

“THE ECONOMICS OF APPRENTICESHIP TRAINING – SEVEN LESSONS LEARNT FROM COST-BENEFIT SURVEYS AND SIMULATIONS”

Summary (detailed reports in [English](#), [German](#), and [Spanish](#))

This article summarizes the seven lessons learnt from the publication “The Economics of Apprenticeship Training” written by Swiss education economists Prof. Dr. Stefan C. Wolter and Prof. Dr. Samuel Mühlemann and published in 2020 by the Bertelsmann Stiftung. The authors derive their lessons from cost-benefit evaluation and simulation studies they conducted over the last two decades. Even though their focus has mainly been on European countries (Germany, Austria, Switzerland, Italy, England, and Spain), the methodologies have also been applied to non-European countries (e.g., Singapore). The lessons learnt may also inspire donors, projects, and partner countries in their communication to engage companies in VET as they help to better understand the factors that influence the decision of companies to offer training.

Lesson 1: Ratio of Costs and Benefits Influences Firms’ Willingness of Providing Apprenticeship Training¹

Even though, the cost-benefit ratio is not the only decisive factor for companies to engage in training, economic theory predicts that if there are two identical companies only differing in their cost-benefit ratio, the one where benefits are higher than costs would train and the one where costs are higher than benefits would not. To test this hypothesis, it was necessary to empirically measure the costs and benefits of a large and representative number of training and non-companies. Only the inclusion of non-training companies allows to make a statement about the actual importance of costs and benefits for the decision to train.

The empirical investigations show the following:

- Swiss training companies had on average a positive cost-benefit ratio, whereas non-training companies had a negative ratio (substantial net costs).
- The cost-benefit ratio has an influence on the decision to train and the number of apprentices in a company.
- Fewer competitors lead to higher benefits (less poaching) and lower costs (lower apprentice’s wages).
- The companies’ willingness to train increases if local labor market conditions allow for a better cost-benefit ratio.

One possibility to increase the companies’ willingness to train is the preferential treatment of training companies in public tenders, which has been empirically shown to work in Switzerland, particularly for small companies. Many countries try to increase the companies’ willingness to train with different forms of financial incentives, however, empirical evidence on the actual impact is often not available.

Lesson 2: Similar Apprenticeship Training Systems Do Not Necessarily Produce Similar Outcomes

The external (e.g., partner country) view on the dual VET systems in Germany, Switzerland and Austria often leads to the conclusion that they are very similar and that therefore the cost-benefit ratios would have to be similar, too. Yet the evidence tells a different story: Whereas Swiss firms on average have a net benefit at the end of training, German and Austrian firms reckon with net costs. The main difference in the cost-benefit ratio between German and Swiss firms is in the productive contribution of apprentices. Whereas Swiss apprentices spend more time for productive (skilled) work, German apprentices have a higher share of unskilled tasks or practice. The differences between Austria and Switzerland can mainly be explained by significantly higher apprentice wages compared to skilled workers wages in Austria. There are two conclusions from these comparisons: First, not only the general characteristics of the VET system and its role in the whole education system are important, but also the political frame conditions such as labor market or social dialogue regulations and the likelihood of state interventions (e.g., offering subsidies or financial incentives). Second, trying to find inspirations for VET systems in partner countries, one must consider that single parameters (e.g., productive contribution of apprentices, relative apprentices wage) lead to large differences in cost-benefit ratios for companies in dual VET systems.

¹ The Bertelsmann publication that is summarized in this article uses the term “apprenticeship”, which we also use for consistency reasons. However, the authors draw on their experiences with the DUAL apprenticeship systems in Austria, Germany and Switzerland and simulation studies based on methods and partly parameters from these countries.

Lesson 3: Returns on Apprenticeships After Training Are Maybe More Important than During

As already mentioned, most Austrian and German firms and around a third of Swiss firms sustain a net cost at the end of training. For firms to be willing to accept these net costs, there must be some considerable benefits gained after the apprenticeship training. To fully understand the reasoning of those companies, the saved hiring and induction costs for skilled workers compared to keeping own apprentices after graduation need to be factored in. Empirical investigations have shown the following propensity to train depending on their cost-benefit ratio and hiring and induction costs of skilled workers:

	Low hiring and induction costs	High hiring and induction costs
Net costs at the end of training	Very low propensity No benefits neither during, nor after training	Unclear propensity Possible if hiring costs are higher than training costs
Net benefits at the end of training	High propensity Benefit already during training, therefore benefit after training not relevant	Very high propensity Companies benefit twice

Table 1: Propensity to train apprentices depending on the combination of cost-benefit ratio and hiring costs of skilled workers.

For companies to accept net costs after training, certain conditions must be fulfilled. First, their investment needs to be protected either legally (labor market regulations) or economically (large geographical distance to next competitor). Net costs may be accepted if the company can keep the apprentice after the training. However, being able to make an attractive job offer to apprentices after training also means that companies must be sufficiently large. This suggests that small and very small companies need to break even already during the training. If the frame conditions do not allow a sufficiently large number of companies to generate a net benefit during the apprenticeship, countries that want to promote apprenticeship training must be prepared to accept the sometimes-negative side effects of rigid labor market regulations and associated conflicts.

Lesson 4: Flexible But Coherent Training Parameters are Key for a Functioning Apprenticeship Training System

Different parameters of apprenticeship training, such as duration, apprentices' wages, expectations of apprentices' competences to be reached by the end of training, influence the firms' cost-benefit ratios and have to be designed as flexible as possible to cope with companies' different economic realities. To break-even for companies, different combinations of those parameters are possible, but do not necessarily lead to a favorable outcome for all stakeholders. Although there is no "one-size-fits-all" model that meets the needs of all training companies, individual parameters cannot be freely set and varied. Rather, they must be determined coherently both in their entirety and in their interaction to ensure a favorable cost-benefit ratio of a majority of the companies during or after training.

The authors provide two examples for this lesson:

Training duration (example 1): Training duration is in many countries uniformly set by the state for different occupations. However, in reality, different occupations require different durations until the apprentice reached the required level of competences. Therefore, the only standard to be applied to define the training duration should be the relative productivity that an apprentice must reach by the end of training compared to a skilled worker. This value should be the same over all occupations to ensure a successful transition into the labor market after the apprenticeship. Setting the same duration across all occupations can lead to the following two (unwanted) scenarios:

- First, it can lead to companies achieving a high net benefit because they can employ already productive apprentices at a low wage for „too long“ or
- Second, the company having to invest a lot of time and money in the training to achieve the required level of competences in the “too short” time, thus ending up with very high net costs.

Interaction between net costs during training and savings in recruitment costs after training (example 2): For an apprenticeship scheme to be worthwhile for a company, it should either bring a net benefit during the training or high enough savings of recruitment costs.

Lesson 5: Variable Apprentices' Salaries Prevent Distortions in the Apprenticeship Market

Being the largest single cost, apprenticeship wages are crucial when determining the costs and benefits for training companies. In case those wages are not determined by market forces, but externally and absolutely or relatively fixed by the state or the social partners (which is the case in many countries), distortions in the apprenticeship market will almost always occur. If companies cannot freely set wages and the wage set is too high, they can either react by not training at all or they can adapt other cost parameters that lead to a reduction in training quality in case there is no quality control system in place. A simulation study in Italy showed, that this relationship does not only affect the cost-side, but also the benefit-side by decreasing the productive contribution of apprentices. Lower training quality will, in turn, have severe negative consequences for the entire VET system. Distortions can either affect the firms' willingness to train in general or in particular sectors, occupations or company sizes. The authors conclude that if the quality of training is ensured, companies should be allowed to freely determine their wages. If, on the other hand, there is no functioning guarantee of training quality, fixed wages will not help either, as they will potentially even lead to a decrease of training quality.

Lesson 6: Apprentices' Benefits are a Relevant Factor That Must Also be Considered for a Functioning Apprenticeship System

Although it is essential for firms offering apprenticeships to break even during or after the apprenticeship, there would be no functioning apprenticeship system if there are no young people to accept the offer. They will only do so, if the cost-benefit ratio (the return on education) is right for them as well. If the return on education is too low, the consequence is that either not enough young people apply for apprenticeships, or mostly unsuitable candidates in terms of talent and motivation do. As a result of unsuitable candidates, the calculated net costs for the companies would increase due to lower productivity and a larger amount of training hours would be needed, leading to the cut of apprentice salaries, which in turn lowers returns on education – this eventually creates a vicious circle. To achieve a win-win situation for firms and apprentices, both the absence of net costs for the firms and a solid return on education for apprentices is necessary.

Lesson 7: Training Quality and Scope May Reduce Net Costs and Increase Returns on Education

The main reason for low returns on education for apprentices is that the additional income to be expected from training is only slightly above the wage of an unskilled worker in some occupations or sector. There are two potential reasons for this. First, it may be that the training in the occupation or sector does not lead to a higher profitability of goods and services produced, which does not allow for higher prices, higher profits, and ultimately higher wages. Second, the training may not be good enough for apprenticeship graduates to produce goods and services efficiently to justify a higher wage. To avoid this, there are certain solutions: in the case of the occupation not generating enough added value to allow for higher wages, this profession should be either only the preparatory stage for a more demanding occupation, which you can only learn if you have learned the basic occupation first, or the training should already prepare apprentices for additional activities that generate a higher added value. In the case of poor training, a firm must consider if and to what extent better training could increase the productivity of apprentices or the willingness of customers to pay. Though this would mean increased costs (longer duration of training and more expensive trainers), which are potentially offset by a significant increase in productivity of the apprentices who show a similar productivity as skilled workers but whose wages are still apprentice-level. Furthermore, firms that offer good training quality will find better apprenticeship candidates at the same or even lower wages because apprentices know that good quality training opens doors in their future. A high-quality training that prepares apprentices not only for the initial occupation but for higher level jobs leads to a more balanced combination of lower net training costs and higher saved hiring costs for firms as well as higher rates of return on education for apprentices.