

Foders, Federico

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Kiel Working Papers

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**Regional Competitiveness
and Training in Germany**

by
Federico Foders



Institut für Weltwirtschaft an der Universität Kiel
The Kiel Institute of World Economics

Institut für Weltwirtschaft
an der Universität Kiel
Düsternbrooker Weg 120
D-24105 Kiel

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Abstract

This paper analyses the German training system from the point of view of regional policy. The problems and prospects of the German system of first and further vocational training are addressed followed by an overview over macro and micro approaches to an empirical assessment of the regional impact of training measures. The paper concludes by proposing some reforms of current training policy in Germany (JEL: I 21, J 24, O15).

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I. Introduction

1. In the current debate about the challenges of globalization faced by Germany as a location of economic activity regional policy occupies centre stage. The reason is that while adjustment to international competition largely takes place at the firm level the economic consequences of globalization also translate into new demands for regional policy, simply because firms have regional roots. In the past the typical reaction of regional policy to actual or perceived locational weaknesses was to propose measures to upgrade infrastructure in an attempt to create new incentives for the accumulation of physical capital and the expansion of employment opportunities. In the so-called Information Age, in which the accumulation of human capital and the production and diffusion of technology govern economic growth in the industrial countries, a different approach seems to be required. This paper explores whether and in which way training as a means of adding to a region's stock of human capital could contribute to German regional policy by increasing the attractiveness of regions for investment and employment.

2. Regional competitiveness shall be taken in this paper to denote a region's attractiveness for mobile factors of production such as physical capital, technology and highly qualified labour. According to neoclassical theory, mobile factors migrate to places where they can achieve the highest productivity. That is often the case in locations in which an appropriate supply of complementary factors exist, both in terms of quantity and quality. The endowment of regions with less mobile factors, like, for example, various classes of skilled labour, plays a key role in locational decisions taken by firms. From a regional perspective, however, it is not sufficient to focus exclusively on static aspects of the supply of less mobile factors. In addition, consideration has to be given to the development over time of that endowment, especially to the ability of regions to continuously adjust the supply of less mobile factors to the demands of structural change and globalization. To secure an appropriate supply of production factors and to adjust that endowment over time are both tasks that require the active participation of all regional agents. Assuming that the behaviour of economic agents follows the pattern of incentives and disincentives resulting from economic policies and regulations, regional and national, regional policy can increase the appeal of a

given region/location by creating the necessary incentives for less mobile factors to adjust to the changing needs of mobile factors.

3. The greatest dilemma faced by regional policy is that while it can readily benefit from locational advantages derived from national policies and regulations, it can neither correct nor adequately compensate for national locational disadvantages. In many cases, national locational disadvantages substantially reduce the scope for regional policy. The employer's share of social security contributions and the level of the effective rate of corporate taxes, for example, both are part of the cost burden that firms located in Germany have to bear and which is entirely owed to national policies and legislation. Since these issues can not be satisfactorily addressed at the regional level, regional policy is confined to improving the attractiveness of a given region, in spite of the impact that national locational disadvantages may have on the outcome of regional initiatives. On the other hand, national disadvantages equally accrue to all regions of a country and hence can hardly be blamed for the persistence of differences in regional growth and employment within a country. That is why regional policy has the task to help relatively rich regions

preserve their high level of performance and to help relatively poor regions catch up with the rich ones.

4. For regional policy the cluster model of regional development could be quite useful (Krugman 1991; Porter 1990). Regional clusters of industries can be found in such places as Silicon Valley, California, and along Route 128, Massachusetts, in the US (semiconductor and software industry), in Sassuolo, Italy, (tile industry) and in Germany in the region Offenbach-Frankenthal-Heidelberg-Würzburg (printing machines). The regional concentration of firms belonging to the same or to related industries can be related to the local availability of qualified labour, technology and suppliers. It might be added to this that such clusters benefit from externalities and knowledge spillovers occurring between firms. Cluster firms learn from each other and interact in many other ways with each other. Such external economies are usually called agglomeration economies in regional science.

5. Having points 1 to 4 in mind, regional policy has the task to (i) create incentives for mobile factors of production to locate in the region and to (ii) keep less mobile factors employed by adjusting them (particularly in quality) to the needs of mobile factors. The first task

involves securing an appropriate supply of skilled labour and the second one securing the continuous adjustment of skill profiles. In both tasks the region's training capacity plays a key role. By encouraging structural change and adjustment, regional policy can actively contribute to maintain and to increase income and employment levels. Firms tend to form clusters in regions with a good supply of less mobile factors. Clusters facilitate communication and technology transfer between firms as well as between firms and other regional agents. The competitive strategy of individual cluster firms ultimately determines the level and composition of a region's demand for skilled labour.

6. In Germany, regional policy is expected to create favourable conditions for an acceleration of the transformation process in the Eastern part of the country and of structural change in the Western part of the country. Germany shares with other industrial countries the growing concern that the acquisition of skills by the workforce is lagging behind. In countries with more labour market flexibility like the US and the UK, mounting wage differentials between skilled and unskilled workers observed in the last fifteen years seem to indicate

that the supply of skilled labour has not been meeting the rising demand. In Germany, as well as in other highly regulated European labour markets, adjustment to the shifting demand for skilled labour is not reflected in wage differentials but rather in the skill composition of the unemployed: the problem of unemployment tends to concentrate among the unskilled, suggesting that the supply of jobs for the unskilled has diminished. Forecasts for Germany show that the demand for unskilled labour will decrease to half its level in the early 1990s by the year 2010, when it is expected to amount to only 10 per cent of all jobs (IW 1993, 1995). Therefore, there seems to be a strong case for training in Germany, especially taking into account the challenges of economic transformation in the Eastern Länder and the challenges of structural change in the Western Länder.

II. The German Training System

7. Training always takes place at the regional level, which is why training measures are bound to have a certain significance for regional policy. The supply of and the demand for training, however, reflects both regional and national characteristics. We define training to denote the transfer of knowledge and skills to trainees by qualified trainers. In

this sense training concerns the process of learning theoretical foundations and acquiring practical skills both of which are strongly oriented towards the requirements of the workplace in a number of occupations. Training should be therefore clearly distinguished from general education or schooling. The German system of general education begins with primary school (Grundschule) for all children aged 6 to 10 years and continues in one of the three following categories of secondary schools to which the pupils are sent as a result of their performance in primary school: the lower level secondary school (Hauptschule, age 10 to 15 years), the intermediate level secondary school (Realschule; age 10 to 16 years) and the upper level secondary school (Gymnasium, age 10 to 19 years). Alternatively, in some German regions the possibility exists to attend a comprehensive school (Gesamtschule, age 10 to 16 or 19 years).

8. For most pupils the normal path involves attending secondary school until age 16. After that they can either compete for a vacancy in a firm offering apprenticeships as a form of vocational training or begin vocational training in a full-time vocational school (Berufsschule). However, they can also decide to start to work right away as

unskilled labour, if they find an opportunity to do so. After servicing an apprenticeship it is possible to (i) stay with the firm where one has been trained (conditional on receiving an offer from the firm), (ii) shop for a job in other firms or (iii) continue training in vocational schools (Berufsfachschule, Fachschule) and eventually engage in higher (tertiary) education. Graduates from the Gesamtschule or the Gymnasium (Abiturienten, generally at age 19 or 20 years) may choose to service an apprenticeship instead of enrolling in tertiary education (Fachhochschule, Gesamthochschule, Technische Hochschule, Universität); in many cases, they go on to tertiary education as postapprentices.

1. First Vocational Training

9. While the overall aim of general education is to teach basic skills such as reading, writing, arithmetic and learning, vocational training deepens some of those basic skills and, in addition, extends teaching to other areas of knowledge which are of particular importance for the workplace. In Germany it is common practice to divide vocational training into first vocational training (apprenticeship) and further vocational training. Estimates show that about 3/4 of each cohort

participate in apprenticeships, including a third of those that decide to enter tertiary education (Wagner 1995). In 1995, about 600,000 graduates from the different levels of secondary school chose to be trained in the German apprenticeship system. It is interesting to note that the number of foreign trainees increases every year. The apprenticeship constitutes a formal labour contract between the firm and the apprentice with a total duration of two to three and a half years (depending on the industry) and stipulating an initial probationary period of four to twelve weeks. It is known as the "dual system" because training is imparted both in the firm and at a vocational school (Berufsschule). Apprentices are expected to either attend school once or twice a week or to concentrate school attendance in several months of the year in order to learn the theoretical foundations of their occupations. The rest of the time is spent learning on the job, where the apprentices are introduced to specific firm knowledge but also to machine tools and other physical capital used. At the end of the training period the apprentices have to take an external exam in which both theoretical and practical skills are tested. Successful candidates gain the skilled worker's certificate, which enjoys nation-wide recognition in Germany due to the high degree of standardisation of

the skills considered necessary for engaging in a number of legally recognised occupations.

10. The dual system is governed by several regional and federal institutions: the part of the training programme pertaining to vocational schools - usually public schools - is subject to the Government at the level of the German Länder, in particular to the Länder Ministries of Education. The firm's share of the training programme is regulated by the Federal Government, especially by the Federal Ministry of Education and other Federal Ministries (depending on the type of occupation). In addition, the rules and the outcome of the game are influenced by the regional chambers of commerce and industry, the regional chambers of crafts, the local government (Gemeinden), the trade unions, the employer's associations and by other institutions. Regional chambers play a key role in monitoring vocational training, giving advice to firms willing to engage in training and by preparing and carrying out all interim and final exams as well as by acting as an arbitrator in case of conflicts between apprentices and firms or schools. The legal framework embraces a large number of laws and regulations, reflecting the interests of a great number of

social groups at the national and regional levels. Due to the adherence to the principle of dealing exclusively with occupations which have been legally established, a programme of training, examinations and certificates has evolved in which national and regional interests are well balanced.

11. The German apprenticeship system seems to benefit those who decide to serve in it. This is implied by recent estimates of the internal rate of return earned by apprentices of the order of 25 per cent (Dicke et al. 1994). This result, which appears to be excessive compared to estimates of the rate of return to training in the US of around 10 per cent (Heckman 1993), could help explain why apprentices are prepared to invest in vocational training by accepting low wages for a period of up to three and a half years. Other authors emphasise explanations other than the return on investment, such as the role of the apprenticeship as the main port of entry to internal labour markets, the insurance effect of the skilled worker's certificate in the German labour market and the limited future prospects for unskilled workers (Soskice 1994).

12: Firms seem to carry the bulk of the costs related to the dual system of vocational training. The reason for this is still the object of a great deal of research and speculative thinking. At least a priori it is possible to identify some potential benefits from the system accruing to the firms. First, by offering to train, firms are able to employ unskilled workers at a wage which is much lower than the average wage for regular unskilled workers. Second, after some part of the training period has elapsed (say, 1.5 or 2 years) and the trainees have acquired some specific knowledge about the firm, the productivity of those trainees tends to increase almost to the productivity level of regular skilled workers, although their wages are much lower than the ones paid to skilled workers. Third, the firm may use the training period to carefully screen the trainees and to select potential candidates for full jobs after finishing their apprenticeship, thereby economising on search costs for personnel and reducing the risk of employing workers that might not meet the firm's long-run expectations. Fourth, the firm saves the cost of introducing workers trained elsewhere to the specific conditions prevailing in the firm, i. e. it can reduce the period in which workers new to the firm earn the full wage but are relatively unproductive due to their lack of specific human capital.

13. Although the potential benefits listed above deserve some plausibility, empirical evidence does not actually support them. In the first place, benefits related to the retention of postapprentices might not be as high as expected, for the estimated retention rates are not the same across firms; they tend to vary especially with firm size and with the branch to which the firm belongs (Soskice 1994). This means that in view of the standardisation of German certificates, the mobility of postapprentices is an intended outcome of the system and that screening during the training period seems to play a minor role. It is obvious that firms try to retain the best postapprentices, at least to the extent that they have openings for them. This, however, is not the case in the crafts (Handwerk), where postapprentices traditionally move to a new firm. By contrast, major firms show the highest retention rates with the probability of staying with the firm being quite high even for weaker candidates. Big firms possibly represent a special case, in which negotiations between employers and trade unions have an influence on retention rates; their behaviour departs from the average behaviour of the great majority of German firms, which largely consists of small and middle-sized firms (Franz, Soskice 1994). Furthermore, recent findings indicate that the net impact of vocational

training on the firm resembles a tax on firm income. Estimates of the net present value (discounted cash flow) of the dual system for each one of the participants and for the economy as a whole, assuming that the funds allocated to training could have earned a rate of interest of 6.5 per cent per annum if they would have been invested in low-risk financial assets, reveal that the economy, the apprentices and the government each turn out to gain, while the firms lose (Dicke et al. 1994). Assuming that an inverse relationship between the rate of interest and the level of the net present value prevails (well-behaved investment), the conclusion is valid that a higher rate of interest of, say, 10 per cent, would yield a still lower net present value of the investment in apprenticeships for the firms under the same circumstances. A similar outcome for the firms, albeit based on a different method, namely on an estimate of costs and benefits, is reported by other authors too. The conclusion from that research is that under the present conditions it does not pay for firms to train apprentices in Germany.

14. Preliminary explanations for those estimates suggest that (i) the actual productivity of apprentices might be lower than normally

assumed and that (ii) the compensation paid to the trainees might be somewhat too high. The therapy that can be recommended involves a revision of apprentice compensation schemes and an outright extension of the time spent on training on the job, even if it were necessary for the latter to reduce the time spent at the vocational school. Moreover, there seems to be no support for the claim that firms offering training should be eligible for a subsidy or a corresponding tax cut, for such a claim would be at odds with the observed fact that firms voluntarily choose to offer training and that it is reasonable to assume that they do so because somehow they expect to increase their profits in the long run. The latter assumption gives some backing to the casual observation that the supply of training is to a certain extent related to firm performance and to the business cycle. Furthermore, criticism has been put forward concerning the time needed to adjust curricula and occupations to technical progress. Here too, some action would be desirable, particularly a simplification of the procedure to adjust the system to current developments.

2. Further Vocational Training

15. Further vocational training embraces all organised training that takes place after a first phase of vocational training has been completed and a minimum work experience has been gathered. Further training can be classified according to the source of the funds into training paid for by individuals, firm-financed training and government-sponsored training. Recent estimates of expenditures for further vocational training reveal that in 1992 a total amount of 83.1 billion DM was spent for this purpose in Germany (IW 1994). Firm-financed training held a share of 52 per cent, government-sponsored training one of 36 per cent and training paid for by individuals a share of 12 per cent in total expenditure. In spite of the impressive amount of funds channelled every year to firm-financed training, private firms do not report on a regular and comparable basis on their activities. Training may take place in-house or in the premises of specialised training institutions or firms. Only employees of the corresponding firm are trained in in-house courses, while in the latter case employees from several firms are trained together. One of the forms of further training is called "Aufstiegsfortbildung" and denotes measures that lead to a certificate after passing an examination. An example of this

is the master (Meister) certificate for occupations like auto mechanic, electrician, hairdresser, butcher, baker, blacksmith, etc. Similarly, training for which individuals pay for themselves is not regularly recorded, neither for the employed nor for the unemployed. Individual training can also extend to "Aufstiegsfortbildung".

16. Government-sponsored training mainly concerns measures foreseen in the Employment Promotion Act (Arbeitsförderungsgesetz), which is currently under review. These measures are a part of the active labour market policies under the responsibility of the Federal Employment Agency (Bundesanstalt für Arbeit) and its regional dependencies (Arbeitsämter). These measures are largely oriented towards the unemployed and carried out by public providers and private firms specialised in supplying training services. The measures endorsed by the Employment Promotion Act are "Fortbildung", "Umschulung" and "Ein-arbeitung". The first type of measures accounted for 76 per cent of all government-sponsored measures in West Germany and for 62 per cent of those in East Germany in 1993 (Scherer 1996). If it leads to a certificate, the measure is called "Aufstiegsfortbildung" (see above), if not, the

measure is called "Anpassungsfortbildung". The second type of measures aims at persons whose occupations have become obsolete in the wake of technical progress and who have to learn a new occupation in order to better match the skills demanded in the labour market. The 1993 shares of this type of measure in total measures were 21 and 28 per cent in West and East Germany, respectively. The third category of measures refers to introductory training when a new employee starts work in a firm and needs to accumulate basic specific human capital; it basically represents a wage subsidy. In 1993 the third type of measures amounted to 3 per cent of total measures in West Germany and to 10 per cent of total measures in East Germany (Scherer 1996). From 1994 onwards measures labelled "Aufstiegsfortbildung" are not supported any more under the Employment Promotion Act; these measures are now regulated by a new Act (Aufstiegsfortbildungsförderungsgesetz). The German Government's latest draft proposal for a new Employment Promotion Act does not include the labels Fortbildung, Umschulung and Einarbeitung any more; they have been replaced by the general label: further vocational training (berufliche Weiterbildung).

17. Empirical evaluations of further training measures from an economic point of view and using appropriate methods do not exist. Most of the studies concerning the German market for further vocational training focus on several aspects of the supply of and demand for this kind of vocational training. The studies generally conclude that individuals and firms interested in further training face information-related problems and deficits in competition policy (see, for example, Dicke et al. 1995). Information problems arise with respect to the information available to the potential consumer of training services about the services offered by training providers. First, it is difficult to get a complete overview over the providers and their services at the regional and supraregional level. Second, it is difficult to find information about the quality of providers (and of the trainers) and of their services. Third, many training providers offer certificates for successful candidates which are not generally recognised by private firms and government agencies in Germany. Fourth, it is difficult to find detailed information about the contents of the training courses in order to compare the services of several providers. Fifth, the potential trainee seldom knows what skills are being demanded by the market at a particular point in time and what the current trends are.

Concerning the degree of competition prevailing in the market, the deficits that have been detected refer to the structure of supply which is characterised by a mix of private (profit and non-profit) providers and public providers. Providers receiving finance from the federal and regional budgets are public schools, which seem to increasingly engage in further vocational training as a substitute for the decreasing number of regular pupils in the wake of demographic developments. These providers directly compete with private providers and the general feeling is that unfair competition prevails.

18. Answers to the problem of imperfect information can be found in regional and supraregional initiatives. In many German regions, both in the East and the West a number of training service centres have been established that aim at supplying information, advice, projections of local skill demand, quality control and curricula development. In many cases these services are complemented by business development and labour market instruments (Table 1).

Table 1 - Germany: Selected Regional Training Initiatives

No	Initiative	Objectives	Organisation	Participants	Tasks	Finance
1.	Ausbilderqualifizierungszentrum Güstrow (AQZ)	skill improvement, business development	formal association	industry associations, unions, chambers	skill demand projections, curricula adjustment	federal funds
2.	Dithmarscher Modell	skill improvement, business development	informal association	local government, labour policy authorities, chambers, training providers	information advice, co-ordination, skill demand projections, quality control	local public funds
3.	GARP (Gemeinschaftsausbildungsstätten Ruit-Plöchingen e.V.)	skill improvement, business development	formal association	firms, chambers, etc.	skill demand projections, curricula adjustment, training	public funds, user's contribution
4.	Innovationstransfer- und Forschungsstelle für beruflich betriebliche Weiterbildung M.-V. (ITF)	skill improvement, business development	project	staff	information, advice, curricula adjustment, training	federal funds
5.	Kommunale Weiterbildungsstelle des Landkreises Hoyerswerda	skill improvement	informal association	local government, similar organisations in West Germany, etc.	information, advice, skill demand projections	local public and European funds

Table 1 continued

No	Initiative	Objectives	Organisation	Participants	Tasks	Finance
7.	Kooperative Bildungsmaßnahmen im Regionalverbund (KBR)	skill improvement, business development	informal association	federal and local government, firms, training providers, etc.	advice, curricula adjustment, co-ordination	local public and European funds
8.	Qualifikationsentwicklungsbüro Brandenburg (Qebb)	skill improvement, business development	informal association	federal and local government, labour policy authorities, chambers, unions, etc.	skill demand projections, curricula adjustment, information, advice	federal and local public funds
9.	Regionales Forschungs- und Transferzentrum für berufliche Weiterbildung Sachsen-Anhalt/Halle (RTW)	skill improvement, business development	informal association	federal and local government labour policy authorities, unions, etc.	skill demand projection, information	federal, local, and European funds
10.	Saarbrücker Programm einer kommunalisierten Beschäftigungs- und Qualifizierungspolitik	labour market policies	authority	local government, chambers, industry associations, labour policy authorities	training	local public funds

Table I continued

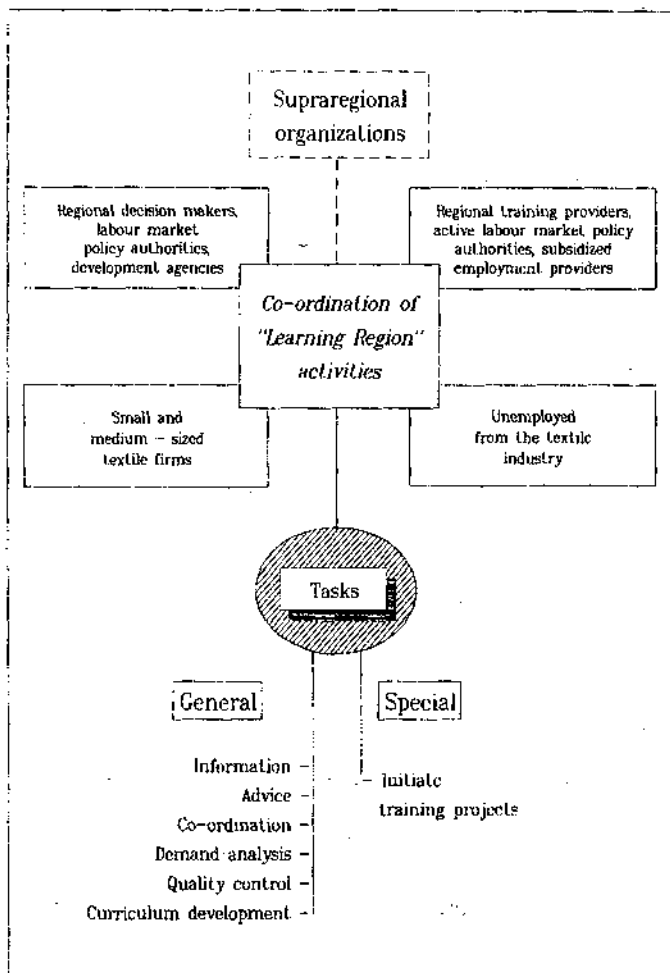
No	Initiative	Objectives	Organisation	Participants	Tasks	Finance
11.	Weiterbildung Hamburg e. V.	skill improvement	formal association	labour policy authorities, chambers, local government, unions, etc	information, advice, quality control	local public funds, participant's contribution
12.	Koordinierungsstelle "Lernende Region" Bayern/Sachsen	regional policy, skill improvement, labour market policies	project	local government, labour policy authorities, chambers, firms, unemployed, etc.	information, advice, quality control, skill demand projections, co-ordination, curricula adjustment, training	public funds

Source: Own compilation.

19. One of the most interesting initiatives from the point of view of regional policy is the Co-ordination Centre for a Learning Region in Bavaria and Saxony (Figure 1). The starting point of the centre is a joint initiative of two non-profit training providers owned by employer's associations in Bavaria and Saxony aiming at complementing traditional training measures with new instruments. The original working hypothesis was that the objectives of the firms and those of the labour market authorities very much influenced the supply of training and that regional aspects had been largely

neglected. Due to the fact that this region is under heavy pressure to adjust its industrial structure, the centre pursues a co-ordinated strategy at the regional level. Participants are local government agencies, employer's associations, training providers, firms, unions, universities, etc., i. e. all agents that have an interest in regional development. By subscribing to the idea of close co-operation and co-ordination, the centre hopes to efficiently use the resources available in the region to bring about structural change. The focus of the activities is on the textile industry, which consists of mostly small firms in both regions, in Bavaria and Saxony. The overall aim is not to maintain the textile industry but rather to search for new products (for example, high-tech ceramics) and to keep regional labour employed. The centre acts as a clearing point for information on demand for and supply of training. It is expected that this will produce valuable information for all agents. Furthermore, the centre engages in skill demand projections, curricula development, quality control and advisory services. This is a pilot project and in case it succeeds, the centre is planning to carry out similar projects together with other

Figure 1 - Germany: The Project "Learning Region"
in Bavaria and Saxony (regional network
of the textile industry - (NETTEX))



regions of the European Union, probably with a textile industry region in Portugal. This project has not been evaluated yet.

20. Other initiatives are engaged in producing local quality standards as a way to solve a part of the information problem. While it is certainly right to try to establish quality standards, due to the fact that the nature of training services is such that deficiencies can only be detected much later, the policy to develop local/regional standards could have adverse consequences for interregional labour mobility. In analogy to the dual system, what is needed here is a system of quality standards that is conceived at the regional level and recognised by the federal authorities. Furthermore, regional chambers of commerce, industry and the crafts offer information, advice, skill demand projections and curriculum development services. In addition, publicly accessible data banks with information on training opportunities are supplied by the chambers (WIS), the Federal Employment Agency (EBB) and the Institut der deutschen Wirtschaft (KURS-DIREKT), the latter on behalf of the Federal Employment Agency. These initiatives are complemented by efforts of the European Commission to establish

regional training data banks in the framework of the FORCE programme.

III. Implications of Training for Regional Policy

21. The German experience with training measures reviewed above reveals that agents at the regional level attach a great importance to training measures in connection with regional economic development. In order to draw conclusions for regional policy it is necessary to take first a look at scientific evaluations of the regional experience with training. Generally, the economic evaluation of training measures has evolved along two distinct lines of research: a macro approach based on neoclassical growth theory and a micro approach based on human capital theory and labour economics. While the macro approach yields direct estimates of the net impact of training on regional growth and income, the micro approach yields indirect evidence of the effects of training measures on regional income, by estimating the impact of training on the earnings of individuals employed in a certain region. Both approaches also differ in their ability to determine all the relevant effects associated with regional training, because the macro approach

is based on general equilibrium theory and the micro approach on partial equilibrium theory.

1. The Macro Approach to Regional Impact Assessment

22. To the extent that the rate of economic growth can be used as an indicator of regional competitiveness, only a few German regions - defined as Länder - have been able to foster their competitiveness in the period 1970-1995. The highest growth rates of real GDP per capita were registered in Bavaria and Hesse and the lowest in North Rhein Westfalia and Bremen (SLBW 1996). Moreover, Bavaria and Hesse also had the lowest unemployment rates and the highest export shares in 1996. North Rhein Westfalia and Bremen showed the highest unemployment rates and (with the exception of Bremen) the lowest export share (SB; SLSH 1996). In order to analyse the relative performance of German regions from a macroeconomic point of view the questions to be asked are Did German regions converge to higher income levels? and Did the distribution of per capita incomes between German regions become less uneven? Hypotheses to answer these questions can be derived from neoclassical growth theory where models developed during the last decade include human capital as a

key factor of production. Available empirical estimates (Sala-i-Martin 1996) reveal that German regions have converged in the period 1950-1990 with a speed between 1.4 and 1.6 per cent per annum β convergence), depending on the regression method used, and that the dispersion of regional per capita income has decreased between 1950 and 1990 (σ convergence). However, the approach used in those estimates (absolute convergence) does not explicitly include human capital variables, which is why it is not possible to determine the exact contribution of human capital to explain convergence and lower income dispersion in Germany on the basis of the existing empirical evidence. However, the contribution of human capital to regional growth can be derived in this approach from the interpretation of the results. Rates of convergence in the order of 2 per cent per annum are considered to be compatible with a national income share of total (human and physical) capital of $2/3$, where the share accruing to human capital is assumed to amount to $1/3$. Estimates of conditional convergence rates for Germany including explicit human capital data for German regions are not known to this author. One reason for the lack of studies is that regional human capital data banks do not exist

yet; a major effort seems to be necessary to gather the data needed for such a research.

2. The Micro Approach to Regional Impact Assessment

23. The micro approach to estimating the regional impact of training measures embraces experimental and non-experimental methods (Ashenfelter, Lalonde 1996). These methods determine the impact of training on individual earnings. In spite of the large number of studies in this field, the state of the art indicates that methodological and severe data problems govern the debate, particularly in relation to experimental methods. The reason is that experimental methods assume the random selection of candidates and the allocation of randomly selected candidates to two groups, one of them being the control group. Such a procedure is extremely difficult in the practical world of training. Neither employed nor unemployed persons can be easily persuaded to participate in experimental studies on a voluntary basis. These problems - not the data problem - can be avoided by switching to non-experimental methods, especially to econometric methods. The latter are able to bypass the selection bias problem by explicitly including the characteristics of trained workers in the

regression equation. There are very few high quality studies applying the micro approach to German data and none of them focuses on regional aspects; the studies address the general impact of training (government sponsored measures) on earnings and other variables. Research for Germany and other countries - most of the sophisticated studies were carried out for the US, where the best collection of data exists - yielded rather mixed results, with almost no support at all for training measures.

This contrasts with the results of the usual way of assessing training measures in Germany and other European countries which is totally unrelated to human capital theory (Schmid, O'Reilly 1996). These studies are normally interested in the extent to which programme objectives were achieved. Such objectives are, for example, the number of participants, the number of successful participants, the ability to find and keep a job after having participated in training courses, etc. Since the hypotheses tested are generally not based on economic theory, there is no explanation for the way a measure is expected to work (black box). Moreover, the methods used are not only not very sophisticated (in many cases only descriptive statistics

prevail), but also subject to the selection bias problem and, in addition, unable to discriminate among different policy impacts (creaming effects, dead-weight effects or windfall profits, displacement effects, substitution and distribution effects).

IV. Conclusions

24. Economic theory and the regional experience in Germany with training measures tend to underline the general importance of training for economic development and regional policy. Useful conclusions for regional policy can be derived from the state of the art in empirical research and from the practical experience with training in Germany. The results of empirical research do not seem to support an expansion of government sponsored training programmes. Regional experience with training in Germany indicates a major need to (i) reform the dual system and to (ii) find means to solve the problems of imperfect information (including quality) and competition detected in the field of further vocational training. A reform of the dual system of first vocational training should start with a thorough review of apprentice compensation schemes and an extension of the training time devoted to training on the job. Solutions to the problem of imperfect

information in the area of further vocational training call for incentives for the establishment of regional learning initiatives, in which all relevant regional agents participate, and for the supply of information by private and other organisations. Quality standards for further vocational training should be developed taking advantage of the vast experience gained with similar standards in the dual system. An appropriate competition policy should be designed to increase competition in the German market for further vocational training.

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