seasonal dummies to control for the cyclic pattern in quarterly data.

$c(L) = 1 - c_1L - c_2L^2 - \dots - c_pL^p$  is a polynomial in the lag operator associated with the job seeker rate, with p as maximum lag, and  $b_j(L) = b_{j0} + b_{j1}L + b_{j2}L^2 + \dots + c_{jq}L^q$  is a polynomial in the lag operator associated to the vacancy rate, the ALMP measures and the other explanatory variables, with q as maximum lag. Therefore q need not be the same for all variables. The imposed dynamic specification enables us to control for the highly persistent pattern of the unemployment rate. Since the average duration of German ALMP programmes is about 8 to 10 months, the inclusion of several lags for the ALMP measures seems to be crucial for identification.

The job seeker rate is included as explanatory with four lags. The vacancy rate and ALMP measures are included up to the fourth lag and the national variables are included with the first and the second lag. Therefore, we cover exactly one year using quarterly data.

While attempting to make clear statements about the effects of ALMP measures on the job seeker rate, the interpretation of the parameters with the inclusion of four lags may be a bit cumbersome.

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<sup>(9)</sup> Due to data limitations, Berlin is excluded from the analysis.

A more straightforward interpretation of results is the use of so-called lag coefficients. Lag coefficients describe the impact of an ALMP expansion in  $t$  on the job seeker rate after  $t+q$  quarters, e.g. the second lag coefficients gives the change of the job seeker rate resulting from an ALMP expansion two quarters ago <sup>(10)</sup>.

The overall effect of an ALMP expansion, i.e. the total change in job seeker rate after  $q$  quarters is then simply given by the sum of the lag coefficients up to the  $q$ 'th quarter. We use the cumulative lag coefficients to make a general statement about the effects of an ALMP expansion through time.

For the residual  $u_{it}$  we assume a one way error component structure, i.e.  $u_{it} = \mu_i + \varepsilon_{it}$ , with  $\mu_i$  as an unobserved regional specific effect and  $\varepsilon_{it}$  as a residual varying over the regions and time.

The empirical model relates to a revised Beveridge curve, explaining total unemployment (i.e. the job seeker rate) as a function of vacancies and the ALMP measures. There are two major concerns in estimating the effects of ALMP. First, our model is a dynamic panel data model where usual estimation methods such as ordinary least squares (OLS) or the within transformation are biased (e.g. Baltagi, 2001). The bias of the OLS estimator results from the non-zero correlation of the explanatory variables with regional specific effects, i.e. we would face a violation of the classical OLS assumptions (Greene, 2000). As discussed in Baltagi (2001) the OLS estimator tends therefore to be upward biased with respect to the autoregressive parameters. In contrast to the OLS estimator, the within estimator accounts for the correlation with the regional specific effect by transforming the data so that the regional specific effect is removed. This transformation is appropriate for static models (i.e. no lagged dependent variable is included in the econometric model) but leads to biased estimates in the case of dynamic panel data models.

A second issue is that the ALMP measures in  $\Psi_{it}$  should be expected to be determined by a policy reaction function, i.e. the job seeker rate and the ALMP measures are determined simultaneously.

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<sup>(10)</sup> See Greene (2000) for the calculation of the lag coefficients.

The econometric model used for estimating the effects of ALMP is a dynamic panel data model. Dynamic refers to a specification where the lagged values of the dependent variable (the job seeker rate) are used as explanatory variables. A panel data model uses data where cross sectional data (observations for different regions) and time series data (a sequence of observations in time) are combined.

### **OLS estimator**

The OLS (ordinary least squares) estimator is a simple estimation method that ignores the regional specific differences in the data. In particular, if these differences are not fully represented by the explanatory variables but are correlated with them, the OLS estimator leads to biased estimates. In the case of a dynamic model this problem is particularly severe since a regional specific effect that is constant in time affects the actual and lagged job seeker rate. Therefore the explanatory variable is *a priori* correlated with the regional specific effect.

### **Within estimator**

The within estimator utilises a data transformation that ensures that the regional specific effect is removed. Application of the OLS estimator on the transformed data leads to the within estimator. Unfortunately, in the case of a dynamic model, the within transformation produces a correlation between the lagged dependent variable and the residual term. This correlation leads to biased estimates when the within estimator is used for dynamic models.

### **System GMM estimator**

Usual panel data estimation methods are not valid for dynamic models. In order to obtain reliable estimates the system GMM estimator is a useful alternative. The basic idea is to combine the model equation in first differences with the model equation in levels. Since there is a considerable loss of information due to the first differencing the additional equations in levels improve the performance of the System GMM estimator. In contrast to the OLS and the within estimator the system GMM estimator results in consistent estimates for dynamic panel data models.

In order to handle both problems we apply the system GMM estimator suggested by Blundell and Bond (1998). In our macro application we must expect that those variables that vary over the regions (i.e. JSR, VR, JCS, SAS and FbW) are all correlated with the regional specific effect  $\mu_i$ . If we consider the first differences residual

$$\Delta u_{it} = c(L)\Delta s_{it} - a_0 - b_1(L)\Delta v_{it} - b_2(L)\Delta \Psi_{it} - b_3(L)\Delta X_{it} ,$$

where  $\Delta$  is the first differenced operator, i.e.  $\Delta X_{it} = X_{it} - X_{it-1}$ , we see that the regional specific effect is removed from the first differenced residual. Therefore the system GMM estimator uses moment conditions that are based on the equations in first differences. Following Arellano and Bond (1991) we can set up the following moment conditions for the lagged dependent variable:

$$E(s_{it-g} \Delta u_{it}); \text{ for } t = 6, \dots, T \text{ and } 2 \leq g \leq t-1 .$$

Note that these moment conditions require that there is no serial correlation in  $\varepsilon_{it}$ . We assume that the ALMP measures are endogenously determined, and thus we can set up the moment conditions analogously to the lagged dependent variable.

$$E(\Psi_{it-g}\Delta u_{it}); \text{ for } t = 6, \dots, T \text{ and } 2 \leq g \leq t-1.$$

Due to the utilisation of this moment condition we use lagged levels of the ALMP measures as instruments for the current and the first lagged ALMP measure. Thinking about ALMP determined by a policy reaction function, the question arises whether there may exist better instruments to tackle the simultaneity problem. Calmfors and Skedinger (1995) for example proposed the utilisation of political measures such as the share of seats in the parliament assigned to the left parties. Unfortunately, for Germany such a measure would suffer from too small variation. Since elections usually take place every four years, the time dimension of the data set does not even cover one legislature period. Furthermore, the regional units are the administrative offices of the labour office whereas political data is on country or *Länder* level. Therefore political data would not vary significantly in the time dimension as well as in the cross section. In addition, the labour office is a tripartite body and not governed by national government, but also by social partners.

Other possible instruments could be regional variables resulting from the administrative processes of local labour offices, such as youth unemployment or long-term unemployment. Unfortunately, a strong interdependency is likely between these variables and the job seeker rate, i.e. these variables are also endogenous and thus cannot be valid instruments.

Therefore we use only lagged levels of the ALMP measures as instruments, bearing in mind that although these instruments may not be the best instruments, they are valid.

We assume that the vacancy rate is also endogenously determined. Standard search theory predicts that the number of vacancies supplied by firms depends on the labour market. In particular the number of vacancies supplied by firms depends on the unemployment rate since a higher unemployment rate implies a shorter time in which vacancies remain open. This is equivalent to a cost reduction that makes a vacancy more profitable. Bearing these theoretical considerations in mind we assume that the vacancy rate is endogenously determined and thus the following moment conditions are valid:

$$E(v_{it-g}\Delta u_{it}); \text{ for } t = 6, \dots, T \text{ and } 2 \leq g \leq t-1.$$

For the variables in  $X_{it}$  that contain no regional information we simply use them to instrument themselves, i.e. we imply that the following orthogonality conditions must hold:

$$E(\Delta X_{it}\Delta u_{it}) = 0.$$

Furthermore the system GMM estimator uses moment conditions that are based on the equations in levels, i.e. the moment conditions refer to the level residual given by:

$$u_{it} = c(L)s_{it} - a_0 - b_1(L)v_{it} - b_2(L)\Psi_{it} - b_3(L)X_{it}.$$

The following moment conditions relate to the assumption that the regional variables  $s_{it}$ ,  $\Psi_{it}$  and  $v_{it}$  in first differences are not correlated with the regional specific effect  $\mu_i$ . In this case

we can use the variables in first differences as instruments, i.e. the following moment conditions are valid:

$$E(\Delta\Psi_{it-g}u_{it}); \text{ for } t = 6, \dots, T \text{ and } g = 1, \dots, 4$$

$$E(\Delta s_{it-g}u_{it}); \text{ for } t = 6, \dots, T \text{ and } g = 1, \dots, 4$$

$$E(\Delta v_{it-g}u_{it}); \text{ for } t = 6, \dots, T \text{ and } g = 1, \dots, 4$$

Finally, we again use the variables in  $X_{it}$  simply as instruments for themselves, i.e. we impose the moment conditions:

$$E(X_{it}u_{it}) = 0$$

This moment condition states simply that we predict the  $X_{it}$  with themselves since they are not correlated with the residual  $u_{it}$ .

For the calculation of the system GMM estimator, the indicated set of moment conditions is used<sup>(11)</sup>. Furthermore, Monte Carlo simulations have shown that the heteroscedasticity consistent two-step estimates for the system GMM estimator are downward biased<sup>(12)</sup>. In order to make reliable inference we use a finite sample correction for the asymptotic variance of the two step estimates as proposed by Windmeijer (2000). In order to test the sensitivity of the results from the system GMM estimator, we additionally present the results from the OLS and the within estimator.

Unfortunately, the system GMM estimator cannot be calculated for East Germany since there are not enough cross sections at hand. As we have only 34 cross sections but 12 time observations at hand, the number of moment conditions becomes too large relative to the number of cross sections and thus the estimates are not reliable. In order to make some statements about East Germany, we calculate OLS and the within estimator. But the results from both estimators should be treated with caution because they do not control for the problems in the dynamic panel data context as well as for the simultaneity problem of ALMP.

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<sup>(11)</sup> For details see Blundell and Bond (1998) or Blundell et al. (2000).

<sup>(12)</sup> For system GMM estimator there exist a one- and a two-step estimator. Whereas the one-step estimator is obtained from a restricted variance-covariance matrix, the two-step estimates are obtained from an unrestricted one. The unrestricted variance-covariance matrix is estimated from the one-step estimates (for details see Blundell et al. (2000)).

## 7. Empirical analysis

Estimating the effects of ALMP on the job seeker rate is done separately for East and West Germany. For both regions the estimates are done with the same model, with the exception that for West Germany the SAS are not included. This is because the SAS are of minor importance in West Germany. Tables 7 and 8 in the annex show that there are, on average, only 62 people in SAS programmes in West Germany, whereas East Germany has 3 105. The other ALMP measures, namely JCS and FbW are included for both regions.

The results for West Germany resulting from the OLS and the within estimator are reported in Table 3. Considering the coefficients for the job seeker rate, we find a strong persistent pattern for the OLS estimator and a weak persistent pattern for the within estimator. Therefore the estimates from the within estimator predict that after a unit shock (i.e. a one-shot increase) the job seeker rate adjusts much faster to the primary level (i.e. the level before the shock) than compared with the OLS estimates. This coincides with the insight that, with respect to the autoregressive parameters, the OLS estimator tends to be upward biased and the within estimator downward biased.

Table 3: Estimate results for West Germany (OLS and within estimator)

Variable		OLS estimator		Within estimator	
		Param.	t-value	Param.	t-value
Job seeker rate	Const.	0.2778	6.773	-	-
	JSR <sub>t-1</sub>	0.8480	16.587	0.4508	5.509
	JSR <sub>t-2</sub>	-0.1208	-1.603	-0.2583	-4.034
	JSR <sub>t-3</sub>	0.1222	4.051	-0.0121	-0.476
	JSR <sub>t-4</sub>	0.1157	0.974	-0.2020	-0.667
Vacancy rate	VR <sub>t</sub>	0.0661	0.330	0.0007	0.006
	VR <sub>t-1</sub>	-0.1083	-1.502	-0.1962	-3.356
	VR <sub>t-2</sub>	0.0579	1.750	-0.0645	-1.430
	VR <sub>t-3</sub>	0.0226	0.894	-0.0359	-0.618
	VR <sub>t-4</sub>	-0.0987	-0.596	-0.1971	-1.709
Participants in job creation schemes	JCS <sub>t</sub>	-0.3983	-6.192	-0.3753	-5.251
	JCS <sub>t-1</sub>	0.3966	4.132	0.2655	3.701
	JCS <sub>t-2</sub>	0.1783	2.048	0.2293	1.774
	JCS <sub>t-3</sub>	-0.0742	-1.581	0.0010	0.017
	JCS <sub>t-4</sub>	-0.0783	-1.460	-0.1318	-1.280
Participants in vocational training	FbW <sub>t</sub>	-0.1119	-4.862	-0.1449	-4.351
	FbW <sub>t-1</sub>	0.1487	5.522	0.1144	6.322
	FbW <sub>t-2</sub>	-0.0541	-3.226	-0.0537	2.680
	FbW <sub>t-3</sub>	0.0327	2.136	0.0106	0.745
	FbW <sub>t-4</sub>	-0.0472	-2.305	-0.0710	-2.567
National unemployed rate	NUR <sub>t-1</sub>	-1.9988	-3.708	0.0309	0.034
	NUR <sub>t-2</sub>	-0.1583	-0.547	1.1980	1.874
National vacancies rate	NVR <sub>t-1</sub>	-3.0450	-2.527	2.3923	0.709
	NVR <sub>t-2</sub>	-2.9899	-2.494	-0.7527	0.923
Seasonal dummy 1	SD <sub>1</sub>	-0.0094	-7.332	0.0063	0.897
Seasonal dummy 2	SD <sub>2</sub>	0.0058	0.676	-0.0022	-0.295
Seasonal dummy 3	SD <sub>3</sub>	0.0023	1.316	-0.0133	-1.332
Wald test of joint significance		[26]	156544.178	[26]	7716.9457
First-order serial correlation		[141]	3.95	[141]	-4.136
Second-order serial correlation		[141]	1.97	[141]	-0.133

Turning to the results from the system GMM estimator in Table 4, we find that the cumulative coefficients for the lagged dependent variable imply a persistent pattern that is slightly below the pattern of the OLS estimator. This means that the estimates from the system GMM estimator suggest a faster adjustment after a unit shock compared to the OLS estimates. Therefore the results from the system GMM estimator look most favourable.

Table 4: Estimate results for West Germany (GMM estimator)

Variable		System GMM estimator	
		Param.	t-value
Job seeker rate	Const.	0.3267	6.123
	JSR <sub>t-1</sub>	0.8591	21.909
	JSR <sub>t-2</sub>	-0.0928	-1.237
	JSR <sub>t-3</sub>	0.0895	2.759
Vacancy rate	JSR <sub>t-4</sub>	0.1044	0.998
	VR <sub>t</sub>	0.1784	0.526
	VR <sub>t-1</sub>	-0.1086	-1.090
	VR <sub>t-2</sub>	0.0438	0.873
Participants in job creation schemes	VR <sub>t-3</sub>	0.0303	0.760
	VR <sub>t-4</sub>	-0.1825	-0.699
	JCS <sub>t</sub>	-0.7612	-5.568
	JCS <sub>t-1</sub>	0.7873	5.198
Participants in vocational training	JCS <sub>t-2</sub>	0.0004	0.004
	JCS <sub>t-3</sub>	0.0833	1.316
	JCS <sub>t-4</sub>	-0.0941	-1.686
	FbW <sub>t</sub>	-0.2068	-4.712
National unemployed rate	FbW <sub>t-1</sub>	0.2217	6.617
	FbW <sub>t-2</sub>	-0.0707	-3.308
	FbW <sub>t-3</sub>	0.0245	1.176
	FbW <sub>t-4</sub>	-0.0293	-1.334
National vacancies rate	NUR <sub>t-1</sub>	-2.0112	-3.143
	NUR <sub>t-2</sub>	-0.4238	-1.051
Seasonal dummy 1	NVR <sub>t-1</sub>	-1.7853	-1.417
	NVR <sub>t-2</sub>	-5.7245	-3.786
Seasonal dummy 2	SD <sub>1</sub>	-0.0105	-6.362
Seasonal dummy 3	SD <sub>2</sub>	-0.0009	-0.094
	SD <sub>3</sub>	-0.0003	-0.189
Wald test of joint significance		[26]	34822.626
Sargan test		[241]	124.871
First-order serial correlation		[141]	-2.189

NB: Parameters are the two-step estimates of the system GMM estimator

Corrected standard errors as suggested by Windmeijer (2000)

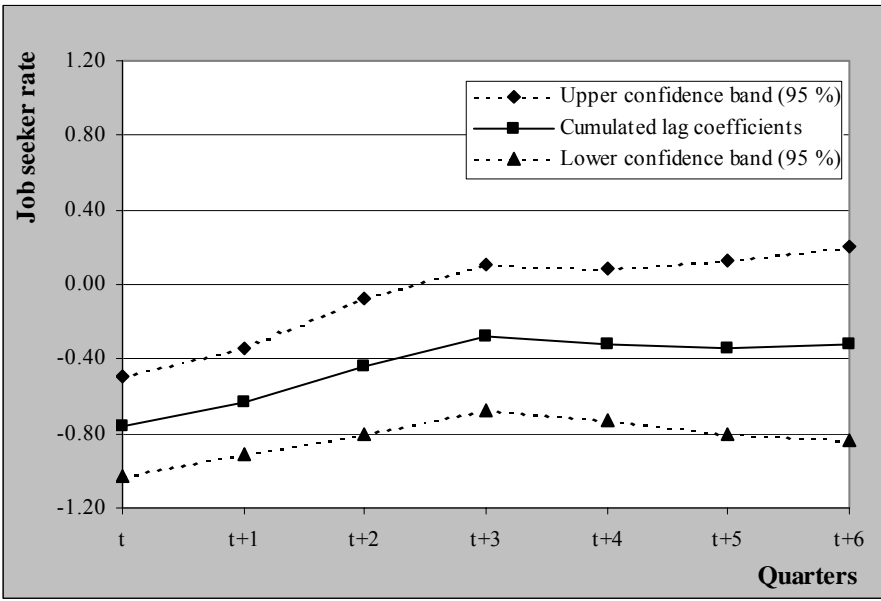
There is no clear negative relationship between the vacancy rate and the job seeker rate for all estimators. In particular, the coefficients on the vacancies resulting from the system GMM estimator are entirely insignificant and thus the existence of any relationship between the total unemployment rate and the vacancy rate as predicted by the Beveridge curve is not observable. It is important to note in this context that the vacancy rate resulting from the

administrative data does not contain all vacancies in the economy. This is because not all open vacancies are reported to the labour office and therefore the vacancy rate describes only a fraction of the labour market. Hence one should be cautious when making any statements about the existence of the Beveridge curve when relying on administrative data for the vacancy rate.

Turning to the coefficients for the ALMP measures, we find that the signs of the coefficients for JCS differ only for the third lag, but the coefficient is not significant. Considering the magnitude, the system GMM estimator implies much stronger effects from the contemporaneous and the first lagged job creation scheme measure. For the coefficients on FbW, there are no differences in the signs and the magnitude is rather similar between the different estimators.

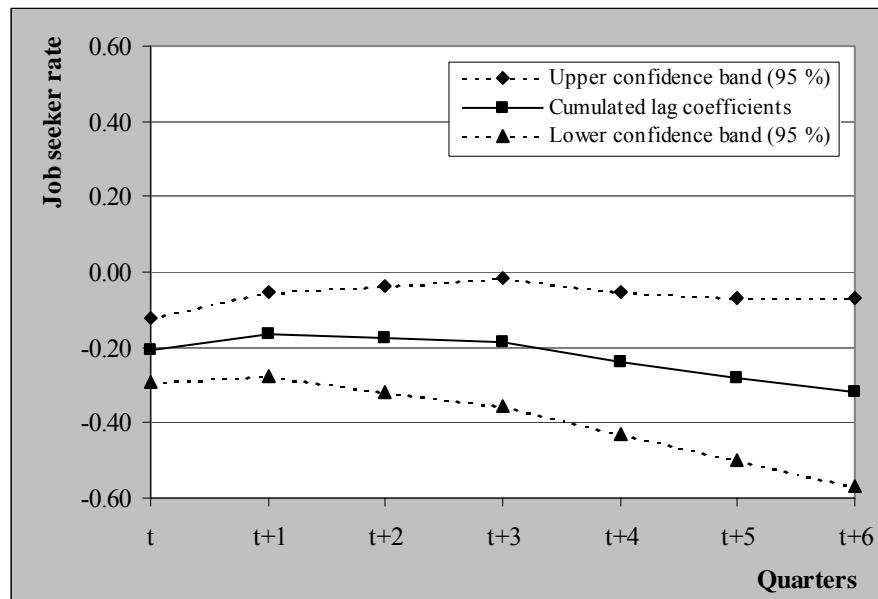
We choose to calculate the lag coefficients up to t+6 quarters and to summarise the effect beyond this timeframe with the long run effect <sup>(13)</sup>. Therefore we can analyse the effects up to 1.5 years after a programme expansion has occurred. The cumulative lag coefficients resulting from the system GMM estimates are plotted in Figure 2 for the JCS and in Figure 3 for FbW.

Figure 2: Cumulative lag coefficients for JCS in West Germany (GMM estimates)



<sup>(13)</sup> See Greene (2000) for the calculation of the long run effect.

Figure 3: Cumulative lag coefficients for FbW in West Germany (GMM estimates)



For the JCS we observe an immediate significantly negative impact on the job seeker rate (here and in the following a negative implies an intended positive effect, i.e. reduction of unemployment). The effect remains negative for two following quarters and becomes insignificant in the long run. Therefore we can conclude that the JCS in West Germany are able to improve the situation in the labour market only in the short run, whereas this negative effect vanishes very quickly.

For the West German FbW programmes we observe a more favourable picture. The cumulative lag coefficients indicate that the immediate significant negative impact on the job seeker rate remains negative through time. Furthermore the negative effect becomes larger, which could be seen as evidence for locking-in effects. As the long run effect for FbW is also negative significant, we can conclude that FbW programmes improve the labour-market situation in all respects, indicating that in West Germany FbW is the most effective programme. This is especially true with respect to medium-term and long-term effects.

The results from the OLS and the within estimator for East Germany are reported in Table 5. Unfortunately, the results from the OLS estimator depict an unstable path for the job seeker rate. This should be seen as an evidence that the OLS estimates for the autoregressive parameters are upward biased. Furthermore, due to the unstable pattern of the OLS estimates the lag coefficients resulting from these estimates are not reliable. Therefore we will base our analysis only on the within estimator, although this estimator is also known to be biased in the dynamic panel data context.

As with West Germany, we do not find a clear picture in relation to vacancies and so the existence of the Beveridge curve may be questionable. We have plotted the cumulative lag coefficients for the ALMP measures JCS, SAS and FbW resulting from the within estimator in Figures 4, 5 and 6.

For the JCS we find a near zero and insignificant effect, indicating that they have hardly any impact on the East German labour market. In the case of the SAS we find throughout a negative cumulative lag coefficient, although it is significant only for  $t+4$  up to  $t+6$ . This provides some evidence that the SAS are able to reduce the job seeker rate in the medium- and long-term. Finally, we find for FbW an insignificant positive effect, i.e. there is no evidence of an effect on the job seeker rate.

Summarising our results, we find very different situations in East and West Germany, though the estimates for East Germany should be treated with caution. Comparing the performance of FbW programmes with other ALMP measures, we find that in West Germany FbW is the most efficient type of programme. In East Germany this does not hold since the effects are, at best, insignificant.

Table 5: Estimate results for East Germany

Variable		OLS estimator		Within estimator	
		Param.	t-value	Param.	t-value
Job seeker rate	Const.	0.2680	3.933	-	-
	JSR <sub>t-1</sub>	0.6729	10.042	0.4644	8.133
	JSR <sub>t-2</sub>	-0.2104	-2.231	-0.2176	-3.221
	JSR <sub>t-3</sub>	0.1139	1.352	0.0318	0.492
	JSR <sub>t-4</sub>	0.4274	5.631	0.4768	6.168
Vacancy rate	VR <sub>t</sub>	-0.4437	-2.491	-0.2064	-0.857
	VR <sub>t-1</sub>	0.3060	1.261	0.1673	0.824
	VR <sub>t-2</sub>	-0.0719	-0.248	-0.0517	-0.187
	VR <sub>t-3</sub>	0.2385	0.990	0.2198	1.244
	VR <sub>t-4</sub>	-0.1483	-0.786	-0.0132	-0.073
Participants in job creation schemes	JCS <sub>t</sub>	-0.0118	-0.362	0.0009	0.028
	JCS <sub>t-1</sub>	0.0127	0.317	0.0099	0.305
	JCS <sub>t-2</sub>	0.0020	0.063	-0.0022	-0.076
	JCS <sub>t-3</sub>	0.0196	0.750	0.0155	0.687
	JCS <sub>t-4</sub>	-0.0165	-0.988	-0.0125	-0.835
Participants in structural adjustment schemes	SAS <sub>t</sub>	-0.1011	-2.801	-0.0886	-2.142
	SAS <sub>t-1</sub>	0.0927	1.869	0.0647	1.522
	SAS <sub>t-2</sub>	-0.0038	-0.084	0.0027	0.065
	SAS <sub>t-3</sub>	-0.0220	-0.604	-0.0058	-0.157
	SAS <sub>t-4</sub>	-0.0165	-0.494	-0.0839	-2.377
Participants in continuing vocational training	FbW <sub>t</sub>	-0.0573	-1.234	-0.0766	-1.439
	FbW <sub>t-1</sub>	0.0452	0.871	0.0926	1.760
	FbW <sub>t-2</sub>	-0.0776	-1.694	-0.0131	-0.321
	FbW <sub>t-3</sub>	-0.0415	-0.996	-0.0359	-0.967
	FbW <sub>t-4</sub>	0.0323	0.951	0.0908	2.105
National unemployed rate	NUR <sub>t-1</sub>	-3.2415	-3.785	-1.8423	-2.373
	NUR <sub>t-2</sub>	0.4996	0.671	0.9055	1.224
National vacancies rate	NVR <sub>t-1</sub>	0.7601	0.423	3.4963	2.154
	NVR <sub>t-2</sub>	-2.1817	-1.090	-1.0512	-0.655
Seasonal dummy 1	SD <sub>1</sub>	0.0088	2.553	0.0150	4.245
Seasonal dummy 2	SD <sub>2</sub>	0.0204	1.746	0.0139	1.488
Seasonal dummy 3	SD <sub>3</sub>	0.0030	0.650	-0.0039	-0.726
Wald test of joint significance		[26]	691131.047	[26]	78622.047
First-order serial correlation		[34]	3.982	[34]	-3.769
Second-order serial correlation		[34]	2.543	[34]	0.455

Figure 4: Cumulative lag coefficients for JCS in East Germany

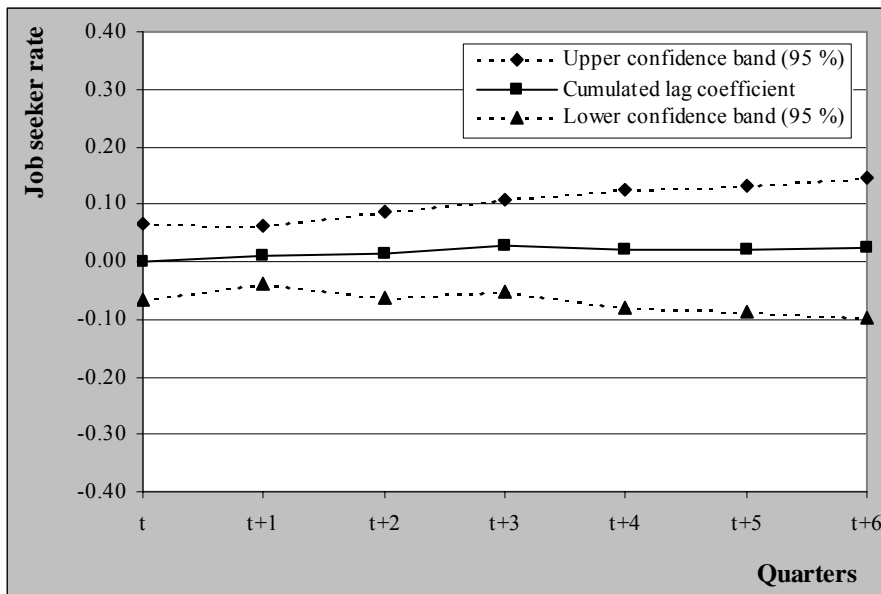


Figure 5: Cumulative lag coefficients for SAS in East Germany (within estimates)

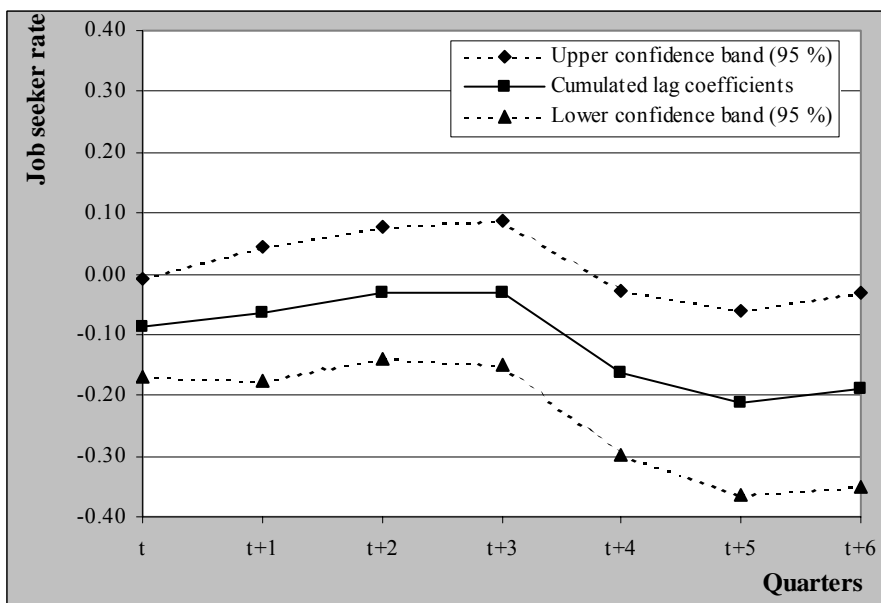
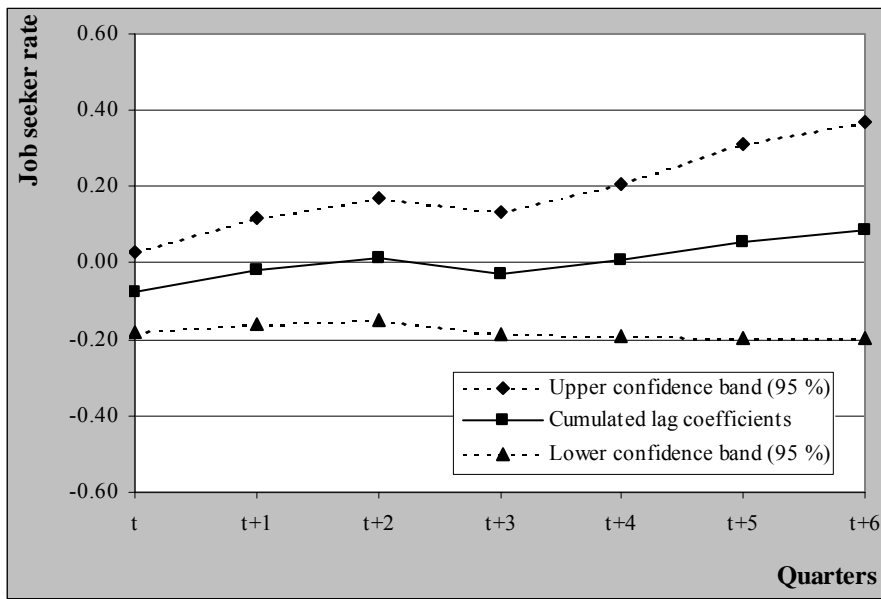


Figure 6: Cumulative lag coefficients for FbW in East Germany (within estimates)



## 8. Implications for policy and future research

What policy implications can be drawn from our results? Empirical evidence suggests that if policy in West Germany has the objective of reducing unemployment, spending on ALMP should be shifted from JCS to vocational training. This conclusion can be drawn simply from the finding that vocational training is the more efficient ALMP measure in West Germany. For East Germany we cannot make similar statements since we did not find a favourable picture for the effects of ALMP, and the results are questionable from an econometric point of view.

An explanation for the non-significant result in East Germany may be the fact that the labour-market conditions in East Germany are very different from West Germany. Unemployment in East Germany is more severe and where this results from a shortage in labour demand, vocational training cannot affect the labour-market situation. This is because vocational training affects the structure of labour supply but cannot solve demand side problems.

This may also be an issue for West Germany since major difficulties on the labour demand side seem to be responsible for recent unemployment. Therefore, if policy intends to shift resources to vocational training it should be considered whether such a shift is practical in the current situation.

Additionally, the objective of ALMP is not solely to increase reintegration into regular employment. Job creation programmes, in particular, have objectives that are not directly associated with economic success. If ALMP is designed to fulfil a set of objectives of which only a proportion are of an economic nature, more than economic consequences should be considered. As our study can only assess the economic consequences of ALMP, the policy implications drawn from our results can only be associated with economic objectives of the programmes.

If we consider only the economic aspects, we can state that the shift of resources to FbW programmes should have favourable effects on employment in West Germany. If there is the question of what type of programme should be extended, FbW programmes seem to be the most promising option. Our results for East Germany do not encourage policy statements since they are unreliable.

It is recommended for future research that more work should be carried out on estimation techniques for dynamic panel data models. There should also be some consideration of how the simultaneity problem of ALMP can be solved. This is directly related to the estimation techniques. In the context of instrumental variables or GMM estimators it is a question of finding appropriate instruments, i.e. instruments that are not only not correlated with the residual of the regression equation but also have a good predictive power with respect to ALMP measures. To do this it might be useful to consider the decision process of how money is allocated to different ALMP measures.

Finally, it would be informative to compare a macroeconometric evaluation with a microeconometric evaluation. If the data is generated from the same sources it enables the researcher to make statements on how the same programme affects individuals and how it affects the whole economy.

## 9. Conclusions

Our results indicate for West Germany that FbW has a negative significant effect, that is FbW is able to reduce the job seeker rate. JCS also has a negative effect but only in the short run. Therefore FbW seems to be the more efficient ALMP measure in West Germany for tackling unemployment. In East Germany we do not find any evidence of a significant effect for JCS and FbW, whereas for SAS there is weak evidence for a negative effect in the medium-term.

The results from our empirical analysis indicate that there are major differences with respect to the effectiveness of ALMP between East and West Germany. That ALMP seems to work in West but not in East Germany may be caused by the fact that the labour market in East Germany is much worse.

Another interesting result is the clear differences in the effects of FbW and JCS in West Germany. Since FbW programmes have a persistently negative effect on unemployment, they seem to be more effective in improving the labour market.

Finally, we can state that a macroeconomic evaluation should be seen as an important ingredient of a complete evaluation, since deadweight losses, substitution and displacement effects are a major problem of ALMP. Important issues with respect to empirical analysis are the inherent simultaneity problem and an appropriate underlying theoretical framework for the econometric specification. Furthermore, the application of dynamic models seems to be essential because of the high persistency of labour-market data. Basically, the ideal macroeconomic evaluation requires three elements: a well developed macroeconomic theory, which is applicable in an econometric framework and which does not fail due to data limitations.

## List of abbreviations

AFG	Work promotion act [ <i>Arbeitsförderungsgesetz</i> ]
ALMP	Active labour-market policy
CAST	measures which are implemented in pathfinder regions and aim to promote the employment of low-qualified individuals or long-term unemployed
FbW	Continuing vocational training [ <i>Förderung der beruflichen Weiterbildung</i> ]
FS	Free support
GMM	Generalised method of moments
JCS	Job creation schemes [ <i>Arbeitsbeschaffungsmaßnahmen</i> ]
JOB-AQTIV	The reform law regarding the ALMP instruments
JSR	Job seeker rate
JUMP	Special programme to combat youth unemployment
NUR	National unemployment
NVR	National vacancy rate
OLS	Ordinary least squares
SAS	Structural adjustment schemes [ <i>Strukturanpassungsmaßnahmen</i> ]
SAS-East	Sam-East for private firms
SGB	Social welfare code [ <i>Sozialgesetzbuch</i> ]
SUTVA	Stable unit treatment value assumption
VR	Vacancy rate
VT	Vocational training

# Annex 1

Table 6: Descriptive statistics for Germany

Variable	Mean	Std	Min	Max
No of labour office districts: 175				
No of observations: 2 100				
Time range: 1999:1 – 2001:4				
<b>Quarterly average measures</b>				
Participants in JCS	1 041	1 682	3	12 547
Participants in SAS	653	1 468	0	9 091
Participants in FbW	1 890	1 407	255	8 500
Unemployed	20 855	14 108	3 331	88 317
Dependent labour force	200 124	112 471	54 113	991 637
<b>Regional information</b>				
Area (in hectare)	203 502	134 599	16 406	813 574
<b>Additional national data</b>				
National unemployed	3 943 250	206 213	3 688 358	4 402 852
National vacancies	492 768	49 220	413 141	562 266
National labour force	41 668	281	41 116	42 068

Table 7: Descriptive statistics for West Germany

Variable	Mean	Std	Min	Max
No of labour office districts: 141				
No of observations: 1 692				
Time range: 1999:1 – 2001:4				
<b>Quarterly average measures</b>				
Participants in JCS	356	339	3	2 181
Participants in SAS	62	107	0	1 241
Participants in FbW	1 227	930	255	8 500
Unemployed	17 092	11 282	3 331	88 317
Dependent labour force	201 539	119 919	59 864	991 637
<b>Regional information</b>				
Area (in hectare)	176 204	95 609	16 406	478 275

Table 8: Descriptive statistics for East Germany

Variable	Mean	Std	Min	Max
No of labour office districts: 34				
No of observations: 408				
Time range: 1999:1 – 2001:4				
<b>Quarterly average measures</b>				
Participants in JCS	3 882	2 019	1 048	12 547
Participants in SAS	3 105	1 894	514	9 091
Participants in FbW	3 813	1 422	1 139	8 197
Unemployed	36 462	13 946	10 671	74 296
Dependent labour force	194 258	73 800	54 113	368 984
<b>Regional information</b>				
Area (in hectare)	316 708	198 754	56 906	813 574

Table 9: Cumulative lag coefficients for West Germany

<b>Job creation schemes</b>				
Quarter	Lag coefficients	Standard error	Cumulative lag coefficients	Standard error
t	-0.7612	0.137	-0.7612	0.137
t+1	0.1333	0.056	-0.6279	0.145
t+2	0.1856	0.055	-0.4423	0.186
t+3	0.1623	0.065	-0.2801	0.200
t+4	-0.0395	0.090	-0.3196	0.208
t+5	-0.0185	0.065	-0.3380	0.240
t+6	0.0217	0.031	-0.3163	0.266
Long run effect	-	-	0.3930	1.142
<b>FbW</b>				
Quarter	Lag coefficients	Standard error	Cumulative lag coefficients	Standard error
t	-0.2068	0.044	-0.2068	0.044
t+1	0.0440	0.021	-0.1629	0.057
t+2	-0.0137	0.022	-0.1766	0.072
t+3	-0.0098	0.023	-0.1864	0.088
t+4	-0.0542	0.015	-0.2406	0.096
t+5	-0.0423	0.018	-0.2829	0.109
t+6	-0.0336	0.020	-0.3164	0.127
Long run effect	-	-	-1.5228	0.385

Table 10: Cumulative lag coefficients for East Germany

<b>Job creation schemes</b>				
<b>Quarter</b>	<b>Lag coefficients</b>	<b>Standard error</b>	<b>Cumulative lag coefficients</b>	<b>Standard error</b>
t	0.0009	0.034	0.0009	0.034
t+1	0.0103	0.020	0.0113	0.026
t+2	0.0024	0.018	0.0136	0.038
t+3	0.0144	0.018	0.0281	0.041
t+4	-0.0055	0.018	0.0226	0.052
t+5	-0.0007	0.010	0.0218	0.056
t+6	0.0025	0.009	0.0243	0.063
Long run effect	-	-	0.0477	0.130

<b>Structural adjustment schemes</b>				
<b>Quarter</b>	<b>Lag coefficients</b>	<b>Standard error</b>	<b>Cumulative lag coefficients</b>	<b>Standard error</b>
t	-0.0886	0.0413	-0.0886	0.0413
t+1	0.0236	0.0389	-0.0650	0.0564
t+2	0.0329	0.0359	-0.0321	0.0552
t+3	0.0015	0.0413	-0.0306	0.0607
t+4	-0.1318	0.0409	-0.1624	0.0692
t+5	-0.0493	0.0247	-0.2117	0.0773
t+6	0.0215	0.0238	-0.1901	0.0817
Long run effect	-	-	-0.4534	0.251

<b>FbW</b>				
<b>Quarter</b>	<b>Lag coefficients</b>	<b>Standard error</b>	<b>Cumulative lag coefficients</b>	<b>Standard error</b>
t	-0.0766	0.0532	-0.0766	0.0532
t+1	0.0571	0.0478	-0.0195	0.0714
t+2	0.0300	0.0354	0.0105	0.0812
t+3	-0.0368	0.0333	-0.0263	0.0808
t+4	0.0325	0.0355	0.0063	0.1015
t+5	0.0513	0.0377	0.0575	0.1295
t+6	0.0299	0.0205	0.0874	0.1439
Long run effect	-	-	0.2366	0.275

Figure 7: Participants in ALMP and unemployed in East Germany

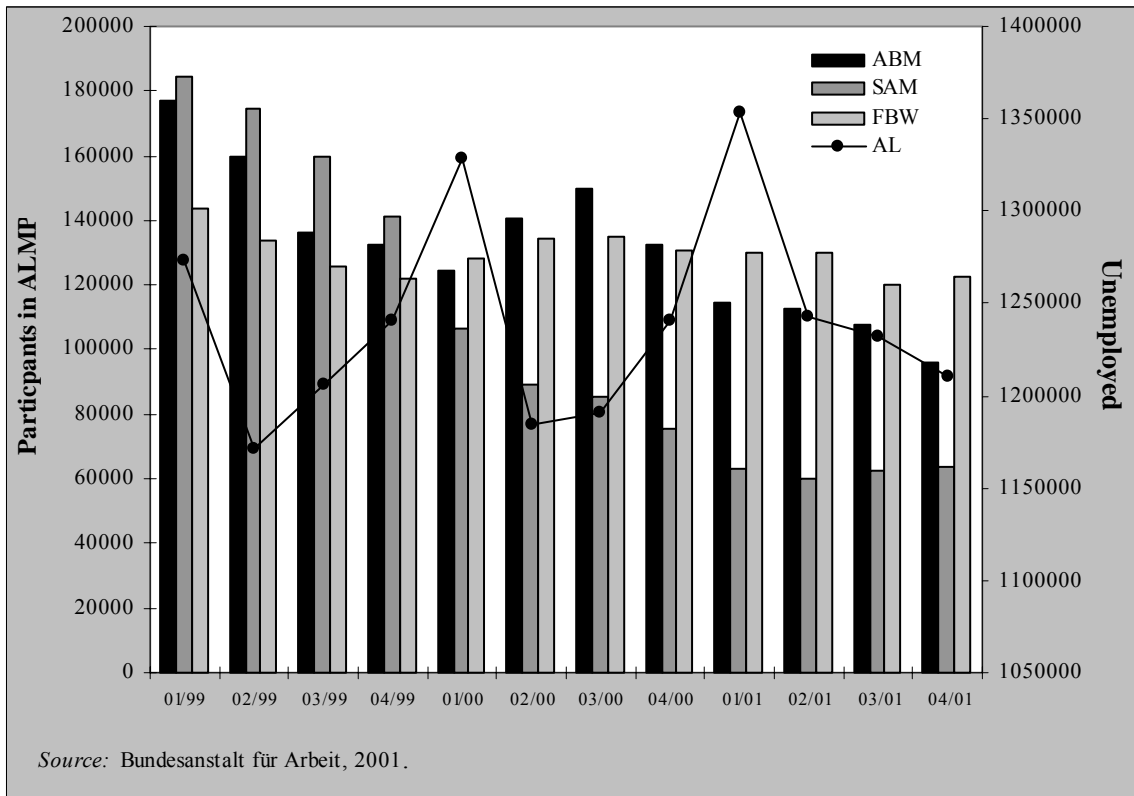
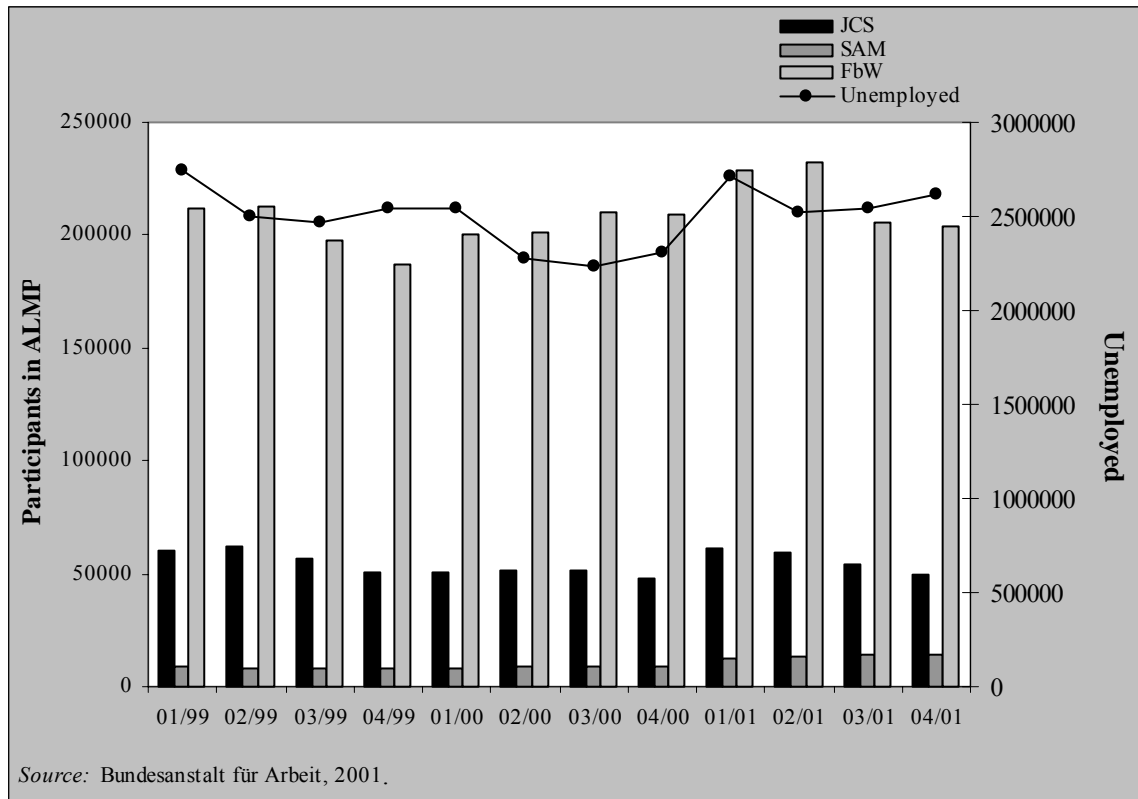


Figure 8: Participants in ALMP and unemployed in West Germany



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