Comments on "Workplace Training in Europe" by Bassanini et al.

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This report brings together a wealth of material on workplace training: it surveys a wide literature, both theoretical and empirical, and it provides some new data and empirical results for a large number of European countries on training. In my discussion, I would like to touch on four of the areas highlighted in the report: measurement and data issues, estimates of the returns to training, theoretical issues, and training policy. I feel what I have to say more often complements the report, than being critical of it. In fact, where I am critical, it is more of the work done in this area and its shortcomings, and this includes my own work.

1. Measurement of training

Thirty or fourty years ago, the economics of human capital used to be comparatively simple. The human capital model was the work horse model to explain wage growth of individuals, as well as a variety of wage differentials between individuals. Since wages reflected marginal products in the models of Gary Becker and Jacob Mincer, many measurement problems were absent because much could be said without measuring training directly.

Things have gotten much more complex since. In addition to human capital, labor economists now entertain a myriad of other models to explain wage growth and wage differentials. Many labor economists feel that wages do not reflect marginal products. Hence, in order to say something about training, we need to measure training directly,

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which is difficult. The report does an excellent job in bringing together and presenting some cross-country measures of training from the best data sources we have available, and the authors are experts on these data. Nevertheless, I feel that even the best data in this area are likely to miss a lot, and I would like to point to two areas where I see particular problems. The first is the interplay of institutional features of vocational training systems and the resulting measurement of training, and the second is the role played by informal training.

I will discuss the case of Germany in order to illustrate some of the problems, which may arise due to particular national institutions. I pick Germany simply because it is a country I know a lot about. Germany is not included in many of the statistics in the report because of data problems. However, according to Chart 2.2, training participation in Germany is below the mean, and towards the bottom end of the range found in the old EU members. Is Germany a low training country? Much workplace training in Germany takes place in apprenticeships, but apprentices are not counted in the surveys these data are based on. This will understate the training level in Germany if apprenticeships are a substitute for workplace training later during workers' lives, as the authors also note. I will shortly show some evidence that this is likely to be the case.

What happens if we count training in the German apprenticeship system? Take the numbers in Chart 2.2 in the report again. The average participation rate in training in a year is about 35 %, and average hours per trainee are about 60. Extrapolating these numbers, an average worker receives about half a year of training during a 40 year working life. Compare this to the training in the German apprenticeship system. About 60 % of a cohort participate in apprenticeship training, and an apprenticeship lasts 3 years on average. This works out to 1.8 years of training for the average worker. Not all the time spent in the apprenticeship is actual workplace training, some is productive work. But even if only half of it is training, apprenticeship training alone would move Germany to the top of the list, *without* counting any of the other workplace training, which takes place.

But this is a rather specific problem, and it may well be special to the apprenticeship systems run in the German speaking countries. The more important problem lies with initial vocational training more generally. In vocational training, the divide between school and firm based training is somewhat fluid. German apprentices spend one day a week in schools. Someone training as a plumber would be classified as an apprentice, hence firm based training. Someone training as a nurse would be classified as learning in a school, although the trainee spends most of her time in a hospital. I suspect similar classification problems arise in other countries, and classifications will differ across countries. This makes comparisons difficult.

Why does this matter? Take one example. An important stylized fact in this literature is the observed correlation between formal schooling and participation in workplace training observed at the individual level. This has typically been interpreted as schooling and training being complements, or is being explained with some individuals being better learners than others. But the German apprenticeship system is a prime example that the correlation may well be negative: the typical apprentice gets 9 or 10 years of schooling, the typical non-apprentice gets far more formal schooling. Firm based vocational training clearly seems to be a substitute for school based academic training.

Let me show you some numbers on Germany in order to convince you that initial vocational training is quite important for individuals, long into their working lives. The numbers come from two waves of the German Qualification and Career Survey in the 1990s. Workers in the survey were asked where they obtained the skills they use most on their job, and they could mention two sources. Table 1 shows sources of workplace skills. About 60 % of respondents say that the most important avenue for receiving their skills was school or an apprenticeship. Apprenticeships are far more important than any formal training later on in life: only 6 % mention these avenues as most important, and they are not mentioned as a major category the second time either. The table also breaks the source mentioned first down by age of the respondent. Schooling and initial vocational training declines in importance with age, but it does so surprisingly little.

If formal company training is not a major source of workplace skills, what is it? The responses clearly point out that it is informal on-the-job training or learning, either instruction by colleagues, or learning through experience. In fact, such informal training is being mentioned about five times as often as formal training. Informal training is notoriously hard to measure, and, of course, the numbers I just presented do not tell us how much resources are being spent on informal training. But they suggest that informal training may be quite important.

The typical argument in empirical analyses of training is to look at the formal training, which we can measure with some degree of accuracy, and argue that formal and informal training are likely correlated. This would imply that looking at formal training is enough. I have made this argument myself but the only piece of evidence I know is the paper by Loewenstein and Spletzer (1999) based on the US NLSY data, which asked respondents directly about informal training. Table 2 casts a shadow of doubt on this conclusion. I have tabulated some numbers by firm size from the same data, counting any mention of formal or informal training as a source of skills. Not surprisingly, formal training is a more important source of skills in larger firms. However, this is at least partially offset by informal training being more important in small firms. The nature of the data I have used has a tendency to produce this type of result (because individuals had to name *some* source for their skills, hence if it was not formal training this makes informal training automatically more likely). Nevertheless, the result is far from mechanical. Ignoring informal training may well lead to some incorrect conclusions.

Another piece of evidence on the importance of formal training, which has struck me working in this area, has been an analysis I have done on the returns to training. In the traditional human capital model, on-the-job training is *the* source of wage growth over the life cycle. However, including measures of training in a standard wage regression hardly attenuates the estimates of experience and tenure effects at all. This could mean various things. Maybe training simply is not responsible for a large part of wage growth over the life-cycle. But if that is so, then we ought to understand what else it is, and we really do not have much of an idea. It would also make us wonder why have come

together for a conference like this. An alternative is that training is important, but training is measured very poorly. To the extent that the unmeasured training is informal, and it is correlated with measured formal training, the formal training should simply pick up the effect of the informal training. Hence, this interpretation is only viable if much informal training is uncorrelated with the formal training we measure.

Taking these pieces of evidence together it seems that informal training and learning by doing may be quite important ingredients in understanding skill formation in the workplace. But measurement of informal training will be difficult, and I have no miracle cures for the measurement problem.

Before concluding the thoughts on measurement, let me add a few remarks about human capital more generally. Training is just one type of human capital. Human capital investment can take a variety of forms, through search and matching between workers and employers, for example, or migration. This is important to realize, because it may change how we judge what is happening in labor markets. Turnover of workers generally tends to be bad for skill accumulation and often reduces the value of these skills. But turnover can bring about better matches between workers and employers, and therefore be productive as well. In addition, human capital itself is not enough in order to make workers productive, because the skills are embodied in humans. They must put forth effort, and hence incentive systems complement skills in the labor market. Different labor markets may put different emphases on these different facets of human capital, and this might be particularly important in comparing the low turnover labor markets in continental Europe with the more fluid ones in Anglo-Saxon countries.

2. Returns to training

The second topic I would like to talk about is the estimates of returns to training. The authors of the report show some estimates for various European countries. The most striking feature of these results, and others in the literature, is that the returns are huge.

The estimates in the report are for the incidence of training. Converting the median fixed effects estimate (for Denmark) to an annual return (similar to how we measure returns to schooling) yields 58 %. Returns to schooling are typically thought of to be in the range of 5 to 10 % a year. Of course, the duration of training is far from a year on average. In fact, most incidents of workplace training are rather short in duration: a week or less. Studies which have looked at returns to the duration of training have consistently found a pattern of very high returns to short training spells, and low returns to long spells.

How can we make sense of large estimates of the returns to training? I can basically see five potential explanations. The first is that the marginal returns to training are truly very high, and expanding training would yield large rewards to employees. This would imply that workers and firms are leaving large investment opportunities unexploited. Workers should be shifting large chunks of their education from schools to workplaces. The fact that this does not happen may be a result of the externalities discussed in the report (and I will comment on these below). I think that this is unlikely, simply because the numbers are too large to be plausible. I also think that the pattern of the empirical evidence points towards other explanations.

The second possibility is that very short training spells indeed have high returns, but long training spells have low returns. This strikes me as a quite plausible possibility. Imagine someone being promoted to a managerial position. The worker receives a week of management training. The payoff to learning that it is not a good idea to constantly shout at your employees is probably quite large. However, after the week is over, there is probably little material left that would make the individual a better manager. At this stage, it might be much more productive to go off and apply the material that has been learned. After, say, a year, there may well be an opportunity to participate in another short training spell, where something new could be taught. I think a lot of workplace training, particularly formal training, could be of this type.

The third possibility is that there is a lot of selection going on in who gets trained, and the standard methods do not deal with it properly. The standard procedure is to account for

fixed personal characteristics by looking at changes in wages due to training. But this may not be enough. I quite like the following idea. Individuals tend to have different rates of wage growth, at least over short horizons. Individuals, who have high wage growth, are more likely to participate in short training spells, and individuals, who lave low wage growth, tend to participate in long training spells. The high wage growth, short training spell individual is our manager from before. She has high wage growth, because she got promoted to manager. Now she receives a week of management training which has a fairly normal rate of return. However, we see her training spell being correlated with the wage increase from her promotion, and erroneously attribute the wage growth to training.

The low wage growth individual is someone who is doing poorly in their occupation. He takes a long duration course in order to retrain for a new, and hopefully better paying, occupation. But the payoffs to this training often only materialize after years, when the individual has found a suitable new job. Hence, the data will show exactly the pattern we see: high apparent returns to short training spells, and low returns to long training spells. In my paper on workplace training in Germany (Pischke, 2001), I show some evidence that accounting for individual level wage growth indeed leads to rather modest estimates of the returns to training, and the strong difference between short and long spells disappears. The report discusses other empirical evidence that attempting to control for selection into training tends to lead to lower estimates of the returns, which is also consistent with this explanation. Unfortunately, these estimates, including mine, are rather imprecise, and it would be good to have more replication of these types of results on different data sets.

The last two explanations for high returns are related to measurement problems. The first is the presumed complementarity of formal and informal training. Let's say for the sake of argument, we ignore informal training completely (this is basically true), there is about four times as much informal training than formal training (this is plausible from the numbers I showed you earlier), formal and informal training are perfectly correlated (which is a strong assumption), and have the same return (we have no idea on this

whatsoever). Then, the returns estimates we get by only using formal training should be five times the true return. The 58% return for Denmark would now be in the order of 12%, a much more plausible number. I could see that this explanation is indeed part of the story, but as I described before, I am not really convinced that formal and informal training are as positively correlated as is often assumed.

The last explanation is measurement error in the training variables which get recorded in surveys. Without going into the details, let me say that it is possible that the measurement error is such that it yields the observed pattern of high returns to short training spells. I am certainly happy to accept that there is likely to be a lot of measurement error in training variables, particularly the duration variable. However, the consensus seems to be that this is unlikely to be a large part of the explanation for the pattern of estimated returns (see Pischke, 2001, and Frazis and Loewenstein, 2005).

My tentative conclusion from the available evidence is that the true returns to training are probably overstated, and that the marginal returns to training are most likely in a sensible range. It may well be true that some short training spells have higher returns than longer ones. All this is consistent with the idea that the returns to training may still be higher than what we observe elsewhere, and hence with the idea that there are externalities and underinvestment in training. This is particularly true because some of the returns are likely to accrue to firms, and the returns discussed here are purely those for the employees. Let me turn to the theoretical issues, and the externalities next.

3. Theoretical issues and externalities

The authors of the report have done a good job to give a flavor of the more recent theoretical research on training, and the main insights emerging from this research. While there is much that we have learned, the theoretical research has often been of the type: "Theoretically, it is possible that *x* happens" with *x* being an ever expanding set. But in the end it is important to know what is going on in the world, not what is

theoretically possible. Unfortunately, often there is not enough of a link between the theoretical research and the empirical analysis to come to a good assessment of which theories are useful and which ones are not.

One reason for this is that the predictions of the theory in the new training literature are often not directly on observables. Much of this literature is on general training. However, many of the implications for general training are similar to those of the Becker model for specific training. Unfortunately, empirically, we do not have good ways of distinguishing general and specific training. Hence, in interpreting the data we are often at a loss of distinguishing between specific training in the Becker model, and general training in the new training literature. For example, the Becker model predicts that specific training (but not general training) and turnover should be negatively correlated, while the new training literature predicts that general training and turnover are negatively correlated. The fact that observed training and turnover are negatively correlated does not help distinguish the models if we cannot make the distinction between specific and general training in the data.

A second problem is that the new training literature emphasizes imperfect labor markets. In the Becker model, where wages equal marginal products, looking at the wage is enough to learn everything about the payoffs of training (general at least). In imperfect labor markets, we learn nothing about productivity by looking at wages. In fact, the difference between the two is an important driving force in these models but it is not a quantity that has an obvious empirical analogue since productivity is notoriously difficult to measure.

A third problem arises from the literature I have contributed to. This literature has been concerned with the question whether it is theoretically possible for firms to pay for the investment in general skills, and under what conditions this would happen. Hence, the goal of the research was to say something about the financing of training. But the financing is not something we observe directly. Workers may pay implicitly for training through lower wages, even when the direct outlays are born by the firm. The typical

short cut is to look at whether training takes place at all. The problem is that the firm paying is not necessarily the same as more training taking place: this only happens under rather strong conditions. For example, in Acemoglu and Pischke (1999) we have shown that under complete contracting over training between firms and workers the firm will pay for a larger share of training if there is more wage compression. But the amount of training will be less.

So the great challenge here is to link the robust implications of the models more directly to observables in the data. This is important because we need to learn which class of models describe training more closely, and in what circumstances. This in turn is important to tell us something about the efficiency of provision of training in the market. These issues are at the core of evaluating training policy.

What are the possible sources of external effects of training, and how large are these externalities likely to be? There are basically three classes of externalities: those between the training firm and the worker (will the worker and firm agree on the optimal level of training for them?), those affecting future employers of the worker (often dubbed the poaching externality), and spillovers on other workers outside the firm. Let me discuss these three externalities in turn.

There are two complications why the training firm and worker may not agree on the optimal level of training. The first is credit constraints of the workers. This strikes me as a small obstacle for employed workers. Since the average worker trained receives about 60 hours of training a year, this means that a full time worker has to give up about 4 percent of annual earnings to finance the training, disregarding direct costs of training. This strikes me as a fairly small amount. I would expect that even someone, who wants to spend a lot of resources now, might be willing forego some present consumption if the returns to the training are indeed substantial. And they could be substantial for the types of short training spells which we commonly observe. Credit constraints may be more of a problem for initial vocational training, like apprenticeships, where the investment is much higher.

The second complication relates to contracting possibilities. Can the worker and the firm agree ex-ante on the level and content of training and the necessary monetary transfers between themselves? That seems much less likely since the training process may be highly idiosyncratic. This should be a particular problem for informal training, which depends on the quality of the co-workers of a trainee. Hence, contracting problems may well be a major obstacle and could prevent the provision of large amounts of profitable training. This would happen, for example, if the training decisions which are made in practice are optimal for either the firm or the worker individually, but not necessarily for the pair taken together. This problem could be overcome if it was possible to write complete contracts over future wages, rather than over the training, for the employee at this firm. This mechanism might allow the pair to vest all the incentives for the investment in one of the parties, for example the firm. Again, such contracts are unlikely to be possible in practice. Employment relationships often last for many years, and it would be difficult for workers to commit to be underpaid compared to their outside options for many years.

The second type of externality is the poaching externality. If labor markets are imperfect, and employers earn rents on their employees, then future employers might gain by being able to hire a more skilled worker. The initial training firm and the worker will not take the gain of these third parties into account when they decide over the level of training. Therefore, too little training may be provided. The size of this externality depends on two things: how much turnover there is for skilled workers, and how much of the returns to training go to outside firms (the degree of wage compression in the market). In general, we would expect these two to be negatively correlated across economies: a high turnover economy is likely to have less wage compression. This suggests that this externality is unlikely to be extreme. On the other hand, at least one of the components might be high, so that the size of the externality could be more than negligible. For example, continental European countries may have relatively little turnover, but future employers gain a lot whenever they do hire a skilled worker.

It is important to note that not all turnover necessarily leads to this type of externality. Moen and Rosén (2004) point out that there is turnover, which is efficient in allocating workers across firms, and even labor markets with a lot of frictions may be organized in a way that they do not lead to a poaching externality. Nevertheless, this argument does not negate the fact that the poaching externality is likely to exist in practice.

But the poaching externality may be relatively unimportant for another reason. Lazear (2003) suggests that much training which looks general may really be firm specific. This is because individuals skills may well be rather general, but there are many skills, and the mix used in a particular firm could be very specific. If skills are highly specific, the poaching externality is not much of a problem since the training pays off only in the current job. Turnover does not matter directly for the optimal choice of training then: the training firm and the worker will choose less specific training when there is more turnover but this choice is optimal. Of course, the turnover in the economy itself may be inefficient. But this is unlikely to be a problem which should be addressed with training policy.

The third externality results from human capital spillovers across workers in different firms. This would happen if more training in one firm lead other firms to be more productive, through channels other than the poaching externality. An example of this could be that a supplier firm might operate more efficiently if the agent at the buying firm is more knowledgeable in specifying the product requirements, and in understanding the capabilities of the supplier. Such spillovers have been discussed in the growth and agglomeration literatures a lot, and there is some investigation of whether there are spillovers from formal schooling. The conclusions of this literature are still up in the air, and I have seen no work thinking about such spillovers in the context of workplace training.

In summary, are any of these externalities likely to be important? My hunch is that contracting possibilities between training firms and workers are at the heart of preventing them from reaching the optimal level of training. I doubt that credit constraints are very

important. The poaching externality may matter but is probably not the major part of the story. Spillovers to workers in other firms may exist, but it is again difficult to imagine that they are huge. However, these are a best informed guesses, more likely rather uninformed ones. The only way to tell is to test the implications of specific models which imply different externalities. This is a complex undertaking. There are certainly no simple tests, like looking at the relationship between training and turnover, as suggested in the report. This is only informative about the under-provision of training in a specific and simple model, but many other factors need to be taken into account simultaneously.

4. Training Policy

So is there a role for training policy? Obviously, if there are inefficiencies in the market for training, and it is quite likely that there are, there is a potential case for some government intervention. On the other hand, as I said, our understanding of the importance of the externalities is still rather limited, and there is basically no work trying to address by how much training provided by the market falls short of the optimal level. Given that we do not fully understand the nature of the externalities, it is difficult to know how the optimal policy should look like. And even if we did, should we expect government to implement that policy? Probably more likely, given the political process, actual policy would at best be a rough approximation, and possibly something falling short quite a bit. But if we are willing to settle for rather imperfect government policies, should we expect them to actually improve matters? At this stage, I am skeptical that that is the case.

Here is an additional point, which complicates policy: I have argued that informal training may be quite important empirically, and possibly account for much more investment than formal training. Informal training may be more difficult to contract on, so it may be subject to larger externalities. This suggests that policy should be directed primarily towards informal training. But what policy would actually raise informal

training? If private parties have problems contracting over such training, it is difficult to see how the government could write laws regulating it.

The second role for training policy pointed out in the report is for equity reasons. Can and should training policy be used to redistribute income? Here I am even more skeptical. Why? First, workplace training, at least formal training, is not important enough to have a big impact on wages. Using my earlier calculation, an average European worker receives half a year of training over their life-time. Say policy can raise this by 50 % for some workers, which certainly would require substantial intervention. At a 10 % return to training for workers, this would mean 2.5 % higher wages, a very modest amount.

The second reason why I am skeptical about government policy in this area is because it is already going on at a reasonably large scale. Many government run or subsidized training programs are focused on workers who are unemployed or at the bottom end of the wage distribution. Some of these programs are rather expensive. There is a large literature evaluating the effectiveness of these programs, and the conclusions are not particularly promising. Many of the programs seem to have no effect, and any positive returns are certainly not out of the ordinary (see Heckman et al., 1999). This contrasts rather sharply with the evaluation of some interventions in formal schooling. It seems to me that an appropriate design of the formal schooling system is the much more effective route to redistribute income.

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Table 1
Sources of Job Relevant Skills in Germany
(in percent)

Source of skill	First Mention	Second Mention	First mention Age ≤ 40	First mention Age > 40
School	3	4	3	4
Apprenticeship/vocational school	40	11	43	37
Technical school	6	4	6	6
University	12	3	11	12
Instruction by colleagues	17	21	18	17
Formal company training	4	11	4	4
Formal training outside company	2	5	2	2
Self-study	2	6	2	1
Experience on the job	14	35	12	15

Table 2
Sources of Job Relevant Skills and Firm Size
(in percent)

Source of skill	Firm size < 100	Firm size ≥ 100
Any mention of formal company training	11	18
Any mention of informal training	72	68