An Evaluation of Active and Passive Labour Market Policy

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Abstract

This paper reports results of an empirical study on the effectiveness of labour market policy. Data from Austria, France, Germany, Great Britain, Sweden and the United States are used to apply a simultaneous equation model with wages and employment being the endogenous variables. In order to explain employment, the amount of unemployment benefits per unemployed (passive labour market policy) and payment for wage subsidies and training per employed and unemployed person (active labour market policy) are used in addition to real wages and output. Wages and output have their expected impact on total employment. It turns out that passive labour market policy has a negative and active labour market measures a positive effect on the number of persons employed.

Zusammenfassung

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1. Introduction

Both in the public and the academic discussion a great deal more attention has been given to the impact of passive labour market policy than to the analysis of active measures. This is not surprising, given the fact that most public expenditure is used for unemployment benefits. For example, in 1991 in the EC 1.85% of GNP was used for passive labour market policy in comparison to .91% spent for active labour market measures. Especially the marked rise in unemployment during the 1970s and 1980s in most OECD countries has resulted in more attention being given to unemployment compensation than at any other time in the post-war period. Most of this attention is rather critical. Typically a negative effect on the labour market is expected; high benefits are said to cause the unemployed to become more selective, rejecting offers more frequently or not searching at all. Thus the persistence of unemployment has in part been attributed to the "generosity" of benefit payments.

The dominance of passive labour market policy in the discussion on employment effects is understandable but should not hinder an investigation of a second component of public policy intervention, namely, active labour market policy. This term is used here for wage subsidies, training programs and other policy measures, which intend to improve the employment chances of somehow disadvantaged persons. In contrast to unemployment benefits, these policy options intervene into the labour market process by improving the chances of the unemployed to return to work. However, it remains to be seen, whether these measures have any effect at all or are mostly spent in vain due to the substitution of currently favoured persons for other employees.

An analysis of the effectiveness of active labour market policy is not easy since the employment of the programme participants and the chances of other groups on the labour market have to be considered simultaneously. The intent of wage subsidies is to decrease the marginal costs of labour and thus to increase employment. However, firms might simply employ the "cheaper" type of labour without any alteration of employment, which means that some persons become redundant because of the subsidies. Labour market policy would in this case be counterproductive in several ways: Expenditures are
wasted and the dismissals of previously employed persons imply a loss in firm-specific human capital.

The purpose of this paper is the presentation and discussion of empirical results on the impact of passive and active labour market policy. In particular it is investigated, how active labour market measures affect the total number of persons employed in an economy. Previous studies, like for example Perloff and Wachter (1979), used data on the firm level to calculate the employment stimulus of wage subsidies. However such studies are prone to selectivity bias. Firms that expand for some exogenous reason might use subsidies without increasing employment above what was intended anyway and total employment in the economy would then not be altered by the subsidy program. Therefore this study makes use of aggregate data and adds to conventional labour market variables like real wages and output information on labour market measures to estimate their total effect on the economy.

The study is based on data from Austria, France, Germany, Great Britain, Sweden and the United States over the time period 1973 to 1988. The countries included are selected in order to compare the major EC economies (France, Germany and Great Britain) with countries like Austria and Sweden, which have a rich experience in the use of active labour market policy and with the United States as the most important economy in the world.
2. Theoretical Considerations on Labour Market Policy

2.1 Unemployment Benefits

There exists a broad literature on the expected consequences of unemployment benefits. (Atkinson and Micklewright 1991 provide a survey on this issue.) The institutional features differ largely between different countries and a simple consideration of the benefit level is misleading. The conditions concerning enrolment, time of coverage, family assistance, requirements to search for employment and acceptance of offers differ. In 1990 63% of the unemployed in Germany actually received benefits or assistance. In France only 41% of the persons without work received unemployment compensation. Some countries (e.g. France and Germany) link unemployment compensation closely to previous income while in others (e.g. the UK) the emphasis is on guaranteeing a minimum level of income. The different institutional settings are in particular a problem in carrying out an international comparison of the effects of labour market policy on the economy.

Economists and the public frequently expect unemployment benefits to provide a disincentive to search for employment or at least to search longer and less intensively. It is feared that quitting a job to enter unemployment might be more frequent in the presence of generous unemployment benefits. In addition labour supply effects are relevant if persons entering the labour market for the first time are qualified for benefits. The logic of these considerations is clear: A reduction in the benefits level will reduce unemployment.

Using the "traditional" microeconomic model, the impact of unemployment benefits is unambiguous. It is assumed that utility of a representative person depends on consumption and leisure. The labour supply decision can be explained most easily by use of a simple diagram. In figure one total time available (T) is shown on the horizontal axis and is divided between leisure (L) and work (H). The left-hand vertical axis measures the sum of labour and non-labour income and therewith possible consumption (C). The right-hand axis measures non-labour income (like fortune or unemployment compensation) Y
The individual budget constraint is a straight line with the slope determined by the hourly wage rate $w$, if overtime premiums are neglected. (In the presence of overtime premiums the line has one or more kinks depending on the premiums received and the number of hours supplied.) The budget constraint intersects the right-hand axis at the point, where no labour is supplied and therefore only non-labour income is received.

**Figure 1**

Labour supply is determined by the slope of the income curve and the level of non-labour income. Given the positive valuation of both consumption and leisure, the indifference curve is convex and the point tangential to the income curve in turn indicates the highest possible utility level. Unemployment benefits work like an increase in non-wage income and for a given wage rate, labour supply will be reduced through an income and substitution effect.

In this analysis, which focuses on labour supply decisions, unemployment benefits increase voluntary unemployment. Whether total unemployment is affected, depends on wage flexibility. If wages are flexible, the effective labour supply function shifts inwards and with an unchanged labour demand function employment is reduced while compensation rises. In case of (assumed for simplicity) inflexible total supply of labour (including employed workers, persons searching for a job but presently not having one fitting their skills and
persons registered as unemployed but not actually willing to work), registered unemployment rises.

If the wage is fixed and above market clearing level, the effect of a rise in unemployment compensation depends on whether the shift in the (effective) supply curve is sufficient to abolish involuntary unemployment or not. If involuntary unemployment persists, the shift doesn't change the overall rate of unemployment but its composition. Voluntary unemployment is increasing, while involuntary unemployment decreases. In case of a drastic shift of the supply curve with an abolition of involuntary unemployment, the market is in disequilibrium as labour demand is above effective supply, while at the same time some persons are voluntarily unemployed. Such a situation looks rather strange but employers often complain about the problems to find persons willing to work at the going wage rate.

This analysis is based on the (innocent-looking) assumption that leisure is a normal good. This simply means a high income without working is preferred to a situation where the same income is received but has to be worked for. While sounding reasonable this assumption neglects the stigma effect of unemployment. With a stigma effect of sufficient magnitude the utility function has a different composition and the indifference curve has a different slope than the one depicted in figure one.

The consideration of a stigma effect can be used to explain differences in behaviour of labour market participants. While the assumption of a stigma effect counteracting the incentive to use unemployment benefits is reasonable for persons with a "traditional" attitude towards the use of public assistance, it is frequently asserted that a change in values has taken place, which leads to a lower importance of the stigma effect. There may be groups in which such a stigma does not play a role but it is not clear how important they are. Perhaps it is fair to say that the stigma effect has become less important during recent years.

There are a number of empirical studies on the impact of unemployment insurance with conflicting results. For example, Meyer (1990) finds that in the US a higher level of unemployment benefits has a strong negative effect on the probability of leaving unemployment. However, the probability of leaving unemployment rises dramatically just prior to when benefits end. On the other
hand, Wadsworth (1991), utilising data from the UK, concludes that persons claiming benefits are searching more extensively than non-claimants. Atkinson and Micklewright (1991, 1721) conclude "that it is essential in the analysis of unemployment compensation to (a) distinguish different labour market states and (b) treat the institutional features of different forms of unemployment benefit".

Another line of argumentation on why unemployment benefits harm the economy is based on the concept of efficiency wages. There exist different explanations for the existence of efficiency wages but the most popular is the shirking model by Shapiro and Stiglitz (1984). According to this model dismissals serve as a sanction against workers caught shirking. This punishment will only work if a dismissal is connected with a financial loss, which in turn implies that generous unemployment benefits reduce work incentives and lower productivity, because the punishment does not work. This causes employers to increase wages further and to employ fewer persons.

Clearly not everybody shares this sceptical view on unemployment benefits. If the rise in unemployment is due to unemployment insurance, it has to be shown whether its extent has changed drastically or the eligible persons have nowadays different attitudes towards the exploitation of social insurance than used to be the case. In particular it seems difficult to explain the massive increase in unemployment in Europe during the eighties by increases in unemployment insurance.

Even if the unemployment insurance system is abused, an abolition has some negative efficiency aspects. As its name expresses, this system provides (partial) insurance against otherwise existing risk. If people are risk-averse, insurance is something desirable with positive welfare effects.

2.2 Active Labour Market Policy

Active labour market policy is concerned with the creation or preservation of employment. In particular one can think of wage subsidies in order to reduce the marginal costs of labour. Training programmes are another popular type of measure. The goal of the latter is to improve the "supply conditions" of labour. These programs are cheaper and more effective if they are targeted (to be
discussed below). Direct targeting attempts to focus demand on under employed groups, like the long-term unemployed, the unskilled, youths and labour in depressed areas. The better the targeting works, the less of the subsidy will go to those who would have been employed anyway.

The theoretical work on employment subsidies focuses on employment effects (e.g. Baily and Tobin 1977, Johnson 1980) or more general on efficiency defined as value of output minus the cost of leisure foregone by workers while producing output (Jackman and Layard 1980). Johnson and Layard (1986) survey in detail the effect of employment subsidies.

An employment subsidy has to be financed by tax revenues. Calling the employment tax rate $t$, the subsidy rate per worker $s$ (employers receive a share $s$ of wage payments reimbursed), the number of persons employed $N$ and the wage rate per worker $w$, if the system is self-financing the following has to hold: $Nwt - Nws = 0$. However, the marginal costs of labour are now $w(1+t) - ws$, which simply reduces to $w$ given the restriction of self-financing: The wage is increased by the tax rate in the same way as it is reduced by the subsidy. Therefore no effect can be expected by the general subsidisation of labour. Even worse, usually every state redistribution activity consumes some of the collected resources for itself. In this case taxes have to be larger than the subsidies in order to run the system, making the net effect negative.

The reader might well argue that nobody asks for subsidisation of all labour but for support of some selected groups. In this case the analysis is more favourable. In the most simple example some number of workers $N_f$ is fixed and every employment of workers above this number $(N-N_f)$ is subsidised. This subsidy in turn is financed by a tax on all workers. Taxes are $Nwt$ and subsidies paid out amount to $(N-N_f)ws (=Nwt$ if the system is self-financing and the governmental activity uses up no resources). The marginal costs of labour are now $w(1+t) - ws$, which are trivially smaller than $w$ for $t<s$ or $N_f>0$.

Figure 2 illustrates the effect of a partial subsidisation of employment. The labour demand curve is affected in two ways: Employment gets more expensive for the first $N_f$ workers which is illustrated graphically by a shift of the original labour demand curve to the left. Employment becomes cheaper if the threshold of these $N_f$ workers is passed, which is shown in the figure by the outward shift of the labour demand curve. Overall the demand for labour will increase by this
measure as well as equilibrium employment, if labour supply $N_s$ has a positive slope (as assumed in Figure 2).

**Figure 2**

This analysis has its shortcomings as well: On the one hand it remains unclear whose employment gets subsidised and on the other hand who pays the taxes. A random choice will hardly be accepted by the public. The justification of subsidies is usually a disadvantage or handicap of some kind by some workers. This disadvantage might be long-term unemployment, lacking work experience or discrimination by employers. Johnson (1980) analyses the case of several labour groups based on the assumption of rigid wages of the unemployed, which in turn are identified as youths and low skilled adults and an inelastic labour supply. Only the employed skilled workers pay taxes to cover the expenditures for wage subsidisation. The cost-benefit of an employment subsidy depends in his model largely on the complementarity or substitutability of workers with different skills as well as on the replacement ratio (ratio of unemployment benefit to the wage rate).

If wages and labour supply are (partially) flexible and special groups are selected by the governmental authority for employment subsidisation, the total impact depends on the supply elasticity (Jackman and Layard 1980, Johnson and Layard 1986). The persons taxed will reduce labour supply or increase it in dependence of the dominance of the income or substitution effect. Usually the subsidised workers are those with a low income and the taxed ones are the
groups with high income. It is quite plausible that the supply elasticity is higher for persons with a low wage in comparison to high-income earners, who might increase labour supply in response to the introduction of a tax. Whatever the response of high-income persons, the welfare increase of the other group has to be compared with the welfare losses of the "tax-payer". Jackman and Layard (1980) as well as Johnson and Layard (1986) show that a condition for a welfare increase (taking also into account disutility from work not merely the number of employees) is, that the supply elasticity of the targeted subsidy group is higher than that of the tax-group, which in turn is quite plausible. Nevertheless the results are not unambiguous and depend on certain parameter values.

A main problem with every subsidisation program is its coverage or exclusion criteria. By definition subsidised labour is cheaper than other workers and if, for example, only some disadvantaged persons get subsidised, any firm has an incentive to dismiss unsubsidised workers and employ the subsidised ones. This effect will be the more important insofar as substitution is easy. With perfect substitutability (partial coverage of a special group) the favoured workers find employment, while others become unemployed. Total employment remains unchanged as long as subsidised labour is below the total demand for a particular group of workers. Therefore it is important that all persons fulfilling some criteria of being disadvantaged are covered since they are perfect substitutes. Workers who are closely substitutable should be included as well. If skilled and unskilled workers are complements rather than substitutes and unskilled labour gets subsidised, skilled workers also benefit from the subsidisation program and the situation is a pareto-improvement (Johnson and Layard 1986).

Training programs are another labour market measure which aims at improving the chances of those persons, who have problems in the labour market because of insufficient skills. Two related questions arise in this connection. Why do firms not provide this training on their own and if firms are unwilling to finance qualification efforts, why do the workers not undertake such training in say privately financed courses? Put differently, do we need the state to finance training activities? Firstly, the firms are not willing to finance general qualification (Becker 1962) and will only in part pay the expenditures for developing firm-specific skills, at least if they behave in accordance with neo-
classical theory. As probably disadvantaged persons need mostly general skills, the financing of the training must be covered by the persons themselves or subsidisation of some kind has to take place.

Arguments in favour of public financing of training are imperfect capital markets, information (or ignorance) of the persons in question and positive externalities. Clearly it is difficult to find a bank financing investment into human capital. Nobody can enforce the use of the investment after it has taken place. Positive externalities of training will be present if employment chances of other workers are improved by the higher qualification, which is the case if complementaries exist. In addition qualification is frequently used to correct social deficiencies, which of course has positive externalities.

The impact of active labour market policy has until this point been discussed in an efficiency perspective. However it might well be misleading to regard such measures as being directed by economic welfare. A major reason to the application of active assistance of the unemployed is most likely equity. Similarly to unemployment benefits wage subsidies or support for training are thought to redistribute resources to the disadvantaged in an economy. Equity is a goal on its own and support for unemployed persons has not only to be evaluated on the basis of efficiency.

3. **Empirical test**

3.1 **Data and Hypotheses**

The study is based on data from Austria, France, Germany, Great Britain, Sweden and the USA collected by Schmid, Reissert and Bruche (1992). These countries were selected for the following reason: France, Germany and the United Kingdom are the most important economies in the EC and differ quite markedly with respect to their economic policy. The United States is the most important economy in the world and is frequently named as the example of a (relatively) unregulated labour market, in contrast to the major European economies (with the possible exception of Great Britain). Clearly Austria and
Sweden receive less attention than the other countries simply because GNP and employment are much smaller. These countries are considered here as well because they have a long tradition of active labour market policy and are thus of particular interest in a comparative study. The comparison of several countries is better suited than the application of time series data since in the latter the central endogenous and exogenous variables often all move together through time and changes in the variables about a time trend is minor. Empirical results are often very different as a result of the inclusion or exclusion of a few observations and/or explanatory variables. A comparison between countries has the advantage that labour market policy varies more intensively than in case of a time series of a particular country.

Of course with some justification it can be questioned whether such highly aggregated data is useful for a test of essentially microeconomic hypotheses. Any aggregation of individually based decisions necessarily leads to a loss of information.

Panel data on unemployed workers is not useful, as it can merely be tested whether the probability of being employed changes, if unemployment benefits are received or a potential employer gets wage subsidies. This is, however, only part of the question to be investigated since the total impact has to be looked at, including possible substitution effects between persons subsidised and others. Disaggregation by regions or industries is also of limited use since a person who receives unemployment benefits or has just finished a training course can (and is expected to do) search for a job within the whole country or even outside of it and is by no means restricted to employment in one industry or region.

Firm level data could be used to assess, whether and to what degree employment is enlarged if a part of the workers' wages are subsidised (see for example Perloff and Wachter (1979). It is however very difficult to collect such data and it has limited potential to characterise market equilibrium and even individual level equilibrium. It is possible, for example, that a variable such as entrepreneurial skill is responsible for knowing about employment subsidies and their use as well as for rapid growth of the observed firm. Employment growth and subsidies are positively correlated, but growth might be observed without the subsidisation of jobs as well.
As noted above the purpose of this study is to test the impact of labour market policy on employment. The most important variable is thus the number of persons in dependent employment in a country and not, for example the number of unemployed in relation to the total workforce. The reason for this specification is that labour demand is more accessible to economic analysis than labour supply. Clearly the latter reacts to economic incentives as well but it is dominated by other factors like demographic development, migration or participation rates of women, which in turn depend among other things on non-economic factors like marital status or child care (Moffit 1991).

The use of employment as the dependent variable is easily justified if the explanatory variables output, real wages and active labour market policy are considered. These factors are expected to directly affect labour demand. By contrast unemployment benefits and assistance will most likely reduce labour supply. However, as discussed above, labour supply is determined by a number of factors which are very difficult to measure. Generous financial support for the unemployed will raise the expectations of the employees regarding monetary and non-monetary benefits connected with a particular job. These expectations and the reduced disciplinary effect of a dismissal can contribute to lower worker motivation and productivity. This in turn should reduce labour demand and the variable "passive labour market policy" may well have an impact in a regression explaining employment, besides its supply side impact. In addition - as discussed in section two above- if wages are inflexible, an increase in unemployment benefits will reduce employment, in case the supply shift is strong enough to move the equilibrium wage above the observed (by assumption unchanged) wage. The reason for this is the higher attractiveness of voluntary unemployment which reduces (effective) labour supply.

The study has the following simple methodology: by use of standard economic variables like real GDP and real wages the expected employment is calculated. In addition labour market policy variables are considered in order to estimate their impact on labour demand.
3.2 Employment Equation

The regressions are based on transformations of the initial financial data, which was given in individual country-currencies. The data was transformed by use of real purchasing power parities expressed in 1980 US dollars as calculated by the OECD for every year in question. The use of the exchange rate as an alternative is not useful because it is influenced by a number of factors, which are independent of the relation of domestic to foreign prices like interest rates, speculation or monetary policy. Therefore real purchasing power seems to be superior in comparison to an application of exchange rates. However, if the financial data is transformed by use of the exchange rates, the results do not differ very much from the ones presented below.

This transformation has also been applied to the real GNP of a country and the real wage rate per employee. GNP is, like in similar studies, used to estimate the employment-output elasticity. The real wage is used to find the wage elasticity. These two explanatory variables are standard in labour demand equations. Unfortunately no data on average hours worked are available and thus not a hourly wage but only the income per year can be calculated.

The labour market variables are divided into passive and active components. The passive labour market policy (PASSLMP) is defined as the sum of unemployment benefits and unemployment assistance per unemployed person. Active labour market measures (ACTLMP) are calculated from expenditures for training and retraining, job creation, preservation of employment and hiring subsidies. In contrast to unemployment benefits and assistance, active labour market policy is defined as expenditures per person in the labour force. Since most active measures are used to avoid open unemployment and the participants are frequently not registered unemployed, a division of the expenditures by the number of unemployed would be misleading. Labour market policy expenditure are also calculated in real US dollars in purchasing power parities.
Central government expenditures (CGE) are also used as an explanatory variable. The data were transformed into real US dollars in the same manner as with the other financial data. The inclusion of this variable is motivated by the desire to measure the impact of state activity on the economy after controlling for the effect of real GNP.

The effect of this variable is theoretically ambiguous. On the one hand usually state activities are rather labour intensive in comparison to private sector production and at least in the short-run a positive impact would be plausible. On the other hand not every governmental activity is efficient in a neo-classical view and thus a large public sector in comparison to the private one could reduce productivity growth and total employment might be lower in the long-run.

Put generally the employment equation intends to consider the effects of wages, wage substitution payments (unemployment benefits), wage subsidies and aggregate demand. Such a specification is common, except that labour market policy variables are added. For example Layard and Nickell (1986) use a similar framework, however in their case the replacement ratio affects wages not employment and they substitute output by factors expected to determine actual in relation to potential production.

3.3 Wage Equation

Clearly the instrumented value of employment has to be one of the explanatory variables in order to test for the effect of labour demand on real wages. Whether GNP has to be added to the wage equation can be questioned. In the first place wages are expected to respond to their own demand, and not to the demand for the produced output. (Of course the output level will, among other things, determine demand for labour.) However, it turns out that GNP has an impact independent of (instrumented) employment and exclusion would probably lead to an omitted variable bias. The observed effect can be present because of rent-sharing, this means in prosperity periods employees might get, due to bargaining power exerted from the unions, a part of the revenues above what is expected from the pure demand for labour.
From the labour market policy variables only passive measures are included, as the other variable has no significant impact and is omitted for the purpose of identification. Clearly it is expected that unemployment benefits are of higher relevance in this connection, given that their level will influence labour supply and therewith the wage that has to be paid.

The central government expenditures are included here as well. The impact is difficult to be predicted. The measurement of a marginal product is always not easy but it is in particular hard in case of the provision of a public good. Hence the government will frequently not be able to follow the rule "marginal product equals the wage" and occasionally it even seems not to be prepared to apply such an efficiency rule. Instead rather rigid remuneration systems are used, which are only very loosely related to private sector wages. Thus how state activities affect wages is unknown.

Within the wage equation another variable named SURPLUS is used, which is the ratio of central government surplus to total expenditures. The naming notwithstanding usually governments make deficits and if in the short-run an explanatory government policy is increasing real wages, the coefficient should be negative. This variable is theoretically of interest for employment as well but no significant impact has been estimated. Thus it has been omitted from the employment equation for identification of the system.

3.4 Econometric Model

For a long time econometricians analysed time series data not very differently from traditional cross-section data. Little attention was paid to the dynamic structure of the time series. Implicitly, the stationarity of the economic data was assumed which is questionable in many cases. In particular most macroeconomic data were shown to be non stationary, rather than stationary around a deterministic trend, as assumed for a long time. The standard statistics as the t- and Durbin-Watson-values as well as measures such as \( R^2 \) are not valid in the presence of non stationary data. One solution to work with data which is not stationary in levels, is to difference it and to use these variables to test hypotheses. The problem of this approach is that useful information on long-run relations is lost. This is a drawback insofar as many
economic theories model long-run equilibrium situations and to a lesser extent the adjustment to deviations from this equilibrium.

Recently, the concept of the error-correction model (ECM) has been suggested as one solution to this problem. This approach measures both short and long run responses to changes in the exogenous variables. As a simple example consider the following relationship:

\( y_t = \beta_0 + \beta_1 x_t + \beta_2 x_{t-1} + \beta_3 y_{t-1} \)

The original equation can be manipulated by subtracting \( y_{t-1} \) from each side, adding and subtracting \((\beta_1 + \beta_2)x_{t-1}\) on the right hand side to produce:

\( \Delta y_t = \beta_0 + \beta_1 \Delta x_t + \left(\beta_3 - 1\right) \left[ y_{t-1} - \frac{(\beta_1 + \beta_2)}{(\beta_3 - 1)} x_{t-1} \right] \)

This is the error correction representation of the original specification with the long-run multiplier \((\beta_1 + \beta_2)/(\beta_3 - 1)\). Note that the term in brackets is the long-run equilibrium relation. If the variables have reached their equilibrium values, the error correction term falls out. Otherwise (the normal case) the last term is not equal to zero and leads to an adjustment of the dependent variable. If, for example, \( y \) grows too quickly, the last term becomes bigger and \( \Delta y_t \) is reduced. The contrary happens if \( x \) is larger than \( y \). The response to an "error" in the previous period is sometimes interpreted as a reaction to disequilibrium and the \( \beta_1 \Delta x_t \) term is regarded as an equilibrium response. Another and in this connection more useful distinction is to measure by the error correction term long run relationships and by the coefficients of the differenced variables short run responses.
Testing shows, that most of the data applied here are non stationary in levels but are stationary after differencing once. As demonstrated above, the error correction model mixes data in level and differences in the same equation, which, if the levels are non stationary, means that the error correction model could be producing spurious results. However, Engle and Granger (1987) have proved that even if the level variables are individually non stationary, their linear combination by use of a coefficient vector might be stationary. In this case the variables are co-integrated and this co-integrated combination is interpreted as an equilibrium relationship. Since it can be shown that variables in the error-correction term in an ECM must be co-integrated, these co-integrated variables must have an ECM representation.

Engle and Granger (1987) suggest the following methodology: Testing for unit root in the raw data in order to determine the order of integration, secondly running the co-integrating regression and thirdly applying an appropriate unit root test to the residuals of this regression to test for co-integration. If co-integration is accepted, the lagged residuals from the co-integrating regression can be used as an error correction term (ECT) in the ECM. The long-run relationship is consistently estimated by using OLS to the level variables despite the complete omission of all dynamics. However, the standard errors of this first step are inconsistent and will not be reported. Least-squares standard errors in the second stage will provide consistent estimates of the true standard errors. Other suggestions for an implementation of the ECM exist as well.

The model is estimated as a simultaneous equation model with employment and real wages being the endogenous variables. In order to implement the model in an error correction framework, the instrumental variables of wages and employment are calculated from the undifferenced values. Based on these estimates the variables in first differences are constructed. It has been shown, that there is no need to distinguish between endogenous and exogenous variables, because any correlation with the error term will be negligible asymptotically and no asymptotic bias will ensue. Therefore the more complicated approach followed here seems to be superfluous. However, the mentioned results are only valid asymptotically and the small sample properties are unknown. Thus the simultaneous equation model is more "cautious" than the simple OLS estimation. On the other hand the results presented below do not depend on the method chosen.
Like in every pooled cross-section-time series analysis the question arises as to which model is used. Popular models are the fixed effects and the random error approaches. In the first case time and country dummies are added while in the second case the error is regarded as a cross-sectional individual specific disturbance (in addition to a unique error component). The random effects model leads to a more efficient estimation, while the fixed effects approach is appropriate if the time and country dummies are correlated with other explanatory variables, as otherwise an omitted variable bias is probable. A Hausman test for correlation between the error and the regressors can be used to check whether the random effects model is appropriate or not.

Not surprisingly, time and country dummies are highly significant and thus a fixed effect model is estimated. As an alternative the random-effects model has been tested. The results are rather similar, but in estimating the long-run coefficients (the "error") a Hausman-test on the probability of assuming no correlation between the dummy-variables and the other variables, leads to a chi-square statistic of 17.69, which is highly significant. Therefore the fixed effects model is preferred.

4. Results

As described above, in the first place it has to be determined whether the variables in question are co-integrated. Therefore a regression with the variables in levels is carried out and the residuals \( e \) are used to apply a Dickey-Fuller t-test on co-integration:

\[
(3) \quad \Delta e_t = -b e_{t-1} + v_t
\]

with \( e \) being the residuals of the cointegrating regression and \( v \) the residuals of the Dickey-Fuller-test equation. This test yields a value of -7.00, which is far
above the critical value of -4.42. Hence the regression in levels shows that the variables are co-integrated and that the error-correction model is appropriate.

The results of the ECM are displayed in table one. The t-values of the first-step estimation with variables in levels are not reported as they are not consistent.

**Table 1: Results of the ECM on the Effects of Labour Market Policy**

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Employment differences</th>
<th>Employment levels</th>
<th>Wages differences</th>
<th>Wages levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>.01 (.601)</td>
<td>-1.28</td>
<td>-.01 (-3.64)</td>
<td>.15</td>
</tr>
<tr>
<td>GDP</td>
<td>.16 (2.82)</td>
<td>1.00</td>
<td>.78 (3.47)</td>
<td>3.20</td>
</tr>
<tr>
<td>CGE</td>
<td>-.04 (-1.20)</td>
<td>.04</td>
<td>.19 (2.35)</td>
<td>.55</td>
</tr>
<tr>
<td>PASSLMP</td>
<td>-.04 (-2.87)</td>
<td>-.12</td>
<td>.02 (.39)</td>
<td>-.28</td>
</tr>
<tr>
<td>ACTLMP</td>
<td>.02 (2.31)</td>
<td>.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WAGE</td>
<td>-.10 (-2.21)</td>
<td>-.58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECT</td>
<td>-.14 (-6.52)</td>
<td></td>
<td>-.13 (-3.42)</td>
<td></td>
</tr>
<tr>
<td>SURPLUS</td>
<td>.03 (.33)</td>
<td>.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMPLOYMENT</td>
<td>-.37 (-1.29)</td>
<td></td>
<td>-4.20</td>
<td></td>
</tr>
</tbody>
</table>

Notes: t-values in brackets, n=90.

The "traditional variables" work quite well within the chosen framework: The long-run real wage elasticity is about minus .58 which seems to be a reasonable value. The differenced variable is highly significant and demonstrates the relevance of wages for employment. The long-run elasticity
of output is one, which is a very convenient result. The ECT term has as well a coefficient of expected magnitude.

Both variables concerning labour market policy are significant. However they work into the opposite direction. The sum of unemployment benefits and assistance (per unemployed) reduces the number of persons employed. This effect has been expected and is in accordance with explanations suggested by efficiency wage theory.

Active labour market policy helps to increase employment. The variable is positive and highly significant. To the best of my knowledge this is the first time that such an effect has been estimated with aggregate data. Wage subsidies and expenditures for training are not merely used to substitute workers whose employment is being subsidised for others for whom no subsidy is paid.

While the employment equation works quite well, this cannot be said about the wage equation. (Instrumented) employment has a strong negative impact on wages in the long run. However, the coefficient of the variable in differences is insignificant, rendering any conclusion speculative. By contrast GNP has a strong positive effect, which is also significant. As both variables are highly correlated (the employment equation shows a GNP-coefficient of one!), the difference is surprising. The coefficients of passive labour market policy have opposite signs in the two specifications and the t-value of the differenced variable is insignificant, which makes no conclusion possible. By contrast government expenditures are significant and positive, pointing to the wage-increasing impact of a relatively large budget.

5. Conclusion

The reported study investigates whether labour market policy affects employment and, in particular, whether the impact of active labour market policy (e.g. wage subsidies or expenditure for training) increases employment or simply leads to substitution effects among workers without any change in the total number of persons employed.
The empirical study finds a positive effect of active and a negative effect of passive labour market policy on employment. Job subsidies and qualification effects increase the total number of jobs in a society. However support of the unemployed by benefits and assistance has the opposite effect. These results together suggest the desirability of shifting policy more towards active measures instead of passive unemployment benefits.

It seems fair to say that previous evaluations of labour market policy have only looked at partial effects on the aggregate level. In particular substitution effects have been neglected, which are of prime importance, if the impact of active measures is to be assessed.

The present study aims at policy evaluation in a controversial area by use of some new data. The results are quite robust to changes in specification but it is obvious, that the limited number of observations makes it necessary to be cautious in drawing conclusions. The approach should be repeated with a longer time series, more countries, and more control variables.

The availability of more variables will possibly help to solve remaining simultaneity problems, since it can well be argued, that a number of variables are possibly endogenously determined in addition to wages and employment. For example, unemployment benefits are in some countries (in part) determined by previous remuneration. This points to a reverse effect, which causes passive labour market measures to depend on wages. The attempt to instrument this variable was, however, not successful: Due to the limited total number of variables the endogenous variables are highly collinear and an estimation is no longer possible. A similar problem arises with respect to output as employment and production are clearly simultaneously determined.
References


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Macroeconomics and the Wage Bargain. A
Modern Approach to Employment, Inflation
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The Labor Market Dynamics of Economic Restructuring. The United States and Germany in Transition
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Unemployment Insurance and Active Labor Market Policy. An International Comparison of Financing Systems
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