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The match between education and work:
What can we learn from the German apprenticeship system?

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Contents

Abstract

The most outstanding feature of education in Germany is its extensive apprenticeship system: approximately two thirds of young people combine learning in schools with in-company training. This system of dual education is considered a main determinant of Germany's high quality labour force and low youth unemployment. In The Netherlands, dual education also exists, but full-time education in schools is more popular.

This paper analyzes the strong and weak points of human capital formation in both countries in relation to labour market performance and focuses on the contents, organisation and finance of dual vocational education at the upper secondary level. It forms part of a study by the Central Planning Bureau which comparatively analyzes the performance of the German and Dutch economies[1]. The information presented here is based on an overview of recent literature. Moreover, the Federal Institute for Vocational Training (BiBB) in Berlin has provided much inside information about the German educational system. As to the Dutch system, the National Centre for the Innovation of Vocational Education and Training (CIBB) in 's Hertogenbosch has provided useful background information[2].

The analysis concludes that the German dual system indeed stands out against the Dutch situation regarding the relation between education and the labour market, in spite of some weak elements of the German system (which are often exaggeratedly referred to as an educational crisis). For that reason, the dual system in Germany can be considered as a model for educational reforms in The Netherlands, where a stronger link between education and work is needed. Although it would be very unrealistic to assume that the German system can be transferred to The Netherlands at one go, strong elements can be considered as lessons to be learned for Dutch educational reforms. The main strong elements of the German system constitute incentives for workers and employers to join the system, as well as the clear value of the skilled worker certificate on the labour market: elements which are not represented to the same extent in the Dutch educational system. Weak elements of

1 This study will be published in 1995.

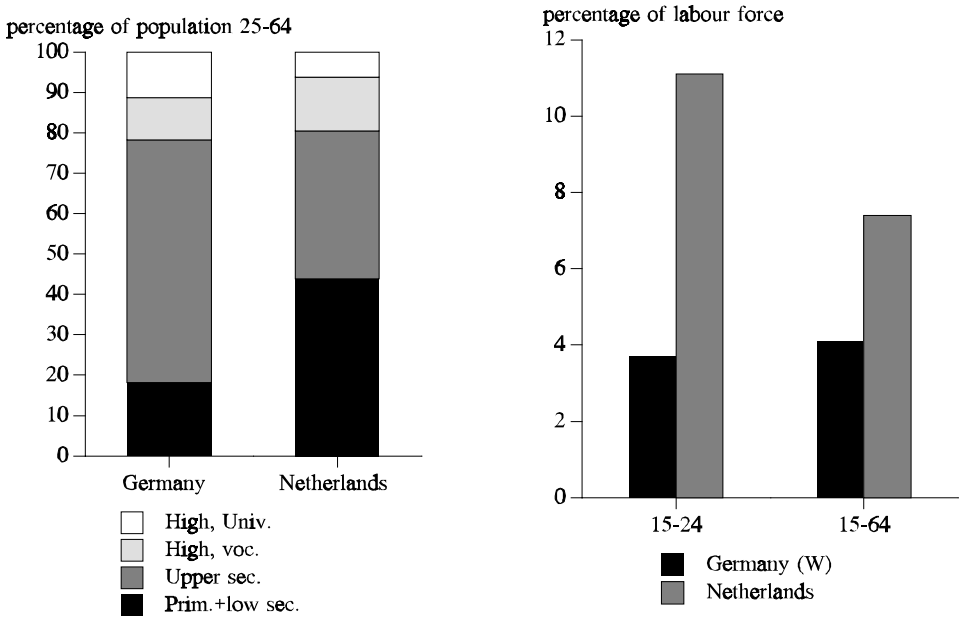
2 I would like to thank dr J. Reuling, Federal Institute for Vocational Training (Bundesinstitut für Berufsbildung, BiBB), Department International Comparison of Vocational Education, drs H.A.M. van Lieshout, University of Utrecht, Faculty of Social Sciences, drs K. Visser, National Center for the Innovation of Vocational Education and Training (CIBB), drs G.E. Van Vliet and drs G.P.M. Scholte, Ministry of Social Affairs and Employment, drs N.E.M. de Jager, dr G.M.M. Gelauff and drs A.H.M. de Jong, Central Planning Bureau, for their valuable comments on an earlier version of this paper.

the German system can also be considered as lessons, because these elements should be avoided when changing the Dutch educational system. Dead end jobs for skilled workers, differences between firms regarding the quality of enterprise-based training and difficulties in absorbing the fluctuating numbers of young people in the dual system are the main problems the German system is facing.

1 Introduction and summary

A comparison of educational outcomes between Germany and The Netherlands leads to the overall conclusion that the German system performs better in providing force with upper secondary qualifications is much higher than in The Netherlands, see graph 1 (and appendix C). In The Netherlands a greater number of young people drop out of secondary school without a leaving certificate. Another striking difference between both countries concerns the level of youth unemployment. As graph 1 shows, this is comparatively low in Germany (see also appendix C).

Graph 1 Educational level and youth unemployment, 1991



Source: OECD, 1994, 2, Employment Outlook, OECD, 1993, Education at a glance

These educational outcomes indicate an advantage of Germany over its Dutch counterpart, although the exact figures have to be interpreted with caution because of differences in statistical methods and definitions between both countries[3]. A stronger link between education and work is needed in The Netherlands and something can be learned from the German experience in this respect.

For that reason, the German educational system is often considered as a model for educational reforms in The Netherlands. Several educational policy measures have been introduced in The Netherlands in order to raise participation in dual education (see for example Rauwenhoff, 1990 or Dercksen, Van Lieshout, Kamps and Wijnands, 1993). To illustrate:

- in order to increase the chance to find a job it is a policy objective that everybody should obtain at least 'starting qualifications' at the primary apprenticeship level;
- in order to stimulate participation in the dual system government subsidies to firms and possibilities for joint provision of apprenticeships exist;
- new courses have been started at the upper secondary vocational level ('mbo') which consist of two years of school-based training followed by two years of apprenticeship training (Hövels and Meijer, 1994).

Unfortunately, dual education in The Netherlands does not include all elements which determine the popularity of the German system among employers and young workers. The German dual system is regulated firmly by government, employers and unions. These regulations lead to easy entry possibilities for young people, as well as widely acknowledged leaving certificates and low wage costs for employers who hire apprentices. They provide incentives for employers and for young workers respectively to join the dual system. The strong elements of the German system can be considered as lessons for educational policy measures in The Netherlands.

On the other hand, the dual system in Germany also features some weak elements. As to these, the career perspectives of skilled workers ('Facharbeiter') are limited, also because higher educated workers seem to reduce the upward career mobility of 'Facharbeiter'. Moreover, it remains difficult to match supply and demand since on the one hand future labour market requirements are to a large extent unpredictable whereas on the other hand the young population fluctuates over time. Weak points of the system also concern the quality of dual education. The quality of enterprise-based training differs between companies and the contents of school-based training

[3] See for example Central Planning Bureau, 1993, for an overview of problems in interpreting international educational statistics.

sometimes lag behind changes in enterprise-based training. Weak elements of the German dual system can also be considered as lessons for the Dutch situation, because they should be avoided where possible.

The structure of this paper is as follows: *First*, the educational systems of both countries will be compared and some information about participation in different types of education in both countries will be given (section 2). *Second*, the system of dual education in both countries will be taken a closer look at. The organisation and finance of dual education will be focused on (section 3). *Third*, the strong and weak points of dual education in Germany and the lessons to be learned for The Netherlands will be described (section 4).

2 Educational systems compared

This section gives a brief description of the initial educational system in Germany and compares it to the Dutch system. This overview aims at clarifying the position of dual education in both counties. The educational systems will be divided (according to the educational level) into primary, lower secondary, upper secondary, higher vocational and university education[4]. The German system will be regarded as one system, although there are differences between the educational systems of the sixteen 'Länder'. Appendices A and B show the main school types at each level of initial education in both countries together with the corresponding certificates, durations and (theoretical) age-ranges. Furthermore, this section presents information on participation in different types of education, especially in dual education. The development of participation in apprenticeships in both countries between 1970 and 1991 will be analyzed.

Primary and lower secondary education

Education in Germany is characterized by a long period of compulsory schooling. Compulsory schooling in full-time education starts at the age of six and lasts nine or ten years, until the age of 15 (or 16 in some 'Länder'). Early school leavers are obliged to follow part-time education for three years (or two years), until the age of 18. However, it is not obligatory to combine part-time schooling with an apprenticeship (Behringer and Jeschek, 1993). The duration of part-time compulsory schooling is one to two years longer than in The Netherlands, where the attendance of full-time schools is obligatory until the age of 16, whereas part-time education for early school leavers is obligatory until the age of 17 only.

Only a small percentage of children in Germany leave school (the 'Hauptschule' or a different type of lower secondary school) without a leaving certificate. Formally, this does not prohibit them to enter an apprenticeship, but makes it very difficult to get employed (Behringer and Jeschek, 1993). In The Netherlands, most apprenticeships require lower secondary education as a pre-entry condition, but in practice some unqualified drop outs do enter these apprenticeships (Meijer, 1994).

4 Secondary education is divided into lower secondary education, which is directed at children in the compulsory age range ("vbo" and "mavo" and the first three classes of "havo" and "vwo" in The Netherlands), and upper secondary education, which is directed at pupils above the compulsory age range ("mbo", "llw" and the last three classes of "havo" and "vwo" in The Netherlands). Higher education can be divided into higher vocational education and university education ("hbo" and "wo" respectively in the Netherlands).

Unqualified drop outs in The Netherlands can also participate in short full-time vocational courses (‘kmbo’) or in part-time classes (‘vormingswerk’).

Children in the compulsory education age range in Germany start with primary school and orientation classes and thereafter choose between several lower secondary school types. *Primary school* consists of four years of basic schooling (‘Grundschule’) and is followed by two orientation years (‘Orientierungsstufe’). These orientation years are considered to be the first stage of *lower secondary school* (Behringer and Jeschek, 1993, p. 10), which makes primary school two years shorter than in The Netherlands, see also appendices A and B. The ‘Orientierungsstufe’ provides an orientation to pupils for their further educational career.

When the ‘Orientierungsstufe’ is finished children have to choose between different types of lower secondary schools: ‘Hauptschule’, ‘Realschule’, ‘Gymnasium’ or ‘Gesamtschule’[5]. As in The Netherlands, children (or their parents) have to make this decision at an early age but can easily switch to another type of school later on and follow so called ‘inefficient’ educational routes. The four lower secondary school types[6] are all general schools, as there is no vocational school type in Germany that can be chosen immediately after completion of primary school. In contrast, in The Netherlands lower secondary vocational education can be chosen after completion of primary education (‘vbo’). However, the curriculum of Dutch ‘vbo’ also consists of general subjects which are concentrated in the first two years. Table 1 shows participation in lower secondary school types in both countries.

The *Hauptschule* provides general education for ‘low achievers’. The duration of the ‘Hauptschule’ is three (or four) years and the leaving certificate (‘Hauptschulabschluß’) gives access to full-time upper secondary vocational education or general education at a higher level. The ‘Hauptschule’ also prepares for dual education, but the certificate is no formal requirement.

The popularity of the ‘Hauptschule’ is diminishing. In 1970, the ‘Hauptschule’ used to be chosen by 55% of all pupils, but gradually the percentage of children that opt for ‘Realschule’, ‘Gymnasium’ or ‘Gesamtschule’ has risen, see table 1. In 1991 only 33% of pupils participated in the ‘Hauptschule’. Consequently, perspectives of ‘Hauptschule’-graduates to find a high quality training place in the

[5] There are also special schools for children with learning problems ("Sonderschule").

[6] The "Hauptschule", the "Realschule" and the first four years of "Gymnasium" or "Gesamtschule" are classified as lower secondary education.

dual system have become worse, compared to perspectives of graduates of the 'Realschule', 'Gymnasium' or 'Gesamtschule' (Malkmus, 1994). A similar trend can be observed in The Netherlands, where lower secondary vocational education ('vbo') used to be chosen after primary school by 41% of pupils (in 1970), whereas this percentage amounted to 32% in 1991. This type of school has become less popular, because it becomes more difficult to find a job or to complete further education with this certificate (Gordon, Jallade and Parkes, 1994).

Table 1 Participation in lower secondary education[1] per type of school

	Germany[2]			Netherlands	
	1970	1991		1970[3]	1991
in %					
general (Hauptschule)	55	33	vocational (vbo)	41	32
general (Realschule)	22	29	general (mavo)	27	29
general (Gymnasium)	23	31	general (havo)	6	7
general (Gesamtschule)	_	7	general (vwo)	7	8
			general (mavo/havo/vwo)	20	24
Total	100	100	total	100	100

Sources: Malkmus S., 1994, appendix 9, original data source: Bundesministerium für Bildung und Wissenschaft, CBS, 1993, 1, table 3.2 and 3.4, CBS, 1980, table 21 and 24
[1] Excluding "Orientierungsstufe" in Germany.
[2] Old Länder.
[3] 1978 for data on the division of general education into types of school, 1970 for division of all pupils into general / vocational.

The *Realschule* provides general education of a higher level than 'Hauptschule' and lasts four years. This type of education has become more popular in the past twenty years. Its certificate ('Realschulabschluß') gives access to full-time upper secondary vocational education and to the 'Gymnasium'. Some full-time vocational schools, such as schools that prepare for higher vocational education, require a

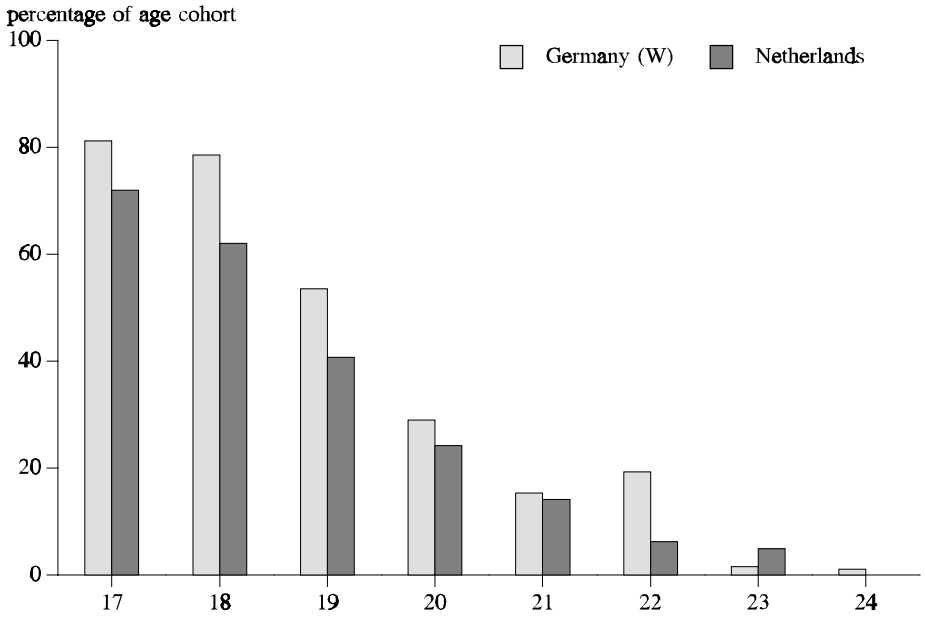
‘Realschulabschluß’ or an equivalent certificate as a pre-entry condition (Malkmus, 1994).

Gymnasia prepare children for higher education and their duration is seven years. This is one year longer than in The Netherlands, where the duration of schools that prepare for university (‘vwo’) is six years. Students in Gymnasia obtain an entry certificate for universities (‘Abitur’ or ‘Hochschulreife’). The *Gesamtschule* combines several types of schools. The ‘Hochschulreife’ can also be obtained at a ‘Gesamtschule’.

Upper secondary and higher education

A majority of children continues to follow upper secondary education when they are out of the compulsory age range. As can be seen in graph 2, German participation in upper secondary education is high in comparison to The Netherlands for almost all age groups. In both countries children have the possibility to stay in a class for another year, switch from one type of school to another or complete several upper secondary schools (such as ‘havo’ and then ‘mbo’ in The Netherlands or ‘Gymnasium’ and then dual education in Germany). This implies that some people of 20-24 years old can still attend upper secondary education.

Graph 2 Participation in upper secondary education, 1991



Source: OECD, 1993, Education at a glance, table S8

The structure of upper secondary school is similar in both countries. Both systems are characterized by a large number of secondary school types (see also appendices A and B) and many possibilities to switch from one type of school to another. Pupils can follow general or vocational education, the latter via a dual or full-time route. After successful completion of dual or full-time vocational education, students obtain an upper secondary vocational certificate.

Table 2 clearly indicates the high popularity of dual education in Germany. There is a high demand for training places by young persons and a high demand for trainees by industrial and commercial firms of all sizes in almost all sectors in Germany (Steedman, 1993). In contrast, a majority of Dutch pupils chooses for full-time instead of dual vocational education. Furthermore, participation in general education is very low in Germany compared to that in The Netherlands. However, the exact figures in this table have to be interpreted with caution, because the duration of the different types of school varies (see also appendices A and B).

Table 2 Participation in upper secondary education per type of school

	Germany[1]			Netherlands	
	1970	1990		1970	1991
in %					
apprenticeships (Beruf und Betrieb)[2]	68	57	primary apprenticeships (primair llw)[3]	22	13
			secondary apprentice-ships (secundair llw)[3]	4	8
full-time vocational (Berufsfachschule etc)	16	23	full-time vocational (mbo)[4]	30	46
general (Gymnasium/Gesamtschule)	16	21	general (havo/vwo)	44	32
total	100	100	total	100	100

Sources: Behringer and Jeschek, 1993, table 2.4.4., CBS, 1993, 1, table 3.3 and 5.7, CBS, 1980, table 21 and 24, Ganga, 1992, table 2.1, CBS, 1993, 2, table 7

[1] Old Länder.

[2] Only pupils with an apprenticeship contract.

[3] Only pupils with an apprenticeship contract. For The Netherlands, the number of apprentices according to the "Landelijke Organen" has been chosen.

[4] Note that part-time mbo courses are not included.

German children who choose for general upper secondary education follow the higher classes of the *Gymnasium* or *Gesamtschule*. The leaving certificate, ‘Abitur’ or ‘Hochschulreife’, gives access to university, but also to higher vocational education. In contrast to the situation in The Netherlands, there is no general upper secondary type of school in Germany (such as the ‘havo’ in The Netherlands) that gives direct access to higher vocational education. In Germany the percentage of pupils in general education rose between 1970 and 1990, whereas this percentage dropped in The Netherlands.

In full-time vocational upper secondary education, several types of schools with different kinds of leaving certificates, can be chosen, see also appendices A and B. In Germany, one year courses (*Berufsgrundbildungsjahr*) can be followed preparatory to entering an apprenticeship or to further full-time vocational education. These courses also have a buffer function: they reduce youth unemployment if there is a shortage of training places in the dual system. After

completion of such a short course, pupils do not possess upper secondary vocational qualifications. In order to acquire upper secondary qualifications, they can continue to study for two or three years in full-time vocational schools (such as *Berufsfachschulen*)[7], see also appendix A. These courses provide a combination of general and vocational education.

For most full-time vocational schools the entrance requirement is a lower secondary leaving certificate (Münch and Henzelmann, 1993, p. 46). The leaving certificate of some courses gives access to higher vocational education. This certificate ('Fachhochschulreife') can be obtained at *Fachoberschulen*, at *Fachgymnasia*, *Technische Oberschulen* and at some *Berufsfachschulen*. As a pre-entry condition these schools require a 'Realschulabschluß' or upper secondary vocational qualifications ('mittlerer Bildungsabschluß'). The contents of this type of education are more theoretical than that in most of the 'Berufsfachschulen' or 'Berufsaufbauschulen' (Malkmus, 1994).

In dual upper secondary education (*Berufsschule und Betrieb*), theoretical education is combined with working experience and practical learning. The duration of apprenticeships in Germany is two to three and a half years, depending on the occupation. During this period most apprentices follow enterprise-based training on the work floor for four (or three) days a week and attend classes ('Berufsschule') one (or two) days a week. In The Netherlands, the dual system is divided into three study levels: primary, secondary and tertiary apprenticeships. These study levels correspond with different qualifications, namely semi-skilled, skilled and specialized skilled workers (Dercksen, Van Lieshout et al, 1993). Participation in primary apprenticeships is highest. A primary apprenticeship lasts two to three years, in which pupils usually go to school for one (or two) days a week and are trained on the job for the rest of the week. In both countries, the qualification for graduates of the dual system is an upper secondary vocational qualification, see also appendices A and B. A completed apprenticeship training does not give access to higher vocational education (except in a few German Länder).

Table 2 reveals that full-time vocational courses at the upper secondary level have become (*relatively*) more popular compared to dual education. In Germany this is also caused by the fact that pupils more often follow a full-time course before they enter dual education. Nevertheless, the trend towards higher participation in full-time vocational courses does not correspond with a lower participation rate in dual

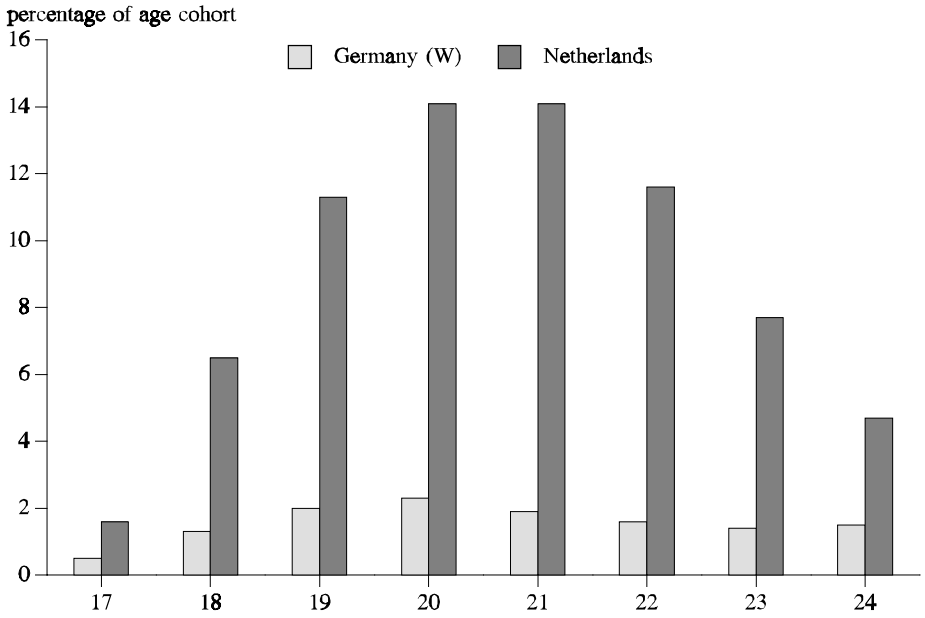
[7] As in The Netherlands, vocational education in the health care sector is organized differently, see Visser (1992, p. 9) and Münch and Henzelmann (1993, p. 11).

education, since the total number of pupils in upper secondary education has risen in both countries (compare table 2 with graph 5).

In Germany full-time vocational qualifications or general qualifications at the pre-university level give access to higher vocational education[8]. In The Netherlands there is also a general type of education at the upper secondary level (‘havo’) that gives access to higher vocational education but not to universities. In both countries access to universities can only be obtained in one way: the ‘Abitur’ and the ‘vwo’-exam respectively. The higher educational systems in both countries are broadly similar. Higher education in Germany consists of higher vocational education (‘Fachhochschulen’) and universities (‘Universitäten’), including other educational institutions of the same level as universities (such as ‘Technische Hochschulen’). Higher vocational education is more oriented towards working practice and has a shorter duration compared to universities (and comparable institutions). The duration of higher vocational education in Germany is one year shorter than in The Netherlands, whereas the duration of education at universities is similar.

[8] Apart from possibilities to participate in higher education for people without the necessary pre-entry conditions (Behringer and Jeschek, 1993, p. 42).

Graph 3 Participation in higher vocational education, 1991

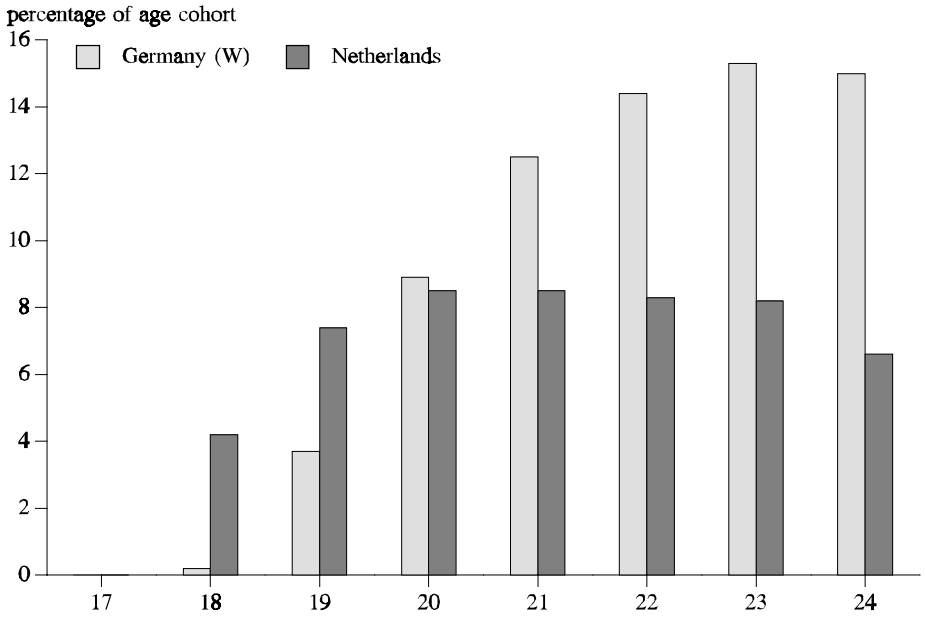


Source: OECD, 1993, Education at a glance, table S9

Higher vocational education is chosen more frequently in The Netherlands than in Germany, where the higher vocational sector is much smaller, as can be seen in graph 3. This is related to the fact that many pupils in Germany have followed an apprenticeship, which does not give access to higher vocational education. Therefore, most German students merely study for upper secondary qualifications or opt for universities (or 'Hochschulen' of the same level). In contrast to the situation at the higher vocational level, German participation in universities is higher than in The Netherlands, as can be seen in graph 4.

Summarizing, it can be concluded that participation per type of school differs between both countries, although the educational structures are quite similar. The position of dual education in the educational structure is approximately the same, as dual education is provided at the upper secondary level in both countries besides many types of full-time vocational education. Moreover, the apprenticeship certificate gives access to higher education in neither of the two countries.

Graph 4 Participation in universities, 1991



Source: OECD, 1993, Education at a glance, table S9 and S10

Nevertheless, as to the position of dual education, four main differences between both educational systems can be mentioned. *First of all*, there are no formal pre-entry conditions to enter an apprenticeship in Germany. In The Netherlands, a lower secondary vocational certificate ('vbo') or general lower secondary certificate ('mavo') is required to enter most apprenticeships, although some apprenticeships can be followed without these qualifications and entry requirements are moreover not always applied in practice. *Second*, the German system does not provide vocational qualifications at the lower secondary level, but only provides short courses ('Berufsgrundbildung') to prepare students for an apprenticeship. In The Netherlands lower secondary vocational courses exist ('vbo'). *Third*, the duration of part-time compulsory schooling is longer in Germany. *Fourth*, the German qualification for graduates of the dual system is always that of a skilled worker or 'Facharbeiter'. In The Netherlands this depends on the level at which the apprenticeship has been followed. A semi-skilled, skilled or specialized skilled worker status can be obtained.

Participation in dual education since 1970

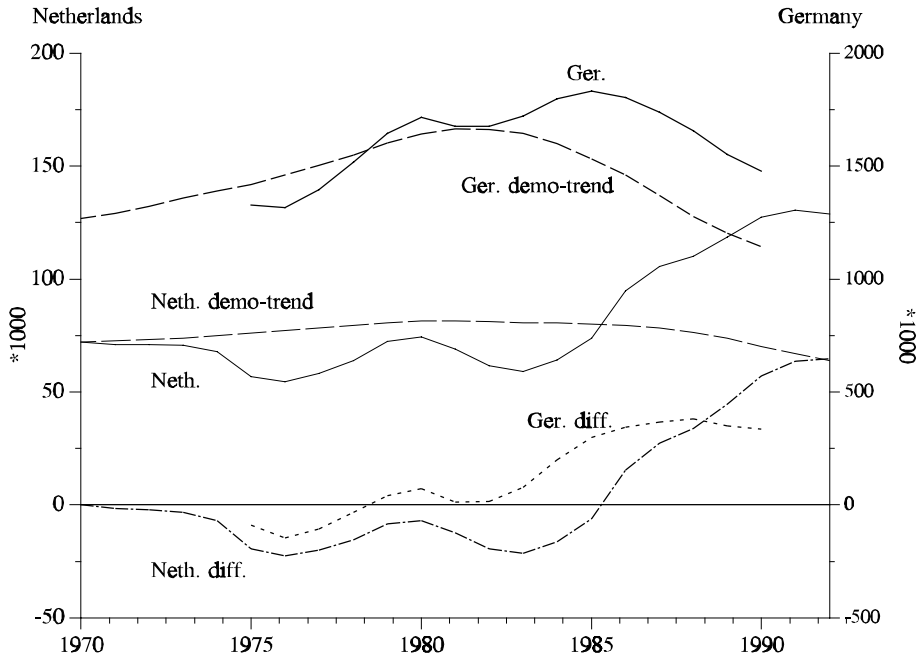
The most remarkable difference in participation between both countries concerns participation in dual education. Not only the level of participation greatly differs between both countries, but also the development of the number of apprenticeships over time (from 1970 until now). In the old German 'Länder' the number of apprenticeships has not fallen below its 1970 level, however, the number of apprenticeships is declining since 1986 (graph 5, Ger). Until 1979, the number of apprenticeships dropped below its 1970 level in The Netherlands, but in the eighties the number of apprenticeships picked up strongly (graph 5, Neth).

Demography, the supply of training places by firms and preferences of young people influence the number of apprenticeships, which by definition is determined by the young population and by participation rates in dual education. Particularly in Germany demographic factors have had a negative influence on the number of apprenticeships since the beginning of the eighties. This is illustrated in graph 5 where the demographic trend - the number of apprenticeships under the assumption of constant participation in dual education at the 1970 level - shows a decline since the beginning of the eighties (graph 5, Ger. demo-trend and Neth. demo-trend respectively).

The supply of training places by firms in both countries fluctuates in a procyclical way (see also Steedman, 1993, table 1). This implies a positive influence of the business cycle on the number of apprenticeships in both countries and also that participation in schools rises as soon as the number of available apprenticeships falls because people who cannot find a training place participate in full-time education. Besides the business cycle situation structural factors, such as preferences of pupils or policy measures, influence the number of apprenticeships. The occupation German pupils choose often determines which educational system (dual or full-time) they should enter.

Over the period 1970-1979 the number of apprenticeships in Germany was below the number that would be expected if only demographic factors had influenced this number (graph 5, line Ger. diff). In the eighties participation started to rise again, and the number of apprenticeships was higher than could be expected on account of demography. However, since 1985 the decline of the young population was so large that rising participation rates could no longer compensate for the falling number of young people (see also Fischer et al, 1993). Therefore, the recent fall in the number of apprenticeships in Germany (since 1985) can be attributed to a declining number of young people (see also Althoff, 1994).

Graph 5 Development of apprenticeships in Germany and The Netherlands



Sources: Behringer and Jeschek (1993), Malkmus (1994), Tessaring (1993), Statistisches Bundesamt (1992), Ganga (1992)

Ger. Neth. the total number of apprenticeships in Germany (old "Länder") and The Netherlands respectively.

Demo-trend the number of apprenticeships under the assumption of constant participation rates since 1970 (as a percentage of the young population aged from 15 to 20).

Diff the total number of apprenticeships minus the number according to demo-trend.

In The Netherlands, participation in dual education remained low for a much longer period: from 1970 until 1985 the number of apprenticeships was lower than the number that would be expected on account of demographic tendencies (graph 5, line Neth. diff.). Since the beginning of the eighties policy measures (such as government subsidies to firms that participate in training activities and the creation of alternative apprenticeship places provided by groups of (small) firms, see Ganga, 1992) led to a strong increase of the number of apprenticeships, in spite of a declining young population. Consequently, since 1985 the number of

apprenticeships was higher than the number that could be expected on the score of demographic factors.

The characteristics of apprenticeships have also changed. Nowadays apprentices are characterized by a higher pre-entry educational level than in 1970. Especially the German system appears to be attractive to a wide ability range, whereas lower secondary education is still the most common inflow category of dual education in The Netherlands. In Germany, the qualifications of apprentices range from unqualified school leavers to people with ‘Hochschulreife’. Between 1970 and 1990 the percentage of apprentices with upper secondary qualifications has almost tripled, and 14% of apprentices has obtained ‘Abitur’ or ‘Fachhochschulreife’, see table 3.

Table 3 Participation in apprenticeships by pre-entry educational level

	Germany				Netherlands		
	1970	1980	1990		1978	1980	1990
	in % of all apprentices				in % of inflow[1]		
primary/lower secondary ("Hauptschule" with or without certificate or "Berufsgrundbildung")	80	50	44	primary/lower secondary ("vbo" with or without certificate and "mavo")	96	93	81
upper secondary: ("Berufsfachschule" or equivalent certificate)	19	44	42	other[2]	4	7	19
upper secondary: ("Hochschulreife" or "Fachhochschulreife")	1	6	14				
total	100	100	100		100	100	100

Source: Tessaring (1993), table 3 and De Grip et al (1993), appendix B
[1] Inflow in primary apprenticeships only.
[2] All other previous educational courses, including "havo" or "mbo".

In both countries, girls are underrepresented in the dual system in comparison to boys, but relatively more so in The Netherlands. Since 1970, the share of girls in the dual system has slightly increased (namely from 35% in 1970 to 42% in 1991

in Germany and from 9% in 1970 to 27% in 1991 in The Netherlands respectively, see Tessaring, 1993 and Ganga, 1992), but in 1991 it still strongly differs from that of boys.

The differing preferences of boys and girls become more clear by looking at the three most popular occupations for boys and girls respectively (table 4 and 5). In both countries, some boys can be found in female dominated economically oriented occupations, whereas hardly any girls can be found in technically oriented occupations dominated by males. According to Behringer and Jeschek (1993) this situation is also caused by discrimination against girls who endeavour to get an apprenticeship in the technical sector.

Table 4 Most popular occupations in Germany[1], 1991

	male	female		male	female
	in % of male and female apprentices respectively				
male dominated			*female dominated*		
electrician	16	0.9	office clerk	5	24
mechanic	12	0.6	merchandiser	6	19
fitter	11	0.4	health care worker	0.3	19

Source: Statistisches Bundesamt (1993)
[1] All Länder.

Table 5 Most popular occupations in The Netherlands, 1991

	male	female		male	female
	in % of male and female apprentices respectively				
male dominated			*female dominated*		
electrician	13	0.9	health care/ services	0.4	28
metal worker	11	0.4	hairdresser	0.5	20
construction	9	1	office/ administrative	3.4	16

Source: CBS (1993, 2)

3 Organisation and finance of dual education

The organisation and finance of apprenticeships in Germany makes it worthwhile for many workers and firms to participate in the dual system, despite some weaknesses of the system. According to Finegold (1991), the success of the German system cannot be understood without a description of its underlying institutional arrangements. Therefore, this section focuses more narrowly on some aspects of the organisation and finance of dual education in Germany and makes a comparison with the Dutch situation. It can be concluded from this description that incentives for employers and workers to take part in the dual system do not exist to the same extent in The Netherlands.

Organisation and finance of the German dual system

The dual system in Germany stems from the craft trades in the Middle ages. In 1869, legislation made part-time education in schools for young workers obligatory (Steedman, 1993 or Malkmus, 1994). Accordingly, young people employed in the emerging industrial sector had to go to school on a part-time basis, as well as workers in the craft sector. Nowadays, a traditional 'Handwerk' (artisan) sector still exists, but dual education in the manufacturing and service sector ('Industrie und Handel') is of a larger scale.

Young workers seeking to join the dual system and employers searching for apprentices have to follow a set of rules decided upon by the government, workers and employers. People of sixteen years old or older can enter the German dual system. Their pre-entry educational level does not formally determine their possibilities to enter the dual system, but influences the chance to find a training place. Employers are not obliged to hire apprentices, but if they do so they are obliged to let them go to school during work time and to provide the enterprise-based part of their training according to national standards. This means that only a certified teacher, who has completed apprenticeship training and has obtained the Trainer Aptitude or the 'Meister' certificate, is allowed to give enterprise-based training and that the contents of enterprise-based training are determined per occupation (OECD, 1994, 1). In 1992 374 recognized occupations existed (Malkmus, 1994).

Over time, the ways to provide enterprise-based and school-based training have become more diverse. Nowadays, parts of enterprise training can be provided through extra plant training centres in order to improve the quality of training and to facilitate the provision of some parts of the training for small or medium sized firms. Public funds were used to build and equip these centres (OECD, 1994, 1).

On the other hand, some (larger) firms also provide the school-based part of the training within the firm.

Training costs are shared between the government, employers and workers. The governments of the Länder pay for the school-based component. Employers finance enterprise-based training, such as remunerations for apprentices, instructor salaries, equipment and examination costs. Evidently, apprentices bear a part of the costs as well, since their salaries are relatively low. The wage and work conditions for apprentices are determined per occupation. Collective bargaining agreements specify the (minimum) apprentice wage. According to Behringer and Jeschek (1993, p. 32) most apprentices earn between 650 and 1000 DM a month. The average apprentice wage is considerably lower than the wage of young unskilled workers (Winkelmann, 1994, 1). Apprentices with very low wages receive an allowance from the government, but this concerns a very small group (Behringer and Jeschek, 1993, p. 32).

Qualifications are awarded on the basis of written and practical examinations, set and marked by external examiners, which implies that the examiner is another person than the teacher (Münch and Henzelmann, 1993). So called competent bodies (mostly chambers of commerce) issue certificates, which are recognised throughout Germany. The examinations result in the skilled worker (‘Facharbeiter’) status and indicate that the pupil has obtained the necessary practical and theoretical knowledge according to the standards of the Vocational Training Act. Certificates in the dual system consist of several parts. Apart from the skilled worker certificate described above, two other certificates exist, namely a training certificate issued by the employer and a theoretical certificate issued by the school. However, these certificates are less important than the final examination for the skilled worker status (Münch and Henzelmann, 1993). In the following, the apprenticeship certificate will be defined as the final certificate after examination for the skilled worker status.

After graduation, workers can apply for a skilled worker’s job with their current employer or look for a job with another employer. A job with the current employer is not guaranteed, because apprentices have a labour contract of limited duration. Skilled workers also have the possibility to participate in adult education, for example to study for the ‘Meister’ certificate. A minimum period of work experience, lower secondary qualifications and an apprenticeship certificate are the entry conditions for the ‘Meister’ study. This study takes approximately two years and the study level is the same as that of a higher vocational study, but the ‘Meister’ certificate does not give access to higher education. ‘Meister’ in the ‘Handwerk’ sector can set up a business and all ‘Meister’ are allowed to train

apprentices. Apart from the ‘Meister study’ skilled workers have the possibility to participate in a further technical study (Münch and Henzelmann, 1993) or to study for the Trainer Aptitude exams, which enables them to provide enterprise-based training (OECD, 1994, 1).

On the labour market, there are clear links between the skilled worker status (‘Facharbeiter’) and the contents and status of a skilled worker job. ‘Facharbeiter’ are included in collective bargaining agreements as a separate category and (minimum) salaries per occupation are determined by collective bargaining agreements. A skilled worker who finds a job in his or her training occupation, will almost always receive the skilled worker wage. In 1989, the net wage of full-time workers without vocational schooling amounted to approximately 90% of that of ‘Facharbeiter’ (Tessaring, 1993, median net wages), whereas the wage differential between ‘Facharbeiter’ and workers with higher education is much higher. Earnings, status and career perspectives of the dual system vary per occupation. The perspectives of jobs in the craft sector (‘Handwerk’) have diminished, whereas apprenticeships in the industry and service sector (‘Industrie und Handel’) feature better career perspectives.

The set of rules governments, workers and employers are bound to follow is jointly determined by government, employers and unions through a complex process at federal, ‘Land’ and local level. OECD (1994, 1), Münch and Henzelmann (1993), Behringer and Jeschek (1993) and Green and Steedman (1993) give an overview of this process. The way in which the contents of training in the dual system are determined will be briefly described here. The contents of the school-based component of dual education are determined by the governments of the ‘Länder’, which take care of the planning, organisation and supervision of the school-based component. This does not mean that the school-based part of the system strongly differs per Land, because the sixteen Länder cooperate on a voluntary basis (Conference of Ministers of Education and Cultural Affairs, OECD, 1994, 1). Employers also advise through advisory committees. As school-based training supplements enterprise-based training, the curricula of school-based training correspond with the occupational structure of enterprise-based training.

Regulations related to the contents of enterprise-based training are determined at the federal level. This is exceptional, because almost all aspects of other types of education are regulated per ‘Land’, including legislation, regulations, curricula, standards, assessment procedures and quality control (Green and Steedman, 1993). Regulations provide legally binding minimum standards for the contents of enterprise-based training. These standards are determined per occupation through a complex and time consuming process in which the federal government, the

governments of the ‘Länder’, employers associations and trade unions participate. However, the slow pace in which training curricula change does not necessarily hinder the adaptability of individual firms to changing skill requirements, because regulations only relate to the provision of minimum standards. Individual firms can choose their own training methods and improve the required minimum training quality (OECD, 1994, 1).

The process which leads to new standards for enterprise-based training ensures that the minimum quality of enterprise-based training is the same in all Länder. The Federal Vocational Training Act provides the institutional framework and states that the federal Ministry of Economics has to approve training regulations in agreement with the Ministry of Education and Science. The Vocational Training Act does not prescribe the coordination procedures by which the minimum standards for enterprise-based training are determined. This procedure is determined in a "joint findings report" (of 1972, see OECD, 1994, 1). The Federal Institute for Vocational Training (‘Bundesinstitut für Berufsbildung’, BiBB) has a coordinating and advisory role in this process. Furthermore, the BiBB contributes to the development of training quality through recommendations on the contents of the curricula. The board of the BiBB consists of representatives of the government, workers and employers (Aalders, 1994). The tasks of the BiBB are laid down in the Vocational Training Promotion Act (of 1981).

The quality of enterprise-based training is monitored at the operating level. The competent bodies which also issue certificates (mostly chambers of commerce) check the quality of training. Firms that participate in training activities are obliged to join these chambers and to train according to the standards in the apprenticeship contract. At the work floor level, works councils ensure that training regulations are followed.

Organisation and finance of Dutch apprenticeships

The Dutch dual system is organized on the basis of occupations and is divided into study levels. There are approximately 400 different occupations (Ganga, 1992) and three study levels: primary, secondary and tertiary. In principle, people of 16 years old or older can enter the dual system. The duration of a primary apprenticeship is two to three years. A lower secondary leaving certificate (‘mavo’ or ‘vbo’) is required to enter most primary apprenticeships[9], although this regulation is not always enforced in practice. Young people who do not have this certificate are

[9] Or an equivalent level such as three years of "havo" or "vwo".

sometimes allowed to follow an apprenticeship, for example if they start with a one year vocational course (‘nuldejaar’, see Ganga, 1992). Although the formal entry conditions for apprenticeships in The Netherlands are not very strict, unqualified young people have more difficulties in finding a training place.

Employers who hire apprentices have to train according to the standards set by national apprenticeship organisations (‘landelijke organen leerlingwezen’). An apprenticeship contract is signed by the employer, the apprentice, the school and a representative of a national apprenticeship organisation. The apprenticeship contract implies that the employer is responsible for the quality of enterprise-based training. In most cases the apprenticeship contract is linked to a labour contract, which can be a contract of unlimited duration or a contract for the duration of the training period. Accordingly, apprentices receive a salary. Some firms provide part-time labour contracts, for example for four days a week. In some cases the apprentice does not get a labour contract and hence does not receive a regular wage but an allowance (see also De Vries and Heere, 1993). A minority of apprentices does not even have an apprenticeship contract, since it is also possible to follow the school-based part of an apprenticeship only.

Parallel to the German situation the government, employers and workers share the costs of training. The government pays for the school-based part of apprenticeships and finances the national apprenticeship organisations. The government also subsidizes enterprise-based training. Firms pay the costs of the enterprise-based training, and often share a part of these costs through payments to schooling funds (‘O&O fondsen’, see also De Vries and Heere, 1993). Schooling funds can stimulate participation of firms in training because firms have to pay a certain percentage of their wage bill to a schooling fund regardless of their training investments and receive a subsidy per apprentice in return. Some (smaller) firms choose to provide enterprise-based training together (‘Gemeenschappelijke Opleidings Activiteiten’ or ‘GOA’). In this case, the employer hires apprentices from the ‘GOA’, pays a fee and is not obliged to hire the apprentice for the entire training period (Frietman and Hövels, 1994). Moreover, these employers can share some training costs, such as recruitment costs, and receive extra government subsidy.

In most cases, wage costs for the apprentice are the largest cost component for employers (according to estimates of De Vries and Heere, 1993). Wage costs vary considerably and depend on the form of the apprenticeship contract. As apprentices without a labour contract are merely remunerated with an allowance, they are cheapest for employers, however, they are relatively expensive for the government because they receive social benefits (Frietman and Hövels, 1994). Most apprentices

(94% of all primary apprenticeships according to Frietman and Hövels, 1994) have a labour contract and receive a regular wage. The minimum wage of apprentices with a labour contract is the legal minimum wage on a part-time basis (4 days a week). The legal minimum wage amounts to 855 guilders (before taxes) on a full-time basis for workers of seventeen years old (in 1994). However, 88% of primary apprentices earns more than the minimum wage on a part-time basis (Frietman and Hövels, 1994), because they are payed on a full-time basis or because they earn more than the legal minimum wage, which depends on the wages per age and function scale specified in collective bargaining agreements (Hövels and Meijer, 1994). Because of the relatively high apprenticeship wages, many firms experience negative returns to apprenticeships during the training period, but the range of costs and benefits varies considerably between sectors (according to an empirical study by De Vries and Heere, 1993).

Graduates from the dual system receive a nationally acknowledged leaving certificate. The division of the system into three levels corresponds to three certificates which are all classified at the upper secondary level and which can be obtained via several educational routes. The qualification after completion of a primary apprenticeship is described as semi skilled worker (‘aankomend vakman/vrouw’). To obtain the qualification of skilled worker (‘zelfstandig beroepsoefenaar’) a secondary apprenticeship course can be followed after completion of a primary apprenticeship. This takes one or two years. Some secondary apprenticeships can be followed after completion of general secondary education or after a short full-time vocational course (‘kmbo’) as well. Subsequently, pupils can continue to study another for one or two years for the tertiary apprenticeship level of specialized skilled worker (‘gespecialiseerd beroepsbeoefenaar’) where they also prepare for self-employment (Hövels and Meijer, 1994). For some apprenticeships full-time upper secondary general or vocational schooling is also a possible pre-entry condition for a tertiary apprenticeship. Apart from the three leaving certificates, it is also possible to obtain a certificate for a part of the training only. The three levels of apprenticeships imply that pupils can study in the dual system for a period of approximately 5 years. This is much longer than the duration of German apprenticeships, which last 3,5 years at a maximum (excluding the ‘Meister’ training). However, tertiary apprenticeships (and secondary apprenticeships in some sectors) can also be considered as a part of adult education.

Graduates from the dual system are not explicitly considered as a separate group of workers in collective labour agreements, which implies that their salary after graduation will depend on their function and age group and not directly on their educational level. If we assume that skilled workers with a completed

apprenticeship (on average) earn the same as workers with a completed full-time upper secondary vocational education (‘mbo’), the unskilled worker wage (before taxes) will be approximately 3/4 of the skilled worker wage of workers who have completed their apprenticeship training (see CPB, 1994, with data from the Central Bureau of Statistics[10]). This implies that net wages of unskilled workers approximately amount to 85% of the skilled worker wage. The wage difference between higher educated workers and upper secondary skilled workers is more substantial than the wage difference between upper secondary and unskilled workers.

The government, employers and workers influence the contents of training in the dual system. The minister of education provides guidelines (Visser, 1992). The contents and certification of the school-based as well as the enterprise-based component is determined by the national organisations of the apprenticeship system (‘landelijke organen leerlingwezen’). These are 31 in number, organized on the basis of clusters of occupations. The board of these organisations consists of representatives of the government, employers, trade unions and the training system (Hövels and Meijer, 1994). They decide upon the school-based and enterprise-based contents of dual education, supervise the implementation of apprenticeship contracts and supervise the examination process (Römkens and Visser, 1994). Table 6 summarizes the main aspects of the organisation and finance of dual education in The Netherlands in comparison to the German situation.

[10] Average wages in the private sector.

Table 6 Dual education: Aspects of organisation and finance

	Germany	Netherlands
pre-entry requirements for apprentices	no requirements	lower secondary education for most apprenticeships (with some exceptions and not always applied in practice)
age of apprentices	15/16 or older	16 or older
status of apprentices	separate category in collective bargaining agreements	no separate category
type of labour contract for apprentices	of limited duration	of limited or unlimited duration
contents of school-based training	determined by Länder governments, coordination between Länder exists	determined by national apprenticeship organisations: representatives of the government, employers, workers, and schools
contents of enterprise-based training	determined at federal level by representatives of the federal government, Länder-governments, employers and workers, with a coordinating role for the BiBB	determined by national apprenticeship organisations: representatives of the government, employers, workers and schools
teaching requirements for enterprise-based training	Trainer Aptitude or "Meister" certificate is required	a certificate is not required
government's expenditures	school-based training, subsidies to special projects such as extra-plant training centres	school-based training, national apprenticeship organisations, subsidies to firms with training activities
employers' expenditures	enterprise-based training	enterprise-based training
examination	by external examiners	by external examiners
skilled worker status	separate category in collective bargaining agreements	no separate category

4 Lessons from Germany

This section summarizes the lessons that Dutch policy makers can learn from the strong and weak elements of dual education in Germany. Strong elements of the German system relate to the educational system and its organisation and finance structure. These features make the system attractive for many young workers and employers[11]. Furthermore, there are some weak elements of the German system which might become threats to the system in the future. Weak elements relate to the quality of dual education, career perspectives of skilled workers and difficulties in realising an efficient match between the demand and the supply of training places.

Lessons from strong elements of the German dual system

The *popularity* of the German dual system for youngsters is related to a number of factors which provide incentives for participation in the dual system to pupils as well as employers (see also Finegold, 1991). From the *perspective of young workers*, there are three main reasons which make the German system more attractive than the Dutch system.

First, there is hardly a labour market for people under eighteen besides the dual system. This is caused by the legal obligation for all people under age eighteen to follow part-time education, if they do not follow full-time courses. For this category, an apprenticeship can be an attractive way to fulfil this obligation.

In The Netherlands, part-time compulsory schooling only lasts one year (see also section 2), which means that apprenticeships are less relevant for young people as a way to complete their compulsory schooling period.

Second, the dual system in Germany is attractive for a wide ability range. The German system has succeeded in attracting a growing number of pupils with upper secondary qualifications, whereas low achievers can still find a training place in the 'Handwerk' sector. The rising number of apprentices with upper secondary qualifications (see also table 3) has led to changing selection procedures by firms. Apprentices with the lowest qualifications, such as drop-outs or 'Hauptschule' graduates, are concentrated in the 'Handwerk sector', whereas apprentices with higher qualifications are concentrated in the 'Industrie und Handel'. For training

[11] Of course, non economic factors also play a role that explain the popularity of the dual system in Germany, which are not taken into consideration here.

places in the industrial or technical sector, employers often choose applicants with a ‘Realschulabschluß’. Apprentices in the service sector commonly require the ‘Hochschulreife’ to find a training place (Gordon, Jallade and Parkes, 1994). These requirements are not formalized but do exist in practice (see also Münch and Henzelmann, 1993). According to Steedman (1993), the ‘Handwerk’ sector is an essential element of the system, because it creates possibilities for lower achieving apprentices to find a training place.

In contrast, the Dutch system seems to be less attractive for a wide ability range. Especially for higher achieving pupils incentives are lacking. This situation automatically reduces the chances to realize an increase of participation in dual education, as the number of graduates from lower secondary education (‘mavo’ or ‘vbo’), the traditional inflow group for apprenticeships, has decreased over time. In this respect the new ‘mbo’ courses which combine school-based and enterprise-based training can be attractive for higher achieving pupils (Hövels and Meijer, 1994).

Third, the skilled worker certificate has a high labour market value in Germany. This value is not so much determined by wage differentials, but rather by a higher chance for skilled workers compared to unskilled workers to find a job. The skilled worker certificate can be seen as a general entry certificate for the labour market: it is even relevant for occupations which strongly differ from a worker’s field of apprenticeship training. The function of the skilled worker certificate as an entry certificate to the labour market is related to the status of the dual system in Germany and to general elements of the contents of training which are useful in different occupations. A high mobility of ‘Facharbeiter’, also to other occupations (see for example Winkelmann, 1994, 1 and 2), gives an indication of the value of their training in other occupations. On the one hand, the mobility of ‘Facharbeiter’ to other occupations is inefficient because occupation specific elements of the training are wasted, but on the other hand this mobility improves efficiency because future skill requirements are to a large extent unpredictable, so that skilled workers can not always find a job in their own occupation.

Although the chance for skilled workers in The Netherlands to find a job is also high compared to the labour market perspectives of unskilled workers, the dual system is not so much perceived by employers as a general entry certificate to the labour market.

Moreover, in the German dual system a clear link exists between the skilled worker certificate and labour market conditions, which also increases the labour market value of the skilled worker status. ‘Facharbeiter’ who find a job in their training

occupation almost always receive the skilled worker wage, which is determined in collective bargaining agreements. Furthermore, ‘Facharbeiter’ have better career perspectives compared to unskilled workers, such as the possibility to continue studying for a ‘Meister’ or a ‘Techniker’ certificate, or the possibility for ‘Meister’ (and not for others) in the ‘Handwerk’ sector to set up their own business (Steedman, 1993).

In The Netherlands the labour market value of a completed apprenticeship training is less evident, since wages in collective bargaining agreements directly depend on the age and function of workers, and not on their educational background. Collective bargaining agreements do specify skill requirements related to certain functions, but generally do not make a distinction between dual or full-time education. Moreover, the differentiation within the dual system makes the value of a certificate even less clear: there are three levels within the system and pupils can also partially participate in the training.

From the *perspective of employers*, the central question is whether it is worthwhile to invest in human capital through apprenticeships. A quantitative analysis of the costs and benefits is difficult to make, because opportunity costs and future productivity gains are hardly measurable. Many firms do not even know the exact direct costs of apprenticeships, for example because they do not know exactly how much time is spent on teaching or which part of the equipment is used for training purposes. Uncertainty about the future benefits of training investments is even higher and stems from the mobility of labour. If workers quit, the employer cannot recoup the training investment.

In Germany, labour mobility after completion of an apprenticeship is substantial. Six months after graduation, 41% of the graduation cohort 1984/85 still worked for the same employer with a contract of unlimited duration (Winkelmann, 1994, 1). Approximately 70% of ‘Facharbeiter’ leave their training firm within a period of 5 years (Harhoff and Kane, 1993). The high mobility of ‘Facharbeiter’ indicates that dual education creates (at least partly) transferrable human capital. In theory, it is not compatible with profit maximizing behaviour that firms invest in transferrable human capital, because this type of human capital is useful to other employers as well. Therefore, poaching will be profitable for employers and workers because they can share the benefits of the enterprise-based training that is payed for by another employer (Becker, 1975). There is some empirical evidence for poaching, because ‘Facharbeiter’ who leave their employer after graduation on average earn higher wages (Harhoff and Kane, 1993). In practice, German firms do invest in transferrable human capital on a large scale through apprenticeships: a considerable part of apprenticeship training is not firm-specific. Apparently firms with training

investments are able to extract enough rents from these investments despite labour turnover.

There are several reasons why investments in dual education can be profitable in Germany in spite of labour mobility. Oulton and Steedman (1992) show that the returns to some apprenticeships can already be positive to the firm during the period of the apprenticeship contract, under certain assumptions such as a low training wage. The returns during the training period also depend on the type of firm: in small firms in the 'Handwerk' sector apprentices can be trained during slack periods, when 'Meister' are less engaged in production work. Because of low apprentice wages and low training costs, returns can be positive. In larger firms in the 'Industrie und Handel' returns are probably negative during the training period, because full-time trainers and expensive training equipment are needed (Steedman, 1993). Another empirical study indicates that the net costs of an apprenticeship vary considerably from zero to 80 000 DM per year (Lutz, see Aalders, 1994).

Harhoff and Kane (1993) argue that poaching can be a problem to firms but does not mean that apprenticeship training is an unprofitable investment. If labour mobility is not too high, apprenticeships are still worthwhile, because a part of all 'Facharbeiter' will stay with the firm long enough to make the investment worthwhile on average. Since the employer cannot be sure in advance which workers will stay with the firm, it is inevitable to incur some losses on training investments.
Maybe the best reason for German firms to hire apprentices is that they can benefit from the highly regulated training infrastructure, whereas it is more costly to develop alternative training programs at the firm level. A related advantage is the high influence employers have on the contents of training (Aalders, 1994). Moreover, the status related to being an 'acknowledged training firm', which is monitored by the chambers of commerce, functions as a quality signal to customers. The quality label 'made in Germany' seems to be strongly related to the dual system.

In The Netherlands, wage costs of apprentices can be relatively high compared to the German situation. A high apprentice wage level reduces the possibilities to recoup the costs of the training investment during the training period, which is especially disadvantageous if labour mobility is high. Unfortunately, exact information on apprentice wages in both countries is not available, also because these wages greatly vary between sectors. However, information about the Dutch situation shows that most apprentices have a labour market contract and earn at least the legal minimum wage on a part-time basis (four days a week). However, many apprentices earn more than that. Their wage level depends on their function

and age group and is determined by collective bargaining agreements. This means that their salary can equal that of an unskilled worker, although they work less hours because part of their working week is used for training. Apparently, Dutch employers do not often make use of the possibility to pay apprentices less than other young workers. The fact that apprentices in The Netherlands are not considered as a separate category in wage bargaining agreements is probably even more important than differences in the wage level of apprentices between both countries, because it implies that employers have little flexibility to adjust apprenticeship wages, for instance to the situation on the labour market for apprentices or to the development of training costs.

Moreover, the status of the dual system in The Netherlands is low compared to that in Germany, which means that training firms have less possibilities to benefit from the quality signal of being a training firm.

Lessons from weak elements of the German dual system

The German dual system features three major weak elements, namely limited career perspectives of skilled workers, differences in the quality of enterprise-based training between firms and difficulties in matching supply and demand. Weak elements have led to publications about the expected extinction of the German skilled worker (see for example FD, 29-9-1994). These views on the dual system seem far too pessimistic. Despite a number of disadvantages the dual system is still very popular from an international perspective. As Steedman (1993) remarks: "It is difficult for an outside observer to perceive any fundamental weaknesses in its massive institutional underpinning and firm public support". Nevertheless, the weak elements of the current German system might become important threats in the future. Therefore they can be considered as lessons for Dutch educational policy reforms, as these elements should be avoided as much as possible.

A *first point of criticism* on the dual system concerns the limited career perspectives of graduates from the dual system compared to the career perspectives of higher educated workers (see for example Lutz, in: Altmann et. al., 1992). According to Lutz a reason for limited upward career mobility is that the German system of work organisation is more productive than for instance the French system. Skilled workers from the German dual system are efficient compared to their French counterparts, who have followed full-time education, which implies that the former need less supervision on the job. Consequently, less middle management positions are available in Germany and the career perspectives for ‘Facharbeiter’ are limited. Moreover, there are indications that the increasing number of workers with higher education reduces the perspectives for apprentices

(Tessaring, 1993). Recent news paper articles (for example Staudt in FAZ 13-5-1994) also indicate that the dual system often leads to ‘dead end’ jobs. Moreover, it is hardly possible for graduates of the dual system to continue studying in higher education (unless they also posses the ‘Hochschulreife’ or ‘Fachhochschulreife’), which further reduces their career perspectives.

German policy makers fear that the position of ‘Facharbeiter’ will increasingly lead to dead end jobs, which will reduce the popularity of the system in the future. In this respect, experiments in Germany which give the ‘Facharbeiter’ of some ‘Länder’ access to higher education in order to increase their career perspectives are interesting (The Economist, 1994). However, it is unlikely that these experiments will be applied in more Länder in the near future.

In The Netherlands, the secondary and tertiary levels of apprenticeships provide possibilities for further training of semi-skilled workers. However, upward career mobility of graduates from the dual system is limited in The Netherlands as well. An empirical study shows that workers with full-time vocational education (‘mbo’) outperform skilled workers from the dual system in upward career mobility (Van der Velden and Lodder, 1993). Dead end jobs for graduates of the dual system in The Netherlands will reduce the popularity of the system, whereas possibilities for further education or upward career mobility for graduates of the dual system can increase participation.

A *second weak element* of the German system are the differences in the quality of enterprise-based training between firms (OECD, 1994, 1). Because the quality standards for the contents of curricula are minimum standards, the quality of enterprise-based training can vary between firms. Some training firms lag behind and will only improve their training quality if the minimum quality standards have been updated. Therefore the lengthy procedures which eventually lead to new minimum quality standards can be a disadvantage for apprentices in low quality training firms. In addition, the school-based part of the training sometimes lags behind enterprise-based training, because the coordination between both parts can also take a long time. Therefore, some larger firms nowadays provide the school-based training component in training centres within the firm.

In The Netherlands differences in training practice between firms also exist, but the coordination of school-based and enterprise-based training is more easy because the national apprenticeship organisations determine both components of training.

A *third weak element* concerns the difficulties the German system faces in matching supply and demand. Although business cycle fluctuations and

demographic changes seem to be absorbed quite well by the system - because full-time vocational education and extra plant training centres can function as a buffer (OECD, 1994, 1) - the qualitative match of supply and demand seems to be a larger problem. Mobility of skilled workers is high and many skilled workers find a job outside their training occupation (Tessaring, 1993). This can be considered a weak element of the system because the occupation-specific part of the training investment is wasted if skilled workers switch to another occupation. To illustrate this loss of human capital: Skilled workers who switch to another occupation often work below the 'Facharbeiter' level (Tessaring, 1993). Mismatch problems increase because some firms deliberately hire more apprentices than they can possibly employ as skilled workers in the future, in order to make a profit on these workers during the training period. This leads to an oversupply of skilled workers in some occupations (for example hairdressers). A related problem is the growing preference of young people for a job in the service sector instead of a blue collar occupation in the industrial sector. Consequently employers of some industrial sectors, such as the building sector, complain about a shortage of apprentices (see FAZ 17-1-1994). However, it is difficult to disentangle this factor from other influences on shortages of apprentices, such as the influence of relative wages in the industrial sector compared to those in the service sector.

Qualitative mismatch problems can be considered as a weak point of the German system because of the corresponding loss of human capital. On the other hand, qualitative mismatches are often unavoidable because future labour market requirements are to a large extent unpredictable. This implies that skilled workers have to be able to switch to other occupations. Therefore, the capability of skilled workers to do so can be perceived as a strong element of the system as well.

In The Netherlands quantitative as well as qualitative mismatch problems also play a role. The lesson which can be drawn from the German situation is that apprenticeship training has to be sufficiently broad in order to promote flexibility of skilled workers and to improve the function of the skilled worker certificate as a general labour market entry certificate.

Implications for educational policy in The Netherlands

Summarizing, it can be concluded that the many strong and few weak elements of the German system mentioned in this section serve as lessons for Dutch educational policy reforms. The German situation shows that the attractiveness of the system as well as its weak elements are not only related to the contents of dual education, but depend to a large extent on the labour market value of the skilled worker status. For that reason a general lesson from the German situation for Dutch policy makers

should be that educational policy measures which only affect the contents of dual education are insufficient in order to realise a rise of participation. The underlying incentive structure of the dual system, which is strongly related to links of the system to the labour market, has to be taken into consideration as well.

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Appendix A The educational system in Germany[1]

Level	type of school	certification	duration (years)	theoretical age (at end of school year)
Primary education	Grundschule	-	4	7-10
Lower secondary education	Orientierungsstufe	-	2	11-12
	Hauptschule	Haupschulabschluß	3 (or 4)	13-15 (or 13-16)
	Realschule	Realschulabschluß	4	13-16
	Gymnasium class 1-4	-	4	13-16
	Gesamtschule class 1-4	-	4	13-16
Upper secondary education	Gymnasium class 5-7	Hochschulreife	3	17-19
	Gesamtschule class 5-7	Hochschulreife	3	17-19
	Berufsgrundbildung	-	1	16
	Duales system	mittlerer Bildungsabschluß	2-3,5	17-18 or 17-19[2]
	Berufsfachschule/ Fachoberschule	mittlerer Bildungsabschluß or Fachhochschulreife[4]	2-3	17-18 or 16-18[3]
Higher education	Fachhochschule	Berufsqualifizierender studienabschluß	3	19-21 or 20-22[5]
	Universität/ Hochschule	Staats bzw. Diplomprüfung	4	20-23

Source: OECD (1990, compendium) and Behringer und Jeschek (1993)

[1] Only the most common schooltypes of the initial full-time educational system including apprenticeships.
[2] Under the assumption that students enter an apprenticeship after completion of the Hauptschule and a Berufsgrundbildungsjahr.
[3] Age and duration depend on whether a "Berufsgrundbildungsjahr" is followed.
[4] The "Fachhochschulreife" can be obtained at "Fachoberschulen", "Fachgymnasia", "Technische Oberschulen" and some "Berufsfachschulen".

Appendix B The educational system in The Netherlands[1]

Level	type of school	certification	duration (years)	theoretical age (at end of school year)
Primary education	basisschool	-	6[2]	7-12
Lower secondary education	vbo	vbo-certificate	4	13-16[3]
	mavo	mavo-certificate	4	13-16[3]
	havo class 1-3	-	3	13-15[3]
	vwo class 1-3	-	3	13-15[3]
Upper secondary education	havo class 4-5	havo-certificate	2	16-17
	vwo class 4-6	vwo-certificate	3	16-18
	primary apprentice-ship (llw)[4]	semi-skilled worker (aankomend vakman/ -vrouw)	2-3	17-18 or 17-19
	secondary appren-ticeship (llw)[4]	skilled worker (zelfstandig beroepsbeoefenaar)	1-2	19-20 or 20-21
	tertiary apprentice-ship (llw)[4]	specialized skilled worker (gespecialiseerd beroepsbeoefenaar)	1-2	20-21 or 21-22
	kmbo[4]	kmbo-certificate	2	17-18
	mbo[4 5]	mbo-certificate	3-4	17-20
Higher education	hbo	hbo-certificate	4	19-22
	wo	doctorandus	4	19-22

Source: OECD (1990, compendium), Dercksen, Van Lieshout et al (1993) and Visser (1992)

[1] Only the most common schooltypes of the initial full-time educational system including apprenticeships.
[2] Excluding 2 years of pre-primary schooling integrated in primary schools.
[3] Often the first (or more) years of lower secondary education are not differentiated per school type and can be compared to the German "Orientierungsstufe".
[4] According to Dercksen, Van Lieshout et. al. (1993, pp 34) the level of kmbo courses is comparable to the level of primary apprenticeships. Three year mbo courses are comparable to a secondary apprenticeships and four year mbo courses are comparable to tertiary apprenticeships.
[5] Students who have completed a four year mbo course have access to higher vocational education (Dercksen, Van Lieshout et al, 1993).

Appendix C Educational outcomes

Table C1 Educational attainment level of the population aged 25-64, 1991

	Germany[1]			Netherlands		
	m	f	m + f	m	f	m + f
	% of population 25-64					
primary + lower secondary	10.6	25.9	18.2	37.6	50.1	43.8
upper secondary	61.3	58.8	60.1	39.9	33.3	36.6
higher vocational	13.6	7.5	10.6	14.0	12.7	13.4
university	14.5	7.8	11.2	8.5	3.8	6.2
total	100	100	100	100	100	100

Source: OECD, 1994, Employment Outlook, table 1.C.1, CBS, 1992, Enquête beroepsbevolking 1991
[1] All Länder

Table C2 Unemployment per age group, 1991

age	Germany[1]	Netherlands
	in % of labour force	
15-24	3.7	11.1
15-64	4.1	7.4

Source: OECD, 1993, Education at a glance, table C6
[1] Old Länder