Formula allocation: The regional allocation of budgetary funds for measures of active labour market policy in Germany

Uwe Blien
Institute of Employment Research of the Federal Employment Agency

Franziska Hirschenauer
Institute of Employment Research of the Federal Employment Agency

Abstract

A common problem of regional policy is the distribution of funds to regional units. To follow the specific purpose of this budgeting process in a rational way this is often done in a formula allocation on the basis of official statistics. In Germany, measures of active labour market policy – e.g. training measures, integration subsidies and job creation schemes – are paid from a common budget. For the allocation of these budgetary funds to the regions of the Federal Republic of Germany, a formula was developed which was to be based essentially on a labour market indicator. Here the procedure used in constructing the distribution process is explained and the distribution result for the year 2004 is set out.

1. Introduction

This paper treats a problem that is of a familiar nature in many contexts (see the articles on "formula allocations" in the Journal of Official Statistics no. 3/2002): The distribution of funds to regional units. To follow the specific purpose of this budgeting process in a rational way this is commonly done in a formula allocation. The structure of the formula depends on the purpose, but there is the additional requirement to transfer this into a formal structure that reflects this purpose correctly.

The example we concentrate on is the regional distribution of means for the purposes of active labour market policy in Germany, which amount to a sum of 10,194 billion €in 2004. A special method was developed in 1997/8 and has been used every year since 1998. The criteria for the development of the method were: most accurate fit to the aim of the policy and to general legal guidelines, transparency of the procedure, openness for necessary policy decisions, scientific correctness in implementation, use of official statistics, efficiency of the whole process.

The purpose of this article is to open the scientific discussion over the degree to which the formula allocations implemented in the policy process corresponds to these requirements. During the time the method was used it has changed slightly. Since the experiences with its application have been promising, the method is described here. Since 2004 there is has been a restructuring of the budgeting process, therefore it is reasonable to sum up and discuss the allocation scheme and possible alternatives.

In Germany active and passive labour market policy are primarily financed by proportional contributions of employees and employers to the unemployment insurance. Since 1.1.98 there has been only one budgetary title, the so called integration budget, for the main instruments of active labour market policy, such as training measures, integration subsidies and job creation schemes. It is left to the employment offices to decide how to distribute the funds among the different types of measures. This is an important element of the regional responsibility in the control of labour market policy, which the legislator now prefers. In the Social Code IV the criteria according to which the funds are to be distributed are already stipulated relatively precisely. In § 71b(2) it says: "*When allocating the funds, in particular the regional development of employment, the demand for labour, the type and extent of unemployment* as well as the particular expenditure development in the preceding financial year *are to be taken into account.*" (italics added by the authors).

The regional allocation of budgetary funds for active labour market policy in Germany has similar features to intergovernmental aid formulas in the USA or Canada (see Downes, Pogue 2002; Taylor, Keenan, Carbonneau 2002). Firstly there is also a redistributive element: the means are collected centrally and given primarily to regions with unfavourable labour market situations and small contributions. Secondly there is a common task analogue to the allocation of state aid to regional units with reference to their specific needs. The method of re-distribution chosen is different from the one in European regional policy (Bachtler, Michie 2001) or within Germany between Federal States (Lenk 1998), as will be described in the following.

2. Basic decisions regarding the allocation process

The regional units the allocation process refers to are the areas corresponding to the 181 administrative units of the single employment offices ("Arbeitsagenturbezirke"). But the distribution is done in three steps not directly in one. In the first step the budget is split between western and eastern Germany. Since in the East the labour market situation is still bad and especially very

different form the one in the West, a fixed proportion of currently 46 % of the budget is allocated to the regions of eastern Germany – far more than the proportion of the population that would imply a proportion of a fifth. Then, in the second step the budget is distributed among 12 (8 in the East, 4 in the West) large regions (the "Regionaldirektionsbezirke"), separately in the East and in the West. This is done by the formula described in the following. Finally, by applying the same procedure as in the second step, the budget is allocated to single labour market regions, within each large region. For brevity, we concentrate here on the second step. *Four indicator components* were used in the formation of the *global indicator* which is the basis for the distribution formula. They are constructed on the basis of official statistics generated by the statistics department of the Federal Employment Agency (generally for the use of such sources in welfare policy, Kramer 1990). Each indicator component is related to a dimension of the criteria which are decisive in the allocation of funds according to the Social Code IV. The four indicator components are

- Rate of change of employment
- Rate of underemployment
- Rate of unemployed with special labour market problems
- Outflows from unemployment into regular employment

The definitions of the single indicator components are:

1. *Rate of change of employment* calculated for two years. This indicator is based on data of the German employment statistics. This statistics cover all employment subject to compulsory social security contributions. It was 'easy' to define and to realise, since the legal provision could be converted directly into operational terms. In order to obtain the same 'direction' as the other indicator components, the sign of the rate of change of employment was changed.

The indicator is calculated for a period of two years, because previous studies have shown that this indicator component demonstrates relatively unstable behaviour. Within a relatively short time, considerable shifts can occur between the regions in the rate of change of employment. The individual Employment Service Regions are affected to differing degrees by cyclical effects depending on the strength and time of their occurrence. To smooth up these abrupt changes, a period of two years is used for the calculation of this indicator.

2. *Rate of underemployment,* made up of the official unemployment rate (which is based on registered unemployment) and the number of participants in relevant labour market policy measures. By using the measures, unemployment in the particular region is partly absorbed and open unemployment is prevented. For this reason structural adjustment measures, job creation measures and full-time training measures were also included in the variable called underemployment. The regional values for the measures and unemployment are shown in Table 1.

3. *Rate of unemployed with special labour market problems.* Here people are counted, who are long-term unemployed. In addition - among the unemployed - disabled people, elderly (above the age of 50), not formally qualified people and those, who came recently back to the labour market, are included. All persons are counted only once, even if they have more than one of the mentioned attributes. The number of people belonging to these groups is weighted by the denominator of the underemployment rate.

4. *Outflows from unemployment into regular employment* in order to take into consideration the demand for labour or the capacity of the labour market to absorb workers. This indicator does not measure the problem situation of the labour market and thus portrays a different dimension of the chosen global indicator. The inclusion of this dimension can be explained by the incorporation of funds for training measures into the integration title. The budget for active labour market policy should be spent where there are good prospects for success.

One problem of this indicator component is that seasonal fluctuations are reflected especially strongly in the outflows. In order to avoid regions with high proportions of seasonal employment, i.e. with large proportions of the tourism and building industries, being reflected disproportionately and undesirably in the indicator values, the month of June was used for calculating the indicator values, as this month is not particularly affected by seasonal fluctuations. Solely for reasons of clarity, the values were multiplied by the factor 12. As the regional proportions do not change as a result of this transformation, the further calculations are not affected.

The data required for the four indicator components were made available by the statistics department of the Federal Employment Agency in the state desired as regards temporal and spatial reference. In this way it was possible to guarantee that solely the correct "official" data from the Federal Employment Agency were used.

3. Basic concept used in the construction of the formula

The procedure adopted for the construction of a formula to be used for the distribution of the funds of the discretionary payments for active employment promotion is to be described briefly in the following, before the formally exact calculation is presented in the next section.

The *distribution formula is based on a global labour market indicator* which combines the four indicator components discussed earlier. Table 1 contains the basic data for all four of the indicator components which are used in constructing the global indicator. The four indicator components "rate of change of employment subject to social security contributions" (with a reversed sign), "underemployment rate", "rate of special groups of unemployed" and "rate of outflow from unemployment into employment" can not be combined simply e.g. by calculating the average.

The various components have a different variation and a different range of values. If this effect is not controlled for, implicit weightings will result. For this reason it is necessary to standardise the indicator components beforehand, i.e. they must be transformed in such a way that they show a mean value of 0 and a standard deviation of 1. By means of the standardisation it is taken into account that the indicator components included show entirely different characteristics as regards their definition and their character. It is not possible to make a direct comparison of a growth rate, such as that for employment, and proportional values. Standardisation gives them a common basis.

The standardised indicators could be combined by forming an average. In this way, however, the fixed variation of the indicator components of 1 would have to be reflected in the values of the global indicator. This would be an effect of the indicator construction and not one of the empirical reality. As one wishes to take into consideration the actual differences in the problem situations of the individual regions, the average of the standard deviations weighted by the particular mean values is calculated (this is the variation coefficient) and the global indicator is multiplied by this value.

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Table 1 Basic indicator components in percent Calculation for budget year of 2004	Rate of change of employment (2 years)	Rate of under-employment	Rate of special groups of unemployed	Rate of outflow from unemployment into employment	Reference Quantity: Dep. labour force
Region (RD)					
SHH	0,02	12,06	7,00	8,12	2027205
NSB	-0,43	11,77	7,42	7,65	3886084
NRW	-0,15	11,57	7,69	5,90	8100902
H	0,41	9,59	5,66	5,59	2767729
RPS	0,05	9,51	5,96	6,42	2283881
BW	0,64	7,35	4,37	5,23	4935553
BY	0,64	8,55	4,76	7,08	5718065
Westberlin	-2,25	21,51	13,94	8,16	935219
Western Germany	0,12	10,36	6,41	6,46	30654636
MVP	-3,60	25,14	12,88	14,10	844191
BB (without Westberlin)	-2,25	23,40	12,97	11,88	1849694
SAT	-3,22	23,28	12,39	13,01	2425353
S	-3,51	22,02	12,52	12,13	2099785
Eastern Germany	-3,11	23,16	12,63	12,59	7219023

Definition of indicators:

Rate of change of employment {(6/01-6/00)/6/00 + (6/02-6/01)/6/01}/2

Underemployment rate (Unemployed + full-time training measures (FbW) + structural adjustment measures(SAM) + job creation measures (ABM) (all 8/02-7/03)) / Reference quantity

Rate of special groups of unemployed: Long term unemployed., unemployed aged over 50, without formal qualifications, disabled and people who come back into the labour market. (8/02-7/03) / Reference quantity

Rate of outflow of unemployed into employment (without ABM, SAM 6/03) / Reference quantity * 12

Reference quantity: Dependent employed persons+ unemployed+participants in full-time training measures (FbW)

Regions (Regionaldirektionsbezirke) are divided between eastern and western Germany

Definition of regions:

SHH = Schleswig-Holstein-Hamburg, NSB = Niedersachsen-Bremen, NRW = Nordrhein-Westfalen, H = Hessen, RPS = Rheinland-Pfalz-Saarland, BW = Baden-Württemberg, BY = Bayern, MVP = Mecklenburg-Vorpommern, BB = Berlin-Brandenburg, SAT = Sachsen-Anhalt-Thüringen, S = Sachsen

The standardised indicators could be combined by forming an average. In this way, however, the fixed variation of the indicator components of 1 would have to be reflected in the values of the global indicator. This would be an effect of the indicator construction and not one of the empirical reality. As one wishes to take into consideration the actual differences in the problem

situations of the individual regions, the average of the standard deviations weighted by the particular mean values is calculated (this is the variation coefficient) and the global indicator is multiplied by this value.

As all calculation operations are carried out separately for eastern and western Germany, the different variation of the labour market problems in the two parts of the country can also be reflected in the values of the global indicator. This is of some relevance since a look at the original values of the indicators in Table 1 shows that among eastern regions the labour market situation is much more homogeneous than among western regions.

The global indicator can then be used for the distribution of funds. The allocation scheme takes into account on the one hand the size of the region in question, and on the other hand the pressure of the problem situation. The choice of the weight of the two components is a decision of regional labour policy; it does not result automatically from the procedure. A need for decisions also exists in another respect: the individual indicator components can be weighted differently.

4. Exact description of the allocation formula

In the following the formally exact description of the formula allocation is given. A global indicator G is formed by linking individual indicators E_i . The simplest combination procedures are multiplication and addition. A multiplication link has the peculiarity of giving extreme values a higher weight. As there is no cause for this in our case, addition is used as a linkage here. The global indicator G is determined as follows, when it is additionally taken into account that specific weights w_i are allocated to the individual indicators i, and r is an index for the regional unit in question.

$$G_r = \sum_i w_i \cdot E_{ir} \qquad (1)$$

Prior to combination, the indicator components have to be standardised as they show different ranges of values and also the mean range of variation of the values resulting for them, i.e. their standard deviation, fluctuates. If no standardisation were carried out, indicators with a higher standard deviation σ_i would implicitly receive a higher weight. With the following formula for the standardisation, values are produced which show the mean value of zero and the standard deviation of one:

$$e_{ir} = \frac{E_{ir} - \overline{E}_i}{\sigma_i} \qquad (2)$$

Here $\overline{E}_i$ denotes the national value for the particular indicator component and σ_i its standard deviation which is calculated according to the following formula in which R stands for the number of regions:

$$\sigma_i = \sqrt{\sum_r^R B_r (E_{ir} - \overline{E}_i)^2} \qquad (3)$$

Here $B_r = b_r/\Sigma b_r$ which is denoted as "*reference proportion*" where b gives the absolute number of persons called the "*reference quantity*", which comprises persons in dependent employment, unemployed and participants in measures (cf. appendix Table 1). The reference quantity is therefore a measure for the size of the regions and is used as denominator in the calculation of the respective rates which serve as indicators. The standard deviations and mean values are calculated separately for eastern and western Germany, since the labour market situation in the two parts of the country continues to differ greatly.

The above formulae differ from those usually found in text books on statistics only in that the national value is used instead of the arithmetical mean and that weightings are set according to the size of the region when calculating the standard deviation. One of the purposes of the precautions is for changes in the boundaries of a region to have as little effect as possible on the global indicator.

The standardisation produces indicator values with the standard deviation of one and thus obliterates the information contained in the original data about the variation of the problem situations. In order to avoid this effect it is appropriate to transfer the average of the variations back to the indicators. However, the standard deviation can not be used for this as the original data have different mean values and ranges of values. Instead, it is advisable to use the variation coefficient V_i, which is the standard deviation weighted by the national value:

$$V_i = \sigma_i / \overline{\overline{E}}_i \tag{4}$$

However, there are two problems which have to be considered here: the variation coefficient is only defined for values either greater than or smaller than zero. This is not always given, in the case of the rate of change of employment E_b. For this reason, only the variation coefficient of the other three indicators is used. Therefore, the indicator change of employment does not contribute to the included assessment of the deepness of regional disparities on labour markets.

Secondly, the application of the value of the variation coefficient to the standardised values can only be an approximation of the solution, since the standardised values show a mean value of zero. In spite of this restriction, the incorporation of an automatism for transferring the variation range of the empirical problem situations to the calculated indicator values is an important advantage of the selected procedure. If different weights for the indicators are taken into consideration, the following formula results for the global indicator GI:

$$GI_r = \left[\sum_{i=1}^{4} w_i e_{ir} \right] \frac{\sum_{i=1}^{3} V_i}{3} \tag{5}$$

It must also be borne in mind that with the standardised indicators at first only a hierarchy for the individual regions is produced. The intended formula however, should give *the distribution of funds.* For this the global indicator must additionally be multiplied by a *measure for the size of the region concerned.* Therefore the relative number of workers B_r (the reference value) is used as weight. Then the distribution of funds can be given according to the following formula:

$$M_r = B_r + B_r \, GI_r \, S \tag{6}$$

It can be seen that the proportion of the available funds that is given to a region is equal to two components which are linked by addition. The first simply gives the *"size" of the region con-*

cerned, by means of which the funds are distributed solely according to the size of the region. The second component on the other hand, which is in turn made up of three factors multiplied together, gives the *pressure of the problems of the labour market situation.* A global *control parameter S* determines the relative weight of the two components. This factor can be set freely, if it is very small, the distribution of funds is determined almost solely by the relative size of the regions; if it is large, the problem situation on the particular labour markets, which is shown by the global indicator, comes through more strongly. It must be kept in mind that as a result of the standardisation the second component is negative for those regions which are in a comparatively good position. Therefore, to these regions fewer funds are allocated than according to their size.

There remains only one final step in the process of constructing the indicator and its application for the allocation of funds: the sum $M = \Sigma_r M_r$ is only approximately equal to one, so that for a correction it is necessary to divide by this very total M. Then the *basic allocation quantity* M' is obtained. It gives the share which a region obtains from the total budget.

5. Discussion of the procedure chosen

The adopted procedure is intended to implement the prescriptions of the Social Act and to take into account formal aspects of the indicator construction in accordance with scientific standards. In principle the funds could also be distributed following other procedures; the method selected here uses suitability as a criterion, not exclusivity.

The proposed procedure has, among other things, the advantage of simplicity. There is no need for multivariate methods, which would make it more difficult to explain the method to the decision-makers. The transparency of the method is necessary as it opens intervention possibilities. One of these concerns the control parameter S, which can not be fixed in advance e. g. by a statistical criterion. What is ultimately behind the choice of the parameter is a question as to the fundamental effects of labour market policy. Does it seem more favourable according to political purposes to employ measures more at the focal points of the labour market or is it better to distribute the funds more equally? This question could not be decided theoretically or on the basis of statistical criteria.

The choice of S can be based on various considerations. One of them is the cost of reintegration of unemployed people. In regions with higher unemployment rates it is more expensive to reintegrate someone. Therefore it might be necessary to use control parameters greater than one to give the disadvantaged regions relatively more funds. To understand the control factor more clearly it is instructive to regard a combination of the equations (4) und (5):

$$M_r = B_r + B_r \frac{\sum_i e_{ir}}{4} \cdot \frac{\sum_i V_i}{3} \cdot S = B_r \cdot (1 + \frac{S'}{4} \sum_i e_{ir}) \qquad (7)$$

Regarding (7) it is clear that setting S = 1 would use only the "natural" variation of the indicator components. If the parameter S is set to values larger than unity relatively more weight is given to the problem situation on the labour market.

Finally it is necessary to point out that the permissible range of values for the control parameter has an upper limit. Formally the problem arises because the global indicator assumes negative values for regions with a comparatively favourable labour market situation. As can be seen from equation (6), if $B_r < -B_r GI_r S$, the allocation of funds becomes negative from a certain point. In this case, which is reached when $S > -1/GI_{ro}$, individual regions r_o would not only re-

ceive no money, but would even have to submit funds. This is, of course, not a useful result that hints at strong outliers and indicates that the parameter S is not chosen sensibly. In many test calculations no such inadmissible effects for the distribution of funds occurred in the area of the values that were considered for the control parameter.

Table 2
Global indicator constructed with four standardised indicator components (budget year 2004)
Indicator components with equal weights, control parameter S = 1,5

	1	2	3	4	5
	Reference quantity (%) B	Basic allocation quantity (%) M'	Allocation of funds (Previous year 50%) M^X	Deviation from region size	Deviation from allocat. previous year
Regions				With respect to M'	
SHH	6,61	8,24	8,24	24,61	2,24
NSB	12,68	16,25	16,23	28,15	-1,41
NRW	26,43	28,71	29,19	8,65	-4,39
H	9,03	7,35	7,45	-18,54	0,07
RPS	7,45	7,12	7,38	-4,50	-9,36
BW	16,10	9,89	10,00	-38,59	-1,32
BY	18,65	15,66	14,72	-16,04	13,73
Westberlin	3,05	6,78	6,78	122,35	-1,69
Western Germany	100,00	100,00	100,00	0,00	0,00
MVP	11,69	12,75	12,74	9,06	0,74
BB (without WB)	25,62	25,25	24,64	-1,46	4,20
SAT	33,60	33,56	34,34	-0,10	-1,35
S	29,09	28,44	28,28	-2,24	-2,28
Eastern Germany	100,00	100,00	100,00	0,00	0,00
Deviation proportional allocation (West)*			22,43		
Deviation proportional allocation (East)*			2,12		

The last two lines show separately for East and West how much the allocation of funds deviates from an allocation according to the region size B (summed up over all regions)

6. The result

Table 2 shows the results of the allocation procedure for the budget year 2004. It was done according to a decision of the Board of the Federal Employment Agency to use the procedure developed for the allocation of funds. This decision included further to use equal weights for all indicator components and to set the control parameter S to 1,5.

The last two columns of Table 2 compare the distribution given by M' with the sizes of the region and with the M' of the previous year. In percent the deviations A are calculated as

$$A_r = \frac{(M_r - B_r)}{B_r} \cdot 100$$

The deviations A are relatively small; this becomes clear in a summarising quantity D^x, which is contained in Table 2. The last two lines of the table show how much the generated distribution of funds differs from a proportional distribution. For this the absolute values of the differences between the first column of the table and the proportional values for the quantity B are simply added together with the column relevant for the distribution of funds. This is done separately for east and west in accordance with the following formula:

$$D^x = \Sigma_r |B_r - M_r^x|$$

The smallness of the values for D^x can be explained by the fact that also the second term in equation (6) includes the size of the region concerned B_r. Even if it is wished to orientate the distribution radically towards the problem situation and not towards proportionality, an allocation of budgetary funds has to take into account the size of the region. The values for D^x differ for eastern and western Germany even when the same control parameter S is used. This can be attributed to two characteristics of the selected indicator construction. Firstly the different values for the average variation coefficients $\overline{V}_{Ost}$ und $\overline{V}_{West}$ have an effect. Secondly the correlations between the indicator components affect the result. If they are high, then there are serious regional disparities, the values for the global indicator differ more considerably and the funds are redistributed to a greater extent. It is thus clear that the global indicator reflects such correlations.

The allocation of funds obtained by the procedure described was afterwards used by the regional units of the Federal Employment Agency ("Regionaldirektionen") to allocate means to the smaller units of local employment offices ("Arbeitsagenturbezirke"). The same procedure was applied respectively, whereas it was possible to use the options of weighting the indicator components differently and to choose a different control parameter S.

7. Current situation and Outlook

Since the beginning of 1998 the labour market policy funds have been distributed according to the formula allocation described. The decision about the distribution formula was made by the Supervisory Board (Verwaltungsrat) of the Federal Employment Agency which is composed of representatives of employers, employees and public bodies. Until 2003 only slight adaptations of the formula have been necessary.

The distribution for the year 2004 was different from the scheme of the years before. By the board of the Federal Employment Agency it was decided to use the directly calculated values of M' only for 50 % of the budget. The other 50 % were distributed on the basis of a system of management by objectives. Target agreements between the central unit and the regional units included an allocation of funds for specified targets. These targets included specific integration rates by the various measures of active labour market policy (integration means the transition of an unemployed person into employment). As a baseline of the funds subject to target agreements, again the described formula allocation was used. This baseline was modified in the negotiations between central and regional units. The resulting distribution taking account the target

agreements was very close to the pure distribution by the formula, the global deviation was only 4%.

Meanwhile the law that regulates the working of the Federal Employment Agency has been changed several times. There has beeb a fundamental reform of labour market policy, including a complete reorganization of the Federal Employment Services. The target agreements between the central unit and the local units about the numbers unemployed into employment are part of this reform. Since 2005 the distribution of money has been done solely on the basis of these target agreements. However, the discussion about the optimal procedure do distribute funds is going on. It is time to take stock about the solutions of the recent past and to develop modifications or new procedures on its basis.

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