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Regional Development of Employment and Deconcentration Processes in Eastern Germany. An analysis with an econometric analogue to shift-share techniques

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**Uwe Blien, Katja Wolf:**

## **Regional Development of Employment and Deconcentration Processes in Eastern Germany.**

**An analysis with an econometric analogue to shift-share techniques**

Paper prepared for presentation at the ERSAs Congress 2001 in Zagreb

### **Abstract:**

This paper examines the development of regional employment in eastern Germany. An approach by Möller & Tassinopoulos is taken up for the analyses using very differentiated data from the employment statistics. This approach uses an econometric analogue of the common shift-share method.

The results show that deconcentration processes play a key role in explaining regional disparities. Inverse localisation and positive urbanisation effects are visible. On the one hand the development can be interpreted as a long-term consequence of the transformation, since the regions of the GDR were virtually characterised by monostructures. On the other hand similar but weaker deconcentration processes are currently occurring in general in European and North American regions and have also been shown for western Germany by Möller & Tassinopoulos. Such processes can be understood with approaches of “New Regional Economics” (based on Krugman et al.), whereas the general significance of industry specific effects, which is also becoming clear, can be explained using approaches of structural change, following amongst others Appelbaum & Schettkat. In addition, positive impulses of the qualification structure on regional development are detectable, which can be understood by endogenous growth theory.

(Acknowledgements see page 12)

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## 1. Introduction

With regard to key labour market indicators, the eastern part of the Federal Republic of Germany continues to be characterised by a large *discrepancy to western Germany*. The underemployment rate, which in addition to unemployment also includes the participants in employment and training measures, is more than twice as high in eastern Germany, at 24.26 %, than it is in western Germany, where the figure is 9.97 %.<sup>1</sup> In eastern Germany in 1998, income from employment subject to social security was only 75 % of the level in western Germany. The productivity gap was even greater, as in the manufacturing industry the median of the eastern German establishments was only 57 % of the corresponding value in western Germany (Bellmann, Brunsig 1999).

In view of the great difference existing between the eastern and the western part of the country<sup>2</sup> *disadvantaged regions in eastern Germany* are doubly affected: they are part of an area that continues to lag behind the west and are in addition to be found at the bottom of the range even there. This affects the living conditions and employment prospects of the people living there and gives cause for concern for the general development prospects of the regions affected: how should the disadvantaged regions in eastern Germany catch up if even the more positive examples can hardly manage to do so? For these reasons the analysis of the development of regional disparities in eastern Germany is of specific interest.

Consequently this paper deals with the internal differentiation of eastern Germany's labour markets and endeavours to find causal factors for it. Here the *development of employment* is regarded as an indicator for the general activity level of the eastern German economy. The factors considered important for development of employment are the regional industry and qualification structures, genuine regional factors, the distribution of establishment sizes and the concentration of the industries in the regions. The variables included are discussed in the following section against the background of economic theory.

## 2. Theoretical background

A trend connected with the regional concentration of industries is prominent in the analyses. The GDR showed a *large degree of regional specialisation*, for many regions it was almost possible to recognise monostructures. Already as early as the analysis carried out by Rudolph (1990) it was pointed out that considerable employment problems could be expected in such "one-sided" regions. When this monostructuring was reversed in the course of the nineties, industries experienced more intensive decline processes in the places where they were particularly heavily concentrated than they did elsewhere. The break-up of the state-owned industrial groupings ("Kombinate") had a parallel effect.

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<sup>1</sup> In each case the average from April 1999 until March 2000, source: own calculations on the basis of statistics from the Federal Employment Services

<sup>2</sup> Cf. Lange, Pugh (1998: 135) for an overview of the unification process in Germany and of the prospects of convergence and catch-up.

Processes of concentration and deconcentration are emphasised in many theoretical approaches which look at general constellations of conditions irrespective of the special situation of eastern Germany as a (post) transformation country. The classical approaches of location theory (for a modern version cf. Puu 1997) take into account agglomeration advantages, transportation costs and natural advantages of location to explain a concentration of economic activities. Decisions of firms about locations are affected by urbanisation effects, which apply to firms of all industries, and localisation effects, which affect only one industry (cf. Stahl 1995).

Agglomeration effects also play an important role in “new regional economics”, which goes back above all to Krugman (1991) and for which the monograph by Fujita, Krugman and Venables (1999) can be consulted as a reference. These papers start from the assumption of an economy in which monopolistic competition prevails and the factor of labour is highly mobile. The lower the transport costs and the higher the returns to scale in production are, the more likely it is that a differentiation between centre and periphery is developed. With suitable parameter constellations it is worthwhile for a firm to select a central location and to deliver to all customers in spatially decentral locations from there. For the case of localisation effects, Krugman (1991: 35ff) cites three effective factors: the advantage of a joint pool of labour, technological spillover effects and the utilisation of intermediate products.

If the conditions change, for example if the costs for starting up a firm fall, a reverse development towards lower rates of concentration can occur. This seems to be the case empirically, at least Krugman (1991) for the USA, Molle (1997) for Europe and Möller, Tassinopoulos (2000) for western Germany each reach this result. Instead of the localisation effects, agglomeration disadvantages have an effect at least at the level of individual industries. At present the question as to how far the modern communication technologies – in particular the Internet – lead to a re-evaluation of classical location factors is a very interesting one. Where direct face-to-face contact used to be necessary for the mentioned spillovers, today it may already be sufficient to have an e-mail connection.

The present results for deconcentration developments refer to the significance of the industries for the analysis of the development of employment. Industries, economic branches seem to be appropriate aggregates for portraying heterogeneous developments on products markets and integrating product-specific productivity developments. This was one of the motivations for numerous analyses of the shift-share type (Dunn 1960, cf. for applications to German regions amongst others Bröcker 1989, Tassinopoulos 1996, 2000, Blien, Hirschenauer 1999) in which the heterogeneity of the regional development of employment is related to the regional industry structures.

The approach is orientated towards structural models of economics. According to these models, industries are subject to specific business cycles, pass through relatively separate developments and are characterised by specific supply and demand conditions: they are affected by specific shocks which spread across the various markets. More recently Appelbaum & Schettkat presented a theoretical approach which permits a good understanding of the dynamics of the different industries. According to their argumentation the effects of technologi-

cal progress on the development of employment depend on the elasticity of demand on the industry-specific products market. If it is high, productivity increases lead to more employment, whereas if it is inelastic, the demand for labour falls (cf. Appelbaum, Schettkat 1993, 1999, further to this Blien 2001). With this approach it is possible to understand the relevance of regional industry structures. If industries are distributed differently according to regions – which is to be assumed in particular for eastern Germany – they will experience different developments.

The significance of the *qualification structure* for regional development arises from the approaches of endogenous growth theory. For models constructed following Lucas (1988), the concentration of human capital in an economy is closely connected, via an external effect, with the ‘engine’ that drives economic growth. Although a connection from here with employment growth has yet to be made, this is possible by assuming that one production factor, labour, is not being used to full capacity and that growth is then connected with an adjustment process in which higher rates of employment are built up.

The relevance of the *establishment size structure* for development of employment is more characterised by empirical arguments which have repeatedly confirmed a connection when it has been shown that small establishments grow more than large ones (cf. for eastern Germany Brix 1999, Blien, Brix, Preissler 2000). This fact has another specific significance in eastern Germany, since the large state-owned firms (“Kombinate”), which were characteristic of the socialist period raised the average establishment sizes to a higher level than is optimal under the conditions of a market economy. In this respect the relative advantage of smaller firms is a hint that a certain problem inherited from the transformation period is being overcome.

In conventional shift-share approaches, regional development of employment is split up into (at least) two components: a structural component, the proportional shift, that reflects the effects of the industry structure and a locational component, the differential shift, that incorporates all the ‘rest’ but is usually identified with genuine regional effects. Also in the context of this paper such *regional effects* that can not be explained by other variables are examined. However, a model based approach is used that controls for more such variables than is possible in the conventional shift-share analysis. The regional effects can be explained by the restricted mobility of the factors of production and by the regional segmentation of labour markets. Studies for the USA (Blanchard, Katz 1992) and for western Germany (Möller 1995b) showed that labour is more mobile than is capital.

The regional effects can be broken down somewhat further as different regions embody different *types of area*, each of which experience specific developments. Suburbanisation effects for example are known from descriptive observations: the large cities lose employment to a greater extent than the periphery of conurbations. In part it is again possible to assume developments associated with catching up processes, if a trend that has already been running for some time in western Germany becomes established in a relatively short time.

Finally the regional *wage level* represents an important variable which influences the development of employment. Wages are costs that are included in the price setting of firms via mark-up calculation and thus lead to higher or lower sales figures. This is anticipated by the

firms and is taken into account when making decisions regarding location and investments. Consequently it is to be expected that high wages have a negative effect on the regional development of employment. These arguments are the standard in many theories, for example in a regionalised version (Blien 2001) of the approach by Layard, Nickell und Jackman (1991).

### 3. Data

The employment statistics of the Federal Employment Services (Bundesanstalt für Arbeit – BA) are appropriate for analysing development of employment. These statistics include all employment relationships subject to social security. A new record is stored for each year up to 31 December and for every change of firm. There are several versions of the employment statistics; this type falls back on so-called quarterly statistics, which include cross-sections for 30 June each year.

There is, however, a problem here. In order to be able to conduct regional analyses on the basis of the employment statistics, in this case for 113 districts (“Landkreise” and “kreisfreie Staedte”), the data had to be classified into uniform regional units. This is not a trivial task as every year considerable restructuring is carried out in the context of territorial reforms. In problematic cases it is unclear whether for a given region a change in the employment figure is a result of a change in the boundaries of an area or a change in the labour market situation. Such problems were solved by reverting to individual data with co-operation between the statistics of the Federal Employment Services and the IAB (Institute for Employment Research) in a complicated procedure. The data represent the territorial situation of 1999 for eastern Germany. West Berlin was not included in the analyses.

The dependent variable of a regression analysis was the change in employment calculated as an annual growth rate per region and per industry, which was obtained by means of aggregation across all the workers of one region and one industry in one year. In order to achieve a high level of differentiation, 27 industries were examined. For the data, which therefore constitute a panel, 37 251 728 individual records about employment relationships in eastern Germany in the period from 1993 to 1999 were evaluated. The maximum figure resulting from the basic dimensions of the analysis is:

$$6 \text{ years} * 113 \text{ districts} * 27 \text{ industries} = 18306$$

In fact 18198 observations were available, since some of the possible combinations of dimensions do not occur. In the employment statistics a number of variables are available which are important as determinants for the development of employment. What was included were qualification details, wages and establishment sizes. These exogenous variables could be incorporated by constructing dummies or by calculating the proportion of workers with represent the respective category in the individual observation. The deflated regional average wage level per calendar day (per region, industry and year) is integrated in logarithmic form. The independent variables are each measured for the reference date of 30 June, the change in employment as the dependent variable refers to the subsequent period of one year.

The qualification details represent the proportions of employment taken up by people without any formal qualifications, with skilled worker qualifications (or the equivalent schooling qualifications) and with higher education qualifications. People for whom no qualification details were available were added to the group without any qualifications, as it is known from tests that in their structure they correspond closely to those without formal qualifications. For establishment sizes three categories were used: the proportion of firms with fewer than 20 employees, those with 20-99 employees and those with at least 100 employees. In addition the typology of the districts according to a common classification into nine types by the BBR (Görmar, Irmen 1991, Böltken, Irmen 1997) was also included among the exogenous variables:

Type of district (within larger regions) according to BBR classification:

Regions with large agglomerations	Regions with conurbational features	Regions of rural character
1 Core city	5 Central city	
2 Highly urbanised districts		
3 Urbanised districts	6 Urbanised districts	8 Urbanised districts
4 Rural districts	7 Rural districts	9 Rural districts

#### 4. Econometric approach

The conventional shift-share method is still generally used for analysing regional development of employment. In this method the growth rate of employment is split up into several components. The so-called proportional shift (corresponds to a structural component) shows how a region would develop if all the industries located there were to grow at the rates that they show in a superordinate reference area (in this case eastern Germany). A business cycle component incorporates fluctuations in the global growth rate of the reference area. The differential shift (corresponds to a locational component) finally represents the entire 'rest' of the development as far as it is not reflected in the other two components. The users of the approach then expect the development of employment to be split up into effects resulting from the industry structure and those resulting from the regions themselves.

The conventional shift-share method has often been criticised (Knudsen, Barff 1991). It does not permit a model-assisted procedure, the observation of causality is problematic and it is not possible to incorporate additional exogenous variables. A further problem is in particular the deterministic design of the procedure, which excludes the testing of hypotheses. A short reflection shows that above all the dominance of the differential shift, which is a typical result, is at least in part an artefact of the approach. Assume that the regional development occurs completely at random and that there are no formative effects at all on the development of employment which are connected with industries or regions. Then the structural component, the proportional shift in the shift-share analysis will correctly be calculated of being zero. For the locational component, i. e the differential shift, on the other hand, it will be cal-

culated that it contributes to 100 % of the development, since with the shift-share method random effects can not be separated from the region effects.

Instead of the conventional shift-share approach, the extension of a regression-analytical equivalent is used which was presented by Patterson (1991) and was applied to western Germany in analyses by Möller, Tassinopoulos (2000). In the approach used by Möller, Tassinopoulos (2000) the regional development is described as follows:

$$\hat{N}_{irt} = \alpha_i + \lambda_t + \delta_y + \kappa_r + \mu_i (a_{ir,0} - a_{i,0}) + \varepsilon_{irt} \quad (1)$$

Where:

$$\hat{N}_{irt} = \frac{N_{ir(t+1)} - N_{irt}}{N_{irt}}, \quad \text{the regional employment growth in the industry } i$$

$\alpha_i$ : the effect of the industry  $i$

$\lambda_t$ : the period effect at the point in time  $t$

$\delta_y$ : the effect of a specific region type  $y$  ( $y = 1 \dots 9$ )

$\kappa_r$ : the locational effect adjusted by effect of a specific region type for district  $r$

$\mu_i$ : the parameter for the structural adjustment for industry  $i$

$a_{ir,0}$ : the proportion of the workers of the  $i$ -th industry in  $r$  in the starting year 1993

$a_{i,0}$ : the proportion of overall employment of the  $i$ -th industry in the starting year

$\varepsilon_{irt}$ : a stochastic error term

Values of  $\mu_i < 0$  show the occurrence of deconcentration processes. In the sense of an extension of the approach to include variables which are considered important in economic theory, the following equations are used as an alternative basis:

$$\hat{N}_{irt} = \alpha_i + \lambda_t + \delta_y + \kappa_r + \sum_{j=1}^3 \beta_j^Q Q_{jirt} + \sum_{z=1}^3 \beta_z^B B_{zirt} + \beta^W W_{irt} + \varepsilon_{irt}, \quad (2)$$

$$\hat{N}_{irt} = \alpha_i + \lambda_t + \delta_y + \kappa_r + \mu_i (a_{ir,0} - a_{i,0}) + \sum_{j=1}^3 \beta_j^Q Q_{jirt} + \sum_{z=1}^3 \beta_z^B B_{zirt} + \varepsilon_{irt} \quad (3)$$

and:

$$\hat{N}_{irt} = \alpha_i + \lambda_t + \delta_y + \kappa_r + \mu_i (a_{ir,0} - a_{i,0}) + \sum_{j=1}^3 \beta_j^Q Q_{jirt} + \sum_{z=1}^3 \beta_z^B B_{zirt} + \beta^W W_{irt} + \varepsilon_{irt} \quad (4)$$

with:

$Q_{jirt}$ : Proportion of the qualification group  $j$  among all workers of the industry  $i$ , the region  $r$  and at the point in time  $t$

$B_{zirt}$ : Proportion of the establishment size of category  $z$  among all workers in  $irt$

$W_{irt}$ : log of average wage in  $irt$

$\beta$ : regression coefficients

A possible endogeneity problem in the case of model 4 (cf. Blien, Wolf 2001) has to be discussed later. All the estimates must be calculated as weighted least squares. Two reasons are important for this: firstly exorbitant jumps are possible in the growth rates in the case of in-



dustries that are very small in a region, which results in an outlier and a heteroskedasty problem. Secondly the growth rate of global quantities can not simply be gained by aggregating sub-units. Therefore, a weighting is needed:

$$\text{cov}(\varepsilon) = \tilde{\Omega} = \mathbf{G}\Omega\mathbf{G} \quad (5)$$

The variance-covariance matrix of the error terms is weighted with a matrix  $\mathbf{G}$ , which as a diagonal matrix includes the employment proportions  $g_{irt} = N_{irt} / N_t$ .

The models (1) – (4) are, however, plagued by perfect multicollinearity. Usually a fixed effect in each set that refers to the regions, industries etc. is excluded. Since the fixed effects are then measured in relation to this excluded reference category, it is then necessary to recalculate not only the effects but also the level of significance, if the grand mean is to be used as a reference (Haisken-DeNew, Schmidt 1997, Möller 1995a). A comparatively ‘elegant’ alternative is the use of identifying restrictions:

$$\sum_{r=1}^{113} \sum_{i=1}^{27} g_{ir} \kappa_r = 0 \quad (6)$$

$$\sum_{r=1}^{113} \sum_{i=1}^{27} g_{ir} \alpha_i = 0 \quad (7)$$

$$\sum_{r=1}^{113} \sum_{i=1}^{27} \tau_y g_{ir} \kappa_r = \delta_y \quad (8)$$

$$\sum_{j=1}^3 \beta_j^Q = 0 \quad (9)$$

$$\sum_{z=1}^3 \beta_z^B = 0 \quad (10)$$

The effect of these restrictions is that the incorporated fixed effects can each be given with reference to the grand mean. No further recalculations for the parameters or for the standard errors are necessary. The weights  $g_{ir}$  are set here as constant with respect to the reference year 1996 in the middle of the observation period.  $\tau_y$  is a selector variable that assumes the value 1 for a certain type of region  $y$  and is always zero otherwise. For the variables B and Q, which are also included, analogous restrictions were defined

The selected procedure leads to a restricted weighted least squares estimate of a regression model without an intercept. One can follow Greene & Seaks (1991) as regards to the numerical calculations. Compared with the unweighted estimate two more equations for each set of fixed effects arise than with the usual strategy, which consists of excluding dummies. Firstly one parameter more is to be determined. Secondly a restriction is to be incorporated to which a Lagrange multiplier is associated.

## 5. Results

Table 1 shows the results for three models from the equations (1) – (3). The first one follows the conventional shift-share analysis relatively closely, since it includes only one set of variables, which can vary continuously. This is the model from equation (1), which was used by Möller & Tassinopoulos. A negative coefficient  $\mu_i$  of the adjustment variables – indicated by “Conc\_...” suggests that a deconcentration process is occurring in the industry concerned. In contrast, model (2) does not include any structural adjustment effects  $\mu_i$ , but includes the continuously varying variables for qualification levels  $Q_j$  and establishment sizes  $B_z$ . Model (3) is estimated with both groups of variables. The period effects (year93... year98) give the estimated values for global employment growth directly only in Model (1). In the other two models the corresponding value has to be calculated by using the values of the variables indicating qualifications and establishment sizes.

In Table 2 Model (3) is used for a break-down of the estimated development for individual regions. The actual values of the variables are multiplied by the coefficients. Summing up for all the industries in a region gives a table which is a close analogue to the results of the conventional shift-share technique. The values determined for the establishment size and for the human capital were left out for reasons of space. The column “structural effect” shows the combined (added) effect of all the industries in a region. For the structural effect  $S$  of an  $r$  the result is thus:

$$S_r = \sum_t S_{rt} = \sum_t \sum_i \alpha_i a_{irt}$$

The concentration effect shows the consequences of industry concentrations analogously. The adjusted structural effect is the sum of the structural effect and the concentration effect. The adjusted regional effect results from the effect of the type of region  $\delta_y$  and the regional effect  $\kappa_r$  (which may be interpreted as an adjusted differential shift from the shift-share analysis). The global effect shows the effect of the overall development for the region concerned.

The generally very small difference between the estimated development and the actual development shows that the model fits well whereas a standard  $R^2$  is not available for this type of analysis.

In the Model (1) without structural adjustment, the industry effects are obviously overestimated. They are clearly smaller when structural adjustment variables are included. In the complete Model (3) nine out of 27 are negatively and two are positively significant. The coefficients show relatively strong effects of the structural adjustment. On the other hand, Table 2 clearly shows that the structural adjustment variables often point in the opposite direction as the effects of the industries do. For the larger cities the structural adjustment is frequently negative, whereas the effects of the industries indicate a more positive development. This is further proof of the deconcentration processes that are occurring. The opposing sign of the aggregated effects of the two groups of variables and the considerable differences between Models (2) and (3) in particular as regards the industry effects, where in some cases the sign

become reversed, show that a model without the structural adjustment effects is not correctly specified.

On a more descriptive level, following Molle (1997), the concentration of industries within regions can be described by the specialisation coefficient SC. The concentration of industries within regions is described by the location coefficient LC.

$$SC_r = \frac{1}{2} \sum_i \left| \frac{N_{ir}}{N_r} - \frac{N_i}{N} \right| \quad LC_i = \frac{1}{2} \sum_r \left| \frac{N_{irt}}{N_i} - \frac{N_r}{N} \right|$$

On the basis of these coefficients the trend towards deconcentration is also visible. Concentration as measured by the specialisation coefficient SC fell in 76 of 113 districts in the period from 1993 until 1999. The maximum value of the coefficient decreased from 0.35 to 0.28. The location coefficient decreased in 17 of 27 industries.

For the distribution of establishment size in a region there are relatively strong effects which show a better development for regions with many small firms. However, it is not possible to separate completely the structural adjustment and the establishment size. The formerly state-owned industrial groupings and in some cases also their descendants were still comparatively large in 1993. Their shrinkage is mainly reflected in the negative coefficients of the highest category of establishment size, but may be partly contribute to the deconcentration process. Strong deglomeration effects are visible, since new firms are more decentralised located with respect to their industry structure.

A better qualification structure has a predominantly positive effect on the development of employment. Whereas the effect of the proportion of highly qualified workers, i.e. workers with university and polytechnic qualifications, is not significant and is close to zero, the proportion of qualified employees with a vocational degree has a positive effect on the development of employment.

The development of the industries differs greatly. Individual industries show a development of employment which is equivalent to a “free fall”. This applies for example to the chemical industry and to engineering. In contrast, for other industries, especially in the service sector, it is possible to recognise positive development patterns. The banking and insurance sector is being built up, business-related services and education are growing rapidly. At regional level, in the case of the structural effect in Table 2 these differences show only to a lesser extent. As some of the industries in a region show opposite developments, the increase and reduction of employment partly offset each other. This is the reason why the proportional effect does not catch on more intensively in the classical shift-share analysis.

The results for the region types show structures which diverge clearly from western Germany. Whereas Möller & Tassinopoulos were able to identify an actual trend in favour of rural areas in western German, here they mainly receive a negative sign. The diagnosis of unfavourable developments in eastern Germany’s rural areas, which was already made in Blien & Hirschenauer (1994) and again in Blien & Hirschenauer (1999), can be confirmed once again here.

What is surprising in the present analysis is the positive value for the core cities, which does not confirm the trends with regard to suburbanisation effects which were determined on the basis of univariate developments. The univariate trend is obviously explained entirely by the unfavourable structure of employment in the core cities. Here the deconcentration processes have a particularly large effect. The results must then be interpreted in such a way that very negative localisation effects that act at industry level stand opposed to weakly positive urbanisation effects at regional level.

Finally it is necessary to regard the effect of regional wages. In the analyses a problem comes to light which was already mentioned when the models were presented. The wage is to be seen as endogenous in an analysis of regional development, as on the one hand it represents determinants of the development of employment but on the other hand is itself a result of the same economic process. In regression analyses with Model (4), the wage receives a positive coefficient (0,3065, t-value: 22,49), this points to an endogeneity problem. The wage does not (only) represent the cost factor in the analyses but is more a measure of the quality of the jobs: good quality is connected with high employment growth and high remuneration. Also other parametrisations do not initially change the significantly positive wage effect in any way: an instrumental variable estimate with the occupational status as a set of additional instruments produces a similar result.

A different strategy to control for endogeneity is the identification of 'high wage' or 'low wage' regions. The description of such wage levels is not intended here to constitute an evaluation of the wage with regard to the process of catching-up with western Germany or with regard to the meeting of needs which the wage makes possible. The yardstick is solely the eastern German average. In order to determine regional deviations from this average value, a regression is estimated with the wage as a dependent variable and with the independent variables as in model (2). However, for each year an independent cross-section including regional effects is taken as a data basis. The regional effects which vary between  $-0.09$  and  $0.09$  are then integrated in model (4) instead of the wage variable. To give room for causal effects the wage variable is integrated with a lag of one year. In this case the coefficient that indicates high wage areas is close to zero (0,0149) and no longer significant (t-value: 0,22). One explanation for this result, i. e. the coefficient still being not negative, is that the effects of the wage on employment are too weak to be detectable because the regional wage levels differ only relatively slightly. The differences are smaller than in Western Germany (cf. Blien 2001). Because of lack of space the complete estimates from model (4) in its different variants are not shown in the tables.

## 6. Conclusions

The present results for the regions of eastern Germany are consistent with a point of view that describes the differing paths of employment development as at least partly caused by a deconcentration process. Employment is decreased to larger extent if an industry is locally concentrated. Therefore the process can be described as caused by *reverse localisation effects*, whilst weaker *urbanisation effects* continue to be effective. The individual effects in “New Regional Economics” as started by Krugman are not predicted as to their direction, no test of the theory can take place here. The various effects can, however, be interpreted in the sense of economic theory.

According to this it can be argued that with the development of new communication and information technologies, in particular with the Internet, a re-evaluation of location factors occurs which is associated with the post-transformation process in the eastern German economy. The new communication technologies, but also other new technological developments, permit a more decentralised organisation of production. Regional monostructures are no longer functional. The costs involved in setting up an additional new location for a certain production are falling. Over and above that the break-up of the formerly state-owned industrial groupings and in part the collapse of their successors have a parallel effect.

On the other hand, the occurrence of urbanisation effects and of problems of the rural areas can be attributed to deficits of the peripheral regions of eastern Germany in the infrastructure. The disadvantaged regions fall below a certain critical mass of impulses in economic development, which is associated with low population densities and the lack of cores for the development (cf. Steiner et al. 1998: 172ff.).

Whilst negative effects of above-average wages can not be shown, considerable effects of the industry structure are visible. The structural change occurring as a consequence of the transformation is burdened with severe problems. The qualification structure of the workers is of considerable importance for the development of employment. In particular large proportions of qualified employees with apprenticeship training and with equivalent qualifications are associated with higher employment growth rates. This is consistent with theories of endogenous growth.

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**Table 1:** Shift-share analogous regression models:

Model 1: with structural adjustment variables

Model 2: with establishment sizes and qualification structures

Model 3: with structural adj. variables, est. sizes and qualification structures

<i>Endogenous variable: employment (shift-share)</i>	<i>Model 1 coefficients</i>	<i>t-values</i>	<i>Model 2 coefficients</i>	<i>t-values</i>	<i>Model 3 coefficients</i>	<i>t-values</i>
Year93	0,0018	0,80	-0,0350	-6,57	-0,0304	-5,52
Year94	0,0066	3,00	-0,0404	-7,40	-0,0348	-6,15
Year95	-0,0138	-6,25	-0,0615	-11,27	-0,0563	-9,98
Year96	-0,0385	-17,46	-0,0875	-16,26	-0,0827	-14,81
Year97	-0,0138	-6,26	-0,0641	-11,88	-0,0595	-10,61
Year98	-0,0127	-5,70	-0,0631	-11,60	-0,0591	-10,44
Agriculture and forestry	-0,0258	-2,43	-0,0604	-7,83	-0,0304	-2,81
Energy industry and mining	-0,0345	-3,80	-0,0174	-2,14	0,0420	4,24
Chemical industry	-0,1276	-5,07	-0,1446	-10,64	-0,0847	-3,36
Manufacture of rubber and plastic products	0,0359	0,83	0,0592	1,83	0,0293	0,68
Stones and earth	-0,0082	-0,25	-0,0091	-0,39	-0,0208	-0,64
Man. of glass and ceramic prod's	-0,0194	-0,32	-0,0144	-0,45	0,0183	0,30
Manufacture and processing of metals	0,0057	0,49	-0,0150	-1,51	-0,0093	-0,80
Man. of machinery and equipment	-0,0833	-6,68	-0,0907	-9,74	-0,0785	-6,27
Man. of motor vehicles	0,0146	1,27	0,0111	1,15	-0,0031	-0,27
Man. of office machinery, EDP, electronics	-0,0292	-4,54	-0,0288	-5,40	-0,0305	-4,76
Manufacture of jewellery, toys	-0,0204	-0,14	0,0201	0,25	-0,0336	-0,23
Man. of wood and wooden prod's	0,0046	0,20	-0,0252	-1,40	-0,0447	-1,99
Paper, paper products, printing	-0,0274	-0,71	-0,0267	-0,84	-0,0438	-1,15
Leather and textile industry	-0,0691	-2,08	-0,0290	-1,71	-0,0816	-2,48
Manufacture of food products and tobacco products	-0,0097	-0,95	-0,0117	-1,19	-0,0255	-2,49
Construction	-0,0102	-5,55	-0,0262	-10,24	-0,0296	-11,06
Commerce	0,0052	2,36	-0,0378	-10,85	-0,0394	-10,18
Transport and telecommunications	-0,0455	-11,68	-0,0298	-9,33	-0,0353	-8,05
Banking and insurance	0,0456	3,71	0,0570	6,89	0,0540	4,36
Hotels and catering	0,0596	7,21	0,0555	6,36	0,0417	4,46
Health and social work	0,0563	21,30	0,0692	24,66	0,0636	20,70
Business-related services	0,0703	16,96	0,0647	21,90	0,0578	12,06
Education	0,0507	13,51	0,0918	16,40	0,1049	15,49
Leisure-related services	0,0172	0,70	0,0678	5,61	0,0411	1,68
Household-related services	0,0252	1,24	-0,0052	-0,26	-0,0125	-0,61
Other social services	0,0530	6,79	0,0410	7,33	0,0643	8,24
Regional/local authorities and social insurance	-0,0743	-35,89	-0,0350	-10,68	-0,0356	-8,82
Conc_agriculture and forestry	-0,5055	-2,09			-0,8466	-3,53
Conc_energy industry and mining	-0,9314	-17,09			-0,6629	-11,64
Conc_chemical industry	-0,4030	-3,82			-0,3054	-2,92
Conc_manufacture of rubber and plastic products	-0,5501	-0,19			2,5523	0,88
Conc_stones and earth	-0,4396	-0,20			1,1930	0,53
Conc_man. of glass and ceramic products	-1,0081	-0,93			-0,7755	-0,72
Conc_manufacture and processing of metals	-1,1305	-4,33			-0,3500	-1,33
Conc_man. of machinery and equipment	-1,5969	-3,72			-0,7700	-1,80
Conc_man. of motor vehicles	-0,4716	-1,80			0,3847	1,45

Conc_man. of office machinery, EDP, electronics, precision eng.	-0,6922	-3,32			-0,1335	-0,64
Conc_man. of jewellery, toys	0,5346	0,19			1,1894	0,44
Conc_man. of wood and wooden products	0,1484	0,10			1,8809	1,29
Conc_paper, paper products and printing	-0,6630	-0,25			1,5065	0,58
Conc_leather and textile industry	0,4041	0,71			1,0200	1,82
Conc_man. of food products and tobacco products	0,9006	1,23			2,2591	3,10
Conc_construction	0,0346	0,54			0,2340	3,48
Conc_commerce	-0,8782	-5,69			-0,6563	-4,20
Conc_transport and telecommunications	-0,6143	-5,15			-0,1619	-1,33
Conc_banking and insurance	-0,4559	-0,28			-0,1849	-0,12
Conc_hotels and catering	0,1190	0,28			0,3707	0,87
Conc_health and social work	-0,8521	-4,48			-0,4469	-2,34
Conc_business-related services	-0,1734	-1,58			0,0388	0,35
Conc_education	-0,9909	-6,69			-0,9294	-6,25
Conc_leisure-related services	0,2225	0,13			1,4703	0,88
Conc_household-related services	-4,9722	-0,46			0,5157	0,05
Conc_other social services	-3,0260	-5,15			-3,0593	-5,25
Conc_regional/local authorities and social insurance	-0,2445	-5,22			-0,2856	-5,97
Core cities	-0,0080	-9,78	0,0049	5,07	0,0054	4,83
Highly urbanised districts in regions with large agglomerat.	0,0073	1,45	-0,0047	-0,93	-0,0060	-1,19
Urbanised districts in regions with large agglomerations	0,0044	2,25	-0,0046	-2,37	-0,0042	-2,11
Rural districts in regions with large agglomerations	0,0074	5,09	0,0080	5,52	0,0061	4,19
Central cities in regions with conurbational features	-0,0044	-3,81	0,0031	2,66	0,0042	3,28
Urbanised districts in regions with conurbational features	-0,0002	-0,13	-0,0056	-4,01	-0,0066	-4,57
Rural districts in regions with conurbational features	0,0030	1,97	-0,0015	-0,99	-0,0011	-0,71
Urbanised districts in rural regions	-0,0034	-1,77	-0,0058	-3,04	-0,0074	-3,91
Rural districts in rural regions	-0,0013	-0,39	-0,0036	-1,07	-0,0043	-1,25
Employees without qualifications			-0,1188	-13,60	-0,0934	-9,97
Qualified employees			0,1092	12,92	0,1029	11,76
Highly qualified employees			0,0096	0,88	-0,0095	-0,83
Establishment size 1-19			0,0813	7,64	0,0835	7,23
Establishment size 20-99			0,0216	2,17	0,0098	0,95
Establishment size >99			-0,1029	-19,35	-0,0933	-15,21
11200 Berlin-East, Stadt	-0,0088	-6,64	0,0142	9,02	0,0128	7,32
12051 Brandenburg, Stadt	-0,0574	-3,93	-0,0294	-2,02	-0,0318	-2,19
12052 Cottbus, Stadt	-0,0080	-1,06	0,0087	1,18	0,0070	0,95
12053 Frankfurt (Oder), Stadt	-0,0034	-0,28	0,0107	0,89	0,0146	1,21
12054 Potsdam, Stadt	-0,0155	-2,44	-0,0145	-2,71	0,0028	0,43
12060 Kreis Barnim	-0,0173	-1,81	-0,0115	-1,21	-0,0142	-1,50
12061 Kreis Dahme-Spreewald	0,0290	2,94	0,0414	4,21	0,0382	3,91
12062 Kreis Elbe-Elster	0,0021	0,19	-0,0129	-1,17	-0,0163	-1,49
12063 Kreis Havelland	0,0235	1,82	0,0188	1,46	0,0162	1,27
12064 Kreis Maerkisch-Oderland	-0,0004	-0,05	0,0076	0,94	0,0056	0,69
12065 Kreis Oberhavel	0,0195	2,07	0,0295	3,15	0,0252	2,70
12066 Kreis Oberspreewald-Laus.	-0,0181	-2,04	0,0384	4,18	0,0372	4,03
12067 Kreis Oder-Spree	-0,0052	-0,62	-0,0026	-0,32	-0,0042	-0,50
12068 Kreis Ostprignitz-Ruppin	0,0120	0,93	0,0028	0,22	0,0055	0,43
12069 Kreis Potsdam-Mittelmark	0,0297	3,78	0,0247	3,20	0,0190	2,42

12070 Kreis Prignitz	-0,0021	-0,14	-0,0200	-1,26	-0,0156	-0,99
12071 Kreis Spree-Neisse	0,0043	0,47	-0,0221	-2,61	0,0144	1,57
12072 Kreis Teltow-Flaeming	0,0130	1,23	0,0079	0,75	0,0064	0,61
12073 Kreis Uckermark	-0,0013	-0,13	0,0028	0,27	0,0014	0,13
13001 Greifswald, Hansestadt	-0,0155	-0,81	-0,0372	-2,09	0,0009	0,05
13002 Neubrandenburg, Stadt	-0,0158	-1,38	0,0039	0,34	0,0043	0,37
13003 Rostock, Hansestadt	-0,0178	-3,54	-0,0187	-3,84	-0,0148	-2,97
13004 Schwerin Stadt	-0,0122	-1,59	0,0083	1,08	0,0111	1,44
13005 Stralsund, Hansestadt	-0,0208	-1,49	-0,0022	-0,16	-0,0074	-0,54
13006 Wismar, Hansestadt	-0,0165	-0,62	-0,0001	-0,01	-0,0090	-0,34
13051 Kreis Bad Doberan	0,0546	3,69	0,0433	2,94	0,0398	2,70
13052 Kreis Demmin	0,0194	1,13	0,0018	0,11	0,0062	0,36
13053 Kreis Guestrow	0,0022	0,16	-0,0075	-0,56	-0,0067	-0,50
13054 Kreis Ludwigslust	0,0225	1,72	0,0225	1,73	0,0158	1,22
13055 Kreis Mecklenburg-Strelitz	-0,0066	-0,37	-0,0198	-1,12	-0,0186	-1,06
13056 Kreis Mueritz	0,0151	0,70	-0,0027	-0,13	-0,0010	-0,05
13057 Kreis Nordvorpommern	0,0248	1,72	0,0117	0,81	0,0105	0,73
13058 Kreis Nordwestmecklenbg	0,0283	1,79	0,0238	1,52	0,0195	1,23
13059 Kreis Ostvorpommern	0,0091	0,60	-0,0063	-0,41	-0,0066	-0,43
13060 Kreis Parchim	0,0348	2,18	0,0202	1,26	0,0212	1,33
13061 Kreis Ruegen	-0,0076	-0,35	-0,0195	-0,98	-0,0280	-1,28
13062 Kreis Uecker-Randow	0,0209	1,19	0,0042	0,24	0,0064	0,37
14161 Chemnitz, Stadt	-0,0143	-3,92	-0,0097	-2,80	-0,0071	-1,94
14166 Plauen, Stadt	-0,0015	-0,09	0,0019	0,11	-0,0010	-0,06
14167 Zwickau, Stadt	0,0138	1,43	0,0191	2,01	0,0143	1,49
14171 Kreis Annaberg	0,0121	0,69	-0,0003	-0,02	-0,0038	-0,22
14173 Kreis Chemnitzer Land	0,0061	0,72	-0,0055	-0,65	-0,0077	-0,91
14177 Kreis Freiberg	0,0001	0,01	-0,0111	-1,07	-0,0091	-0,88
14178 Vogtlandkreis	0,0000	0,01	-0,0181	-2,30	-0,0235	-2,96
14181 Mittlerer Erzgebirgskreis	-0,0031	-0,18	-0,0115	-0,68	-0,0125	-0,74
14182 Kreis Mittweida	0,0098	0,78	-0,0083	-0,66	-0,0097	-0,78
14188 Kreis Stollberg	0,0094	0,57	-0,0034	-0,21	-0,0031	-0,19
14191 Kreis Aue-Schwarzenberg	0,0047	0,41	-0,0158	-1,38	-0,0144	-1,26
14193 Kreis Zwickauer Land	0,0063	0,48	-0,0131	-1,01	-0,0175	-1,33
14262 Dresden, Stadt	-0,0005	-0,25	0,0073	3,32	0,0081	3,45
14263 Goerlitz, Stadt	-0,0221	-1,10	-0,0187	-0,94	-0,0213	-1,07
14264 Hoyerswerda, Stadt	-0,1026	-4,51	-0,0472	-2,07	-0,0474	-2,09
14272 Kreis Bautzen	-0,0080	-0,88	-0,0077	-0,85	-0,0105	-1,16
14280 Kreis Meissen	0,0097	1,01	0,0116	1,21	0,0085	0,89
14284 Niederschles. Oberlausitzk.	0,0041	0,27	0,0013	0,08	-0,0067	-0,45
14285 Kreis Riesa-Grossenhain	-0,0046	-0,39	-0,0040	-0,34	-0,0088	-0,74
14286 Kreis Loebau-Zittau	0,0043	0,41	-0,0100	-0,97	-0,0123	-1,20
14287 Kreis Saechsische Schweiz	-0,0105	-1,04	-0,0088	-0,88	-0,0175	-1,75
14290 Weisseritzkreis	0,0147	1,11	0,0097	0,74	0,0045	0,35
14292 Kreis Kamenz	0,0265	2,43	0,0180	1,66	0,0120	1,11
14365 Leipzig, Stadt	-0,0079	-3,49	0,0009	0,40	-0,0021	-0,92
14374 Kreis Delitzsch	0,0195	1,86	0,0063	0,60	0,0082	0,79
14375 Kreis Doebeln	0,0078	0,41	0,0002	0,01	-0,0006	-0,03
14379 Kreis Leipziger Land	0,0100	1,19	-0,0198	-2,43	0,0039	0,46
14383 Muldentalkreis	0,0100	0,80	-0,0178	-1,43	-0,0183	-1,47
14389 Kreis Torgau-Oschatz	0,0106	0,71	-0,0077	-0,51	-0,0084	-0,56
15101 Dessau, Stadt	0,0109	0,80	0,0216	1,59	0,0245	1,80
15151 Kreis Anhalt-Zerbst	0,0028	0,14	-0,0152	-0,75	-0,0138	-0,68
15153 Kreis Bernburg	-0,0244	-1,18	-0,0217	-1,05	-0,0314	-1,53
15154 Kreis Bitterfeld	-0,0712	-6,88	-0,0495	-4,80	-0,0586	-5,68
15159 Kreis Koethen	0,0090	0,39	-0,0038	-0,16	-0,0021	-0,09
15171 Kreis Wittenberg	0,0029	0,25	-0,0011	-0,09	-0,0087	-0,74
15202 Halle (Saale), Stadt	-0,0137	-3,79	-0,0027	-0,74	-0,0021	-0,56
15256 Burgenlandkreis	-0,0223	-2,28	-0,0252	-2,57	-0,0304	-3,12
15260 Kreis Mansfelder Land	-0,0013	-0,10	-0,0141	-1,04	-0,0076	-0,57



15261 Kreis Merseburg-Querfurt	0,0035	0,38	0,0138	1,57	0,0190	2,05
15265 Saalkreis	0,0808	3,90	0,0621	3,06	0,0648	3,16
15266 Kreis Sangerhausen	-0,0250	-1,22	-0,0299	-1,47	-0,0300	-1,48
15268 Kreis Weissenfels	0,0104	0,50	-0,0033	-0,16	-0,0047	-0,23
15303 Magdeburg, Stadt	-0,0026	-0,72	0,0105	2,96	0,0111	3,06
15352 Kreis Aschersleben-Stassf.	-0,0079	-0,57	-0,0054	-0,39	-0,0052	-0,38
15355 Boerdekreis	0,0059	0,29	0,0071	0,35	0,0037	0,18
15357 Kreis Halberstadt	0,0092	0,49	0,0039	0,21	0,0044	0,24
15358 Kreis Jerichower Land	0,0017	0,12	0,0023	0,16	0,0013	0,09
15362 Ohrekreis	0,0335	2,35	0,0316	2,23	0,0293	2,08
15363 Kreis Stendal	0,0017	0,17	-0,0077	-0,78	-0,0051	-0,52
15364 Kreis Quedlinburg	0,0049	0,27	-0,0084	-0,46	-0,0024	-0,13
15367 Kreis Schoenebeck	-0,0108	-0,55	-0,0043	-0,22	-0,0063	-0,32
15369 Kreis Wernigerode	-0,0103	-0,66	-0,0127	-0,82	-0,0152	-0,98
15370 Altmarkkreis Salzwedel	0,0238	1,60	0,0014	0,09	0,0083	0,56
16051 Erfurt, Stadt	0,0094	2,28	0,0209	5,09	0,0191	4,62
16052 Gera, Stadt	-0,0271	-2,90	-0,0279	-3,00	-0,0266	-2,87
16053 Jena, Stadt	0,0179	1,66	0,0074	0,74	0,0231	2,15
16054 Suhl, Stadt	-0,0264	-1,33	-0,0183	-0,92	-0,0147	-0,74
16055 Weimar, Stadt	-0,0259	-1,61	-0,0146	-0,91	-0,0055	-0,35
16056 Eisenach, Stadt	-0,0208	-1,01	-0,0056	-0,27	-0,0040	-0,20
16061 Kreis Eichsfeld	0,0154	1,02	-0,0102	-0,67	-0,0126	-0,84
16062 Kreis Nordhausen	0,0010	0,07	0,0022	0,16	0,0010	0,07
16063 Wartburgkreis	0,0252	1,95	0,0064	0,50	0,0035	0,27
16064 Unstrut-Hainich-Kreis	0,0101	0,78	-0,0160	-1,26	-0,0115	-0,90
16065 Kyffhaeuserkreis	0,0097	0,58	-0,0139	-0,83	-0,0097	-0,58
16066 Kreis Schmalkalden-Mein.	0,0049	0,47	-0,0130	-1,25	-0,0165	-1,59
16067 Kreis Gotha	0,0123	1,19	0,0008	0,08	0,0026	0,25
16068 Kreis Soemmerda	0,0049	0,22	-0,0129	-0,59	-0,0130	-0,60
16069 Kreis Hildburghausen	0,0080	0,32	-0,0157	-0,63	-0,0169	-0,69
16070 Ilm-Kreis	-0,0004	-0,03	-0,0164	-1,16	-0,0182	-1,29
16071 Kreis Weimarer Land	0,0398	2,14	0,0220	1,19	0,0197	1,07
16072 Kreis Sonneberg	-0,0013	-0,05	-0,0186	-0,70	-0,0207	-0,77
16073 Kreis Saalfeld-Rudolstadt	-0,0098	-0,80	-0,0173	-1,42	-0,0228	-1,89
16074 Saale-Holzland-Kreis	0,0090	0,51	-0,0102	-0,58	-0,0137	-0,78
16075 Saale-Orla-Kreis	0,0021	0,13	-0,0156	-0,99	-0,0206	-1,31
16076 Kreis Greiz	-0,0070	-0,58	-0,0143	-1,20	-0,0254	-2,10
16077 Kreis Altenburger Land	0,0053	0,38	-0,0069	-0,49	-0,0088	-0,63

**Table 2: Shift-share analogous decomposition of the development for individual regional units**

District	actual development	estimated development	structural component	Concentration effect	Adjusted structural component	Regional effect	Region type effect	Adjusted region effect	Global effect
11200 Berlin-Ost, Stadt	-0,161	-0,158	0,040	-0,027	0,013	0,069	0,030	0,099	-0,072
12051 Brandenburg a.d.H.	-0,279	-0,337	0,001	-0,017	-0,016	-0,166	0,032	-0,134	-0,068
12052 Cottbus, Stadt	-0,201	-0,207	0,034	-0,035	-0,001	0,038	0,023	0,061	-0,072
12053 Frankfurt (Oder), Stadt	-0,162	-0,084	0,056	-0,044	0,012	0,084	0,035	0,120	-0,078
12054 Potsdam, Stadt	-0,227	-0,234	0,034	-0,054	-0,020	0,015	0,029	0,044	-0,071
12060 Kreis Barnim	-0,070	-0,110	-0,006	0,011	0,005	-0,083	0,036	-0,047	-0,079
12061 Kreis Dahme-Spreewald	0,146	0,178	-0,040	0,005	-0,035	0,255	0,041	0,296	-0,094
12062 Kreis Elbe-Elster	-0,106	-0,072	-0,069	0,010	-0,059	-0,097	-0,007	-0,103	-0,081
12063 Kreis Havelland	0,109	0,078	-0,040	-0,006	-0,046	0,104	0,040	0,144	-0,090
12064 Kreis Maerkisch-Oderland	0,039	-0,023	-0,026	-0,012	-0,039	0,036	0,040	0,076	-0,094
12065 Kreis Oberhavel	0,058	0,053	-0,053	0,007	-0,045	0,158	0,038	0,197	-0,088
12066 Kreis Oberspreewald-Lausitz	-0,167	-0,218	-0,007	-0,092	-0,098	0,223	-0,007	0,216	-0,082
12067 Kreis Oder-Spree	-0,062	-0,099	-0,017	-0,014	-0,031	-0,025	0,036	0,011	-0,080
12068 Kreis Ostprignitz-Ruppin	0,043	0,000	-0,005	-0,028	-0,034	0,035	-0,027	0,008	-0,089
12069 Kreis Potsdam-Mittelmark	0,186	0,148	-0,033	0,000	-0,033	0,129	0,042	0,171	-0,096
12070 Kreis Prignitz	-0,081	-0,145	-0,031	-0,038	-0,068	-0,093	-0,026	-0,119	-0,082
12071 Kreis Spree-Neisse	-0,209	-0,251	0,013	-0,165	-0,152	0,082	-0,006	0,076	-0,074
12072 Kreis Teltow-Flaeming	0,114	0,048	-0,042	0,015	-0,027	0,041	0,040	0,081	-0,092
12073 Kreis Uckermark	-0,066	-0,125	-0,039	-0,022	-0,061	0,008	-0,025	-0,017	-0,081
13001 Greifswald, Hansestadt	-0,133	-0,189	0,124	-0,155	-0,031	0,048	-0,024	0,024	-0,074
13002 Neubrandenburg, Stadt	-0,111	-0,162	0,048	-0,023	0,025	0,024	-0,024	0,000	-0,077
13003 Rostock, Hansestadt	-0,210	-0,213	0,059	-0,036	0,023	-0,080	0,023	-0,058	-0,073
13004 Schwelin, Landeshauptstadt	-0,189	-0,203	0,027	-0,033	-0,006	0,061	-0,041	0,020	-0,074
13005 Stralsund, Hansestadt	-0,143	-0,184	0,041	0,014	0,055	-0,042	-0,024	-0,067	-0,076
13006 Wismar, Hansestadt	-0,154	-0,175	0,043	0,026	0,069	-0,050	-0,041	-0,091	-0,073
13051 Kreis Bad Doberan	0,369	0,376	-0,026	0,000	-0,027	0,288	-0,008	0,280	-0,105
13052 Kreis Demmin	0,030	0,028	-0,032	-0,039	-0,072	0,040	-0,027	0,012	-0,089
13053 Kreis Guestrow	-0,028	-0,060	0,001	-0,036	-0,035	-0,040	-0,007	-0,047	-0,082
13054 Kreis Ludwigslust	0,077	0,072	-0,035	0,026	-0,009	0,101	-0,027	0,074	-0,089
13055 Kreis Mecklenburg-Strelitz	-0,030	-0,154	-0,031	-0,039	-0,070	-0,118	-0,027	-0,145	-0,089
13056 Kreis Mueritz	0,056	-0,026	0,007	-0,037	-0,030	-0,006	-0,028	-0,034	-0,091
13057 Kreis Nordvorpommern	0,073	0,098	-0,023	-0,006	-0,028	0,067	-0,027	0,040	-0,090
13058 Kreis Nordwestmecklenburg	0,147	0,076	-0,043	-0,009	-0,052	0,128	-0,049	0,079	-0,094
13059 Kreis Ostvorpommern	0,102	-0,002	0,037	-0,017	0,020	-0,043	-0,028	-0,070	-0,092
13060 Kreis Parchim	0,138	0,144	-0,030	-0,021	-0,051	0,141	-0,028	0,113	-0,094
13061 Kreis Ruegen	0,007	-0,050	0,045	0,024	0,070	-0,167	-0,026	-0,193	-0,081
13062 Kreis Uecker-Randow	0,005	0,004	0,017	-0,045	-0,029	0,041	-0,027	0,014	-0,089
14161 Chemnitz, Stadt	-0,217	-0,227	0,002	-0,036	-0,035	-0,038	0,029	-0,009	-0,071
14166 Plauen, Stadt	-0,095	-0,111	-0,026	0,022	-0,004	-0,006	-0,039	-0,044	-0,079
14167 Zwickau, Stadt	-0,027	-0,024	0,023	0,007	0,030	0,082	0,024	0,106	-0,078
14171 Kreis Annaberg	0,054	0,016	-0,052	0,040	-0,012	-0,024	-0,026	-0,050	-0,087
14173 Kreis Chemnitzer Land	0,080	0,032	-0,049	0,060	0,011	-0,050	-0,039	-0,088	-0,090
14177 Kreis Freiberg	-0,024	-0,031	-0,003	-0,008	-0,010	-0,056	-0,026	-0,081	-0,085
14178 Vogtlandkreis	-0,016	-0,042	-0,057	0,061	0,004	-0,143	-0,040	-0,184	-0,085
14181 Mittlerer Erzgebirgskreis	-0,028	-0,032	-0,027	0,016	-0,011	-0,076	-0,025	-0,101	-0,084
14182 Kreis Mittweida	0,000	-0,035	-0,077	0,029	-0,049	-0,059	-0,025	-0,085	-0,085
14188 Kreis Stollberg	0,070	0,030	-0,044	0,026	-0,018	-0,020	-0,039	-0,058	-0,089
14191 Kreis Aue-Schwarzenberg	-0,056	-0,067	-0,022	0,006	-0,016	-0,086	-0,039	-0,125	-0,083
14193 Kreis Zwickauer Land	0,046	-0,051	-0,051	0,029	-0,022	-0,114	-0,043	-0,157	-0,092
14262 Dresden, Stadt	-0,102	-0,128	0,046	-0,032	0,015	0,047	0,031	0,078	-0,078
14263 Goerlitz, Stadt	-0,155	-0,229	0,013	-0,002	0,011	-0,125	-0,006	-0,131	-0,081
14264 Hoyerswerda, Stadt	-0,277	-0,598	0,018	-0,049	-0,031	-0,240	-0,033	-0,273	-0,067
14272 Kreis Bautzen	-0,075	-0,128	-0,033	0,017	-0,016	-0,062	-0,039	-0,102	-0,082
14280 Kreis Meissen	0,004	-0,031	-0,040	0,002	-0,037	0,053	-0,026	0,027	-0,087
14284 Niederschles. Oberlausitzkreis	-0,037	-0,093	0,012	-0,025	-0,013	-0,043	-0,007	-0,050	-0,088
14285 Kreis Riesa-Grossenhain	-0,033	-0,111	-0,031	0,004	-0,027	-0,052	-0,025	-0,077	-0,081

14286 Kreis Loebau-Zittau	-0,020	-0,011	-0,024	0,048	0,024	-0,075	-0,040	-0,116	-0,084
14287 Kreis Saechsische Schweiz	-0,082	-0,059	-0,012	0,032	0,020	-0,104	-0,025	-0,129	-0,082
14290 Weisseritzkreis	0,087	0,081	-0,027	0,012	-0,015	0,030	-0,027	0,002	-0,092
14292 Kreis Kamenz	0,240	0,112	-0,058	0,057	-0,001	0,083	-0,046	0,037	-0,101
14365 Leipzig, Stadt	-0,128	-0,121	0,057	-0,006	0,051	-0,012	0,031	0,019	-0,076
14374 Kreis Delitzsch	0,097	0,060	-0,061	0,010	-0,051	0,056	0,042	0,097	-0,099
14375 Kreis Doebeln	-0,019	-0,062	-0,068	0,007	-0,061	-0,038	-0,025	-0,064	-0,085
14379 Kreis Leipziger Land	-0,185	-0,194	-0,008	-0,128	-0,137	0,022	-0,024	-0,002	-0,076
14383 Muldentalkreis	0,037	0,031	-0,054	0,026	-0,028	-0,114	0,038	-0,076	-0,087
14389 Kreis Torgau-Oschatz	-0,014	0,022	-0,045	0,000	-0,045	-0,051	0,037	-0,014	-0,084
15101 Dessau, Stadt	-0,051	-0,056	-0,021	-0,008	-0,029	0,142	-0,043	0,099	-0,079
15151 Kreis Anhalt-Zerbst	-0,068	-0,145	-0,080	-0,008	-0,088	-0,085	-0,026	-0,111	-0,085
15153 Kreis Bernburg	-0,153	-0,232	-0,027	0,042	0,015	-0,181	-0,043	-0,224	-0,078
15154 Kreis Bitterfeld	-0,297	-0,492	-0,063	0,008	-0,055	-0,320	-0,041	-0,361	-0,072
15159 Kreis Koethen	-0,094	-0,084	-0,066	0,023	-0,043	-0,013	-0,047	-0,060	-0,089
15171 Kreis Wittenberg	-0,058	-0,083	-0,041	0,024	-0,017	-0,053	-0,026	-0,078	-0,082
15202 Halle (Saale), Stadt	-0,214	-0,205	0,019	-0,026	-0,007	-0,011	0,023	0,011	-0,072
15256 Burgenlandkreis	-0,179	-0,225	-0,050	0,004	-0,045	-0,173	-0,006	-0,179	-0,078
15260 Kreis Mansfelder Land	-0,140	-0,185	-0,042	-0,054	-0,096	-0,043	-0,038	-0,081	-0,077
15261 Kreis Merseburg-Querfurt	-0,172	-0,265	-0,121	-0,075	-0,196	0,109	-0,038	0,071	-0,078
15265 Saalkreis	0,549	0,462	-0,121	-0,016	-0,137	0,519	-0,009	0,510	-0,118
15266 Kreis Sangerhausen	-0,184	-0,263	-0,058	-0,011	-0,069	-0,172	-0,006	-0,178	-0,077
15268 Kreis Weissenfels	0,108	-0,069	-0,093	0,031	-0,062	-0,028	-0,040	-0,068	-0,082
15303 Magdeburg, Landeshauptstadt	-0,172	-0,167	-0,016	-0,035	-0,052	0,061	0,023	0,084	-0,073
15352 Kreis Aschersleben-Stassfurt	-0,103	-0,169	-0,053	-0,016	-0,068	-0,030	-0,038	-0,067	-0,076
15355 Boerdekreis	0,018	-0,065	-0,090	-0,005	-0,094	0,023	-0,007	0,016	-0,087
15357 Kreis Halberstadt	-0,027	-0,058	-0,047	-0,002	-0,049	0,025	-0,006	0,019	-0,079
15358 Kreis Jerichower Land	-0,013	-0,060	-0,077	-0,004	-0,080	0,008	-0,007	0,001	-0,088
15362 Ohrekreis	0,150	0,093	-0,072	-0,013	-0,085	0,193	-0,007	0,186	-0,093
15363 Kreis Stendal	-0,160	-0,126	-0,056	-0,018	-0,074	-0,029	-0,024	-0,054	-0,078
15364 Kreis Quedlinburg	-0,123	-0,110	-0,031	-0,025	-0,056	-0,014	-0,039	-0,052	-0,079
15367 Kreis Schoenebeck	-0,164	-0,174	-0,080	-0,011	-0,091	-0,037	-0,039	-0,076	-0,081
15369 Kreis Wernigerode	-0,124	-0,146	-0,034	0,002	-0,031	-0,088	-0,006	-0,094	-0,078
15370 Altmarkkreis Salzwedel	0,061	-0,027	-0,079	-0,041	-0,120	0,051	-0,026	0,025	-0,084
16051 Erfurt, Stadt	-0,079	-0,054	0,011	-0,014	-0,003	0,112	0,025	0,137	-0,080
16052 Gera, Stadt	-0,201	-0,219	0,013	-0,010	0,003	-0,143	0,023	-0,120	-0,070
16053 Jena, Stadt	-0,073	-0,039	0,103	-0,084	0,020	0,132	0,024	0,156	-0,077
16054 Suhl, Stadt	-0,223	-0,223	0,018	-0,018	0,000	-0,078	-0,039	-0,117	-0,070
16055 Weimar, Stadt	-0,217	-0,181	0,041	-0,041	0,000	-0,030	-0,037	-0,067	-0,073
16056 Eisenach, Stadt	-0,022	-0,229	0,002	-0,021	-0,020	-0,025	-0,042	-0,067	-0,084
16061 Kreis Eichsfeld	0,085	0,157	-0,030	0,039	0,009	0,080	-0,047	0,033	-0,089
16062 Kreis Nordhausen	-0,040	-0,059	0,016	0,005	0,021	0,006	-0,044	-0,039	-0,083
16063 Wartburgkreis	0,072	0,014	-0,045	0,016	-0,029	0,022	-0,046	-0,024	-0,086
16064 Unstrut-Hainich-Kreis	0,039	-0,039	-0,018	0,000	-0,018	-0,071	-0,046	-0,117	-0,085
16065 Kyffhaeuserkreis	0,005	-0,057	-0,013	-0,020	-0,033	-0,059	-0,026	-0,085	-0,085
16066 Kreis Schmalkalden-Meiningen	0,019	-0,084	-0,036	0,030	-0,006	-0,100	-0,045	-0,145	-0,083
16067 Kreis Gotha	0,032	-0,011	-0,011	-0,009	-0,021	0,016	-0,041	-0,025	-0,087
16068 Kreis Soemmerda	0,053	-0,045	-0,050	-0,007	-0,058	-0,082	-0,007	-0,088	-0,086
16069 Kreis Hildburghausen	0,063	-0,059	-0,035	0,026	-0,010	-0,106	-0,027	-0,133	-0,086
16070 Ilm-Kreis	-0,011	-0,084	-0,006	-0,010	-0,016	-0,110	-0,007	-0,117	-0,083
16071 Kreis Weimarer Land	0,202	0,208	-0,045	0,024	-0,021	0,132	-0,044	0,087	-0,096
16072 Kreis Sonneberg	-0,017	-0,080	-0,025	0,046	0,021	-0,123	-0,044	-0,168	-0,081
16073 Kreis Saalfeld-Rudolstadt	-0,079	-0,108	-0,019	0,029	0,010	-0,135	-0,007	-0,142	-0,081
16074 Saale-Holzland-Kreis	0,064	-0,014	-0,024	-0,001	-0,026	-0,086	-0,007	-0,093	-0,088
16075 Saale-Orla-Kreis	0,060	-0,046	-0,045	0,035	-0,010	-0,130	-0,007	-0,137	-0,088
16076 Kreis Greiz	-0,075	-0,142	-0,037	0,020	-0,018	-0,148	-0,038	-0,186	-0,080
16077 Kreis Altenburger Land	0,004	-0,068	-0,048	0,011	-0,037	-0,054	-0,040	-0,094	-0,084

## References:

- Appelbaum, Eileen; Schettkat, Ronald (1993): "Employment Developments in Industrialized Economies: Explaining Common and Diverging Trends" (Discussion Paper FS I 93- 313, Wissenschaftszentrum Berlin für Sozialforschung)
- Appelbaum, Eileen; Schettkat, Ronald (1999): "Are Prices Unimportant?", in: *Journal of Post-Keynesian Economics* 21/3: 387-398
- Baltagi, Badi H.; Blien, Uwe; Wolf, Katja (2000): "The East German Wage Curve: 1993-1998", in: *Economics Letters* 69/10: 25-31
- Blanchard, Olivier Jean; Katz, Lawrence F. (1992): "Regional Evolutions", in: *Brookings Papers on Economic Activity* 1: 1-75
- Blanchflower, David G.; Oswald, Andrew J. (1994): "The Wage Curve", Cambridge (Mass.), London: MIT Press
- Blien, Uwe (2001): "Arbeitslosigkeit und Entlohnung auf regionalen Arbeitsmärkten. Theoretische Analyse, ökonometrische Methode, empirische Evidenz und wirtschaftspolitische Schlussfolgerungen", Heidelberg: Physica
- Blien, Uwe; Hirschenauer, Franziska (1994): "Die Entwicklung regionaler Disparitäten in Ostdeutschland", in: *Mitteilungen aus der Arbeitsmarkt- und Berufsforschung* 27/4: 323-337
- Blien, Uwe; Hirschenauer, Franziska (1999): "Regionale Disparitäten auf ostdeutschen Arbeitsmärkten" in: *Wiedemann et al. (1999)*: 139-162
- Blien, Uwe; Wolf, Katja (2001): "Regionale Disparitäten auf ostdeutschen Arbeitsmärkten", in: *Informationen zur Raumentwicklung* (im Erscheinen)
- Böltken, Ferdinand; Irmen, Eleonore (1997): "Neue siedlungsstrukturelle Regions- und Kreistypen", in: *Mitteilungen und Informationen der BfLR* 1: 4-5
- Bröcker, Johannes (1989): "Determinanten des regionalen Wachstums im sekundären und tertiären Sektor der Bundesrepublik Deutschland 1970 - 1982", München: VVF
- Fujita, Masahisa; Krugman, Paul; Venables, Anthony J. (1999): "The Spatial Economy: Cities, Regions, and International Trade", Cambridge (Mass.), London: MIT Press
- Gahlen, Bernhard; Hesse, Helmut; Ramser, Hans Jürgen (1995) (ed.): "Standort und Region. Neue Ansätze zur Regionalökonomik", Tübingen: J. C. B. Mohr (Paul Siebeck)
- Görmar, Wilfried; Irmen, Eleonore (1991): "Nichtadministrative Gebietsgliederungen und -kategorien für die Regionalstatistik. Die siedlungsstrukturelle Gebietstypisierung der BfLR", in: *Raumforschung und Raumordnung* 49/6: 387-394
- Greene, W.; Seaks, T. (1991): "The Restricted Least Squares Estimator", in: *The Review of Economics and Statistics* 73: 563-567
- Knudsen, D. C.; Barff, R. (1991): "Shift-share analysis as a linear model", in: *Environment and Planning A* Vol. 23: 421-431
- Krugman, Paul (1991): "Geography and Trade", Cambridge (Mass.) etc.: MIT Press

- Lange, Thomas; Pugh, Geoffrey (1998): "The Economics of German Unification: An Introduction", Cheltenham etc.: Edward Elgar
- Layard, Richard; Nickell, Stephen; Jackman, Richard (1991): "Unemployment. Macroeconomic Performance and the Labour Market", Oxford: Oxford University Press
- Lucas, Robert E. (1988): "On the Mechanics of Economic Development", in: Journal of Monetary Economics 22: 3-42
- Molle, Willem (1997): "The Regional Economic Structure of the European Union: An Analysis of Long-term Developments", in: Vosgerau (1997)
- Möller, Joachim (1995): "Empirische Analyse der Regionalentwicklung", in: Gahlen, Hesse, Ramser (1995)
- Möller, Joachim (1995): "Unweighted and Weighted Measures of Inter-Industry Wage Variability - A Technical Note", unpublished paper of the University, Regensburg
- Möller, Joachim; Tassinopoulos, Alexandros (2000): "Zunehmende Spezialisierung oder Strukturkonvergenz? Eine Analyse der sektoralen Beschäftigungsentwicklung auf regionaler Ebene", in: Jahrbuch für Regionalwissenschaft 20/1: 1-38
- Patterson, M. G. (1991): "A Note on the Formulation of the Full-Analogue Regression Model of the Shift-Share Method", in: Journal of Regional Science 31/2: 211-216
- Rudolph, Helmut (1990): "Beschäftigungsstrukturen in der DDR vor der Wende. Eine Typisierung von Kreisen und Arbeitsämtern", in: Mitteilungen aus der Arbeitsmarkt- und Berufsforschung 23/4: 474-503
- Stahl, Konrad (1995): "Zur Entwicklung und zum Stand der regionalökonomischen Forschung", in: Gahlen, Hesse, Ramser (1995): 3-40
- Steiner, Viktor; Wolf, Elke; Egel, Jürgen; Almus, Matthias; Schrumpf, Heinz et al. (1998): "Strukturanalyse der Arbeitsmarktentwicklung in den neuen Bundesländern", Baden-Baden: Nomos
- Tassinopoulos, Alexandros (2000): "Die Prognose der regionalen Beschäftigungsentwicklung" (Beiträge zur Arbeitsmarkt- und Berufsforschung Band 239), Nürnberg: Bundesanstalt für Arbeit
- Tassinopoulos, Alexandros (1996): "Regionale Beschäftigungsprognose 1996/97 für die alten Bundesländer", Mitteilungen aus der Arbeitsmarkt- und Berufsforschung 3
- Vosgerau, Hans-Jürgen (1997) (ed.): "Zentrum und Peripherie - Zur Entwicklung der Arbeitsteilung in Europa", Berlin: Duncker & Humblot
- Wiedemann, Eberhard; Brinkmann, C.; Spitznagel, E.; Walwei, U. (1999) (ed.): "Die arbeitsmarkt- und beschäftigungspolitische Herausforderung in Ostdeutschland" (Beiträge zur Arbeitsmarkt- und Berufsforschung 223), Nürnberg