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A selective cooperation between education and firms in the apprenticeship revival

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SUMMARY

ABSTRACT

The place of apprenticeships in the French educational system has largely evolved for the past two decades. It was before mainly used to reach a first secondary vocational qualification level. Nowadays, it constitutes a parallel way of acquiring a vocational or technical qualification in several fields and whatever the educational level. A large number of french studies showed that if apprenticeships provides an easier access to the labour market, it does not offer any benefits in terms of wages. This finding arises from the analysis of secondary vocational qualification level, a population which was yet representative of apprenticeships ten years ago. Here, considering the vocational or technical college degree level, we obtain opposite results : former apprentices do not gain a genuine advantage in getting a job, but do experience higher earnings than other leavers exiting from the traditional scholar track. Overall, the individual benefits of apprenticeships seem to depend on the educational level.

From an individual point of view, an apprenticeship in France is the association of vocational training and an employment contract. From a collective point of view, it does not constitute a total and coherent educational system. To represent it correctly, it is necessary to forget the well-know German dual system where the vocational training concerns firms and trade unions and where they govern equally. Three dimensions confer a particular identity to French apprenticeships : Firstly, it is a complementary educational device placed alongside school vocational training which remains dominating. Secondly it is totally a liberal system where regulation is only produce by the meeting of particular initiatives. it is thirdly an heterogeneous system where the characteristics and the logic of the operators are very different according to the professions and the apprenticeships training centres. The apprenticeship system was marginal in that there was an absence of formalised blue collar training before the second world war, and, later, in the context of sustained high growth of school vocational training (1943-1971). Since 1971 recurring public policies have aimed at developing it. The law of 1971 on continuous vocational training can be regarded as a renewal : the legal definition specifies apprenticeship contracts, preparation for the national diplomas, the fixing of teaching standards and the supervision of National Education in exchange for a public contribution to the financing of the apprenticeship training centres. The scope of exercise nevertheless remained limited to the short secondary level. The law of 1987 removes this limitation by opening all training level to apprenticeships and raising to 25 years the apprenticeship contract maximum age. Finally, a succession of other laws (1993, 1996, 2002, 2004) has contributed to its development by the decentralization of the public intervention and the suppression of preliminary authorisation for the firms. At the same time, by way of successive inciting tax policies (premiums, exemptions, etc) apprenticeships passed from a system financed exclusively by local initiatives and obligatory contributions of the firms (apprenticeship tax) to a system financed 75 % by national and regional governments.

The goal of this paper is to provide a first assessment of the results of this policies. Initially we will examine the evolution of the relative position of the apprenticeships within vocational training, and then examine advantages for former apprentices on the labour market. In this work we will use three quantitative sources : the annual census of the manpower registered in the apprenticeship training centres by diplomas and vocational fields and two successive waves (leavers 1998, leavers 2001) of the CEREQ's génération surveys.

1. CRAFT INDUSTRY, ECONOMIC SECTORS AND OPPORTUNITIES FOR FIRMS

Schematically, apprenticeships have three different origins in France:

- The traditional training of some "reglemented occupations". Even though if a number of liberal laws fought against it during and after the French revolution it nevertheless survived ; either in a pure form (the hairdressing), or in hybrid forms (pharmacy employees, prothesists,…). The model is Malthusian, it presumes a collegial management of access to skills and market. Here Apprenticeships is an exclusive training essential to the economic equilibrium of the companies with the manpower it provides.
- The vocational courses created at the beginning of the XX th century (Astier laws 1919, Apprenticeships tax 1924). This complementary school for young workers appears as a first response to the deficiencies - increasingly obvious – of "training by doing" which constituted at that date the main access to employment for young workers. Created in 1925, Chambers of Craft industries and Chambers of trade were entitled to collect the apprenticeships tax and to organize the training. We can find this heritage in numbers of craft industries (bakery, butchery, pork butchery, chefs, hotel and catering, joinery, cabinet work, iron work,…)

Here, Apprenticeships is local vocational training. Employers' trade-union govern a geographic territory (city, county). The firms are usually very small and the bond master-apprentice is mostly private. The training provided in Apprenticeships Training Centres is only juxtaposed.

- The third form of French apprenticeships appeared after the second world war. It resulted from a clear strategy of firms trade-unions (building and automobile repair, mechanical industries,…) aiming at a collective production of available skills in a "professional job market" where different

sized companies could supply each other. It excludes the simple juxtaposition of specific work and general schooling which existed before. Apprenticeships is here asserted as a new pedagogy coming from adult vocational training: "alternation". In addition the Ministery of Education was a very active partner in this gestation. The great "law for continuous vocational training" (July 16, 1971) institutionalized this model which defines modern apprenticeships.

Until the end of the eighties, apprenticeships essentially concerned young people with a very low level of education. It was the first vocational training level for those who didn't have any future at school. It only led to exclusive vocational diplomas which offered very few opportunities in further training: Certificates in Vocational Capacity. The opening of all training levels to apprenticeships (1987), its regionalization (1993) and the permanent increase in government aid (1987-1996) led to the birth of a new form, probably inspired by the increasing recruitment of young people under derogatory employment contracts (qualification, adaptation, orientation, young people in firms, etc). In this movement, many continuous vocational training diplomas moved into the field of apprenticeships which invested in higher education. Engineering degrees, "masters" in elite business schools and vocational college diplomas may now be done under apprenticeships' contracts. In 1995, 80 % of apprentices completed a first level secondary vocational training diploma. In 2003, this figure was around 60 %. Meanwhile, the share of young apprentices who completed "vocational baccalauréat" passed from 14% to 21% and the share of young who began an apprenticeship in college passed from 6 % to 17%. In addition, while all the training course leading to diplomas equivalent at least to "A levels" continued their progression, those of first secondary level declined: since 1999 they have lost 23.000 apprentices. Another fact is added to this rise in level: the increase in secondary vocational training apprentices' level of education. Today, nearly 75 % stayed at secondary school to sixteen; thirty years ago this figure was only 25 %.

In terms of fields of vocational training, the "A levels" define a clear border ; below this diploma apprentices are exclusively confined to historical skills ; beyond this they have been many new development in several vocational training. At the first level of vocational training, all the fields present in 2003 were present in 1995 and the relative share of the ten most important fields increased. During this period, only an internal redistribution occurred : the building trades progressed whereas those of food industry and hotel trade declined. At the second level of secondary vocational training two new fields appeared and the share of the first ten decreased slightly. Nevertheless, apprenticeships traditional skills still stand out : salesmen, hairdressers, waiters, cooks, skilled worker in the building, electric industry or automobile repair. We can only note a transfer in some vocational training fields, from the first level to the second level of secondary vocational training (pharmacy employees, car repairs skills). At the same time apprenticeships considerably evolved at the college level: in eight years it invested in thirteen new vocational fields. Today, in terms of training fields, the college level is the one where you can find the broadest opportunities. In industrial fields we often find it in electricity, mechanics or robotics, but, administrative and commercial trainings are the most present. Apprenticeships developed here in a set of occupations where continuous vocational training and internal promotion were usually important : trade, accountancy, management, bank, insurance, assistant managers, data processing, etc. This marked prevalence of the commercial and administrative tertiary sector is also available for bachelors and masters degrees. At these high training levels, trade, accountancy, data processing, finance and human resources includes 54% of the apprentices, and the number of apprentices has quadrupled in eight years. Equally, at this level the opportunities were multiplied (23 new training fields) and you can find today apprentices in academic training like linguistic, fundamental physic or earth sciences. Nevertheless, "product process engineer" training remain dominating at a high level : fundamental technology, electricity, mechanics and chemistry are still dominant.

So, new professions which invest in apprenticeships today seem almost interested in young people having at least "A levels". Perhaps we find here an historic constant of French firms in vocational training : their disinterest for the workers' training and their polarization on technical functions. Another assumption could be that, concerning their long term recruitments the companies select diploma as a "signal". Apprenticeships investment seems not to be useful for low skills which can be fed by substitutable workers (short term contracts, interim) or, "trained on site". Finally it could also express the opportunity of employing young motivated and productive workers on derogatory short term fixed contracts, low payed and fiscally attractive.

Today, at the end of the renewal process we have describe above, apprenticeships is organized schematically in three sets, each with differing dynamism.

- - The first group includes the traditional skills of the craft industry, the small trade and hotel and catering trade. Centred on the first level of secondary vocational training, it benefits of apprenticeships development very little. Between 1995 and 2003, contrary to the general evolution, the manpower of apprentices decreased by about 13% in the food trade and 16 % in hotel and catering. These occupations are full up, like the hairdressing or the pharmacy employees, or, not attractive for the new population of apprentices: with a higher level of education, they should also bare the many constraints of these jobs : heavy and shift schedules, work at the weekend, etc. The founding system of apprenticeships training centres should also be considered : in fact their financial dynamism is limited when they serve small size firms. In spite of the many national promotion campaigns, this apprenticeships remains in decline.
- - The second group is animated by the training policies of professional trade unions: building, automobile repair, electricity, metallurgy, logistic transport … Apprenticeships training centres, working in network and heavily founded, benefit highly from the renewal of apprenticeships ; either by a total progression of manpower when the conjuncture is high - between 1995 and 2003 manpower of apprentices in the building trade increased by 25% in short secondary level and they almost doubled for "vocational baccalauréat" – or by recruiting apprentices at a higher level of education (electricity, car mecanics) when the firms recruit less.
- - The third group is a new form of apprenticeships. It exist only in higher education (elite business, engineers schools, private institutes, vocational college, universities) and prepares skills, which, previously, were supplied by high education graduates or by intern promotion and continuous vocational training: trade or management executive and technicians, skills of finance and accountancy, factory engineers … This block, very heterogeneous knew the higher increase. As well in terms of diversity of opportunities as in terms of relative development of manpower.

Thus, the place of apprenticeships in French education largely evolved. He was before the first step of access to qualification in a few number of occupation and he is now a parallel track of vocational training you can find at different level in several fields of vocational training. From an individual point of view what is the real outcome of this training track ? Is it the same whatever could be the qualification level or the vocational field ? To answer theses question we examine in the next part the access to employment and the wages of education system leavers in the vocational fields where apprenticeships is enough present.

2. THE INDIVIDUAL BENEFIT OF APPRENTICESHIPS DEPENDS ON EDUCATION LEVEL

Recurring public policies aiming to develop apprenticeships intend to solve a tricky problem : in France the unemployment of young workers is very high compared with other country. An implicite idea often goes with this report : this difficult "school to work transition" is a result of vocational school training ; Being academic and distant from firms it would prepare badly it's pupils for real employment. Firstly in terms of individual skill adjustment and secondly in terms of regulating the flow of young workers toward the labour market. Our purpose is to verify this idea by comparing the school to work transition of apprentices and vocational school leavers. Apprenticeship still does not exist at all level and in all vocational training fields. Our study will be limited to these field where apprenticeships exist. Work on the entire population would have credited apprenticeships with qualities that only relate to specific training fields. Of the 742.000 initial training leavers in 1998, only 410.000 had a choice between apprenticeships and vocational school training. As a result, only a limited number of vocational field of training in the table below constitute our studied population.

Percentage apprenticeships and school by vocational fields

Educational level / training fields	bachelors/post-graduate		vocational college		secondary vocational 2		secondary vocational 1	
	apprentices	school	*apprentices*	school	*apprentices*	school	*apprentices*	school
	%	*%*	*%*	*%*	*%*	*%*	*%*	*%*
10 Agricultural	*/*	100	*19*	81	*33*	67	*49*	51
11 Building	*NS*	NS	*8*	92	*48*	52	*64*	37
12 Metal skills	*/*	*/*	*11*	89	*46*	54	*49*	51
13 Wood skills	*/*	NS	*NS*	NS	*40*	60	*57*	43
14 Car repair	*/*	NS	*6*	94	*43*	57	*63*	37
15 Food craft and trade	*NS*	NS	*12*	89	*63*	37	*87*	13
16 Mecanical, energy	*9*	91	*5*	96	*22*	78	*24*	76
17 Industrial technologies	*9*	91	*15*	85	*30*	70	*8*	93
20 Business and trade	*7*	94	*11*	89	*15*	85	*52*	48
21 Transport, logistics	*/*	100	*14*	86	*16*	84	*27*	73
22 Accountancy, management	*8*	92	*6*	94	*1*	99	*2*	99
23 Assistant	*/*	*/*	*6*	94	*5*	95	*2*	98
24 edition	*NS*	NS	*/*	100	*NS*	NS	*49*	51
25 Beauty, hair styling	*/*	*/*	*NS*	NS	*100*	*/*	*41*	59
26 health	*/*	100	*/*	*/*	*20*	80	*43*	57
27 Hotel and catering	*/*	100	*9*	91	*12*	88	*46*	54
Total	*7*	93	*9*	91	*20*	80	*45*	55
manpower in the generation	*3308*	42 427	*9760*	95 869	*23 117*	90 761	*64 907*	80 030

Access to employment and wages.

To describe access to employment, we calculated the percentage of individual who had jobs three years after they left initial training. Other indicators exist like the time spent in employment during the first three years on the labour market, the percentage of population who had experienced fast access and stable employment, the share of the open ended contracts … These indicators give the same result as our selected indicator, the information they deliver is the same in terms of hierarchy in regards to employment.

Percent on job three years after leaving initial training

Educational level / training fields	bachelors/post-graduate		vocational college		secondary vocational 2		secondary vocational 1	
	apprentices	school	*apprentices*	school	*apprentices*	school	*apprentices*	school
	%	*%*	*%*	*%*	*%*	*%*	*%*	*%*
10 Agricultural	*/*	91	*92*	93	*85*	72	*88*	75
11 Building	*ns*	ns	*ns*	85	*99*	95	*89*	69
12 Metal skills	*/*	*/*	*ns*	89	*88*	93	*90*	81
13 Wood skills	*/*	ns	*ns*	ns	*97*	93	*88*	86
14 Car repair	*/*	ns	*ns*	95	*93*	92	*88*	86
15 Food craft and trade	*ns*	ns	*87*	86	*95*	77	*87*	76
16 Mechanical, energy	*96*	97	*95*	92	*92*	89	*89*	82
17 Industrial technologies	*92*	95	*93*	92	*89*	70	*ns*	74
20 Business and trade	*95*	93	*91*	87	*84*	86	*75*	67
21 Transport, logistics	*/*	87	*93*	92	*ns*	83	*94*	83
22 Accountancy, management	*98*	93	*92*	89	*ns*	77	*ns*	64
23 Secretarial	*/*	*/*	*95*	90	*85*	79	*ns*	65
24 Edition	*ns*	ns	*/*	81	*ns*	ns	*85*	64
25 Beauty, hair styling	*/*	*/*	*ns*	ns	*82*	*/*	*76*	69
26 health	*/*	94	*/*	*/*	*94*	82	*74*	79
27 Hotel and catering	*/*	96	*85*	86	*87*	83	*77*	76
All	***96***	**94**	***92***	**90**	***90***	**82**	***85***	**75**

When we check individual situations three years after leaving initial training three fact clearly appear. Firstly, on average, whatever the education level, apprentices leavers are always more often employed than school leavers ; but, this advantage decrease when the education level is high : ten points separate leavers of first level of secondary vocational training, eight point the second level of secondary vocational training and two points only the college and the post-graduate leavers. Secondly, Continuing studies to a higher training level is always better, even if this level effect is stronger for school leavers. Thirdly, the vocational field of training plays an important part in the school to work transition, both in terms of general access to

employment and in terms of way of training effect : the differences between the two track is for example very small at the first of the hotel and catering field, while it is much larger at the same level of the building field. In firms the use of apprenticeship contract seems to be different according to activity sectors. This is confirmed by a close examination of apprentice recruiting practices at the end of training. It also shows that the educational level remains most important.Percent on job three years after leaving initial training

Percent apprentices recruited by their firm at the end of training

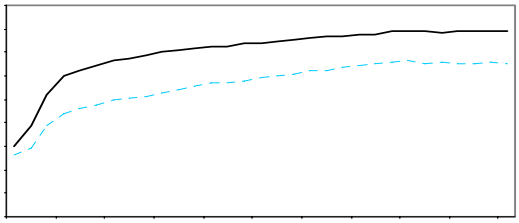
Educational level / **training fields**	bachelors / post-graduate	vocational college	secondary vocational 2	secondary vocational 1	**All**
10 Agricultural	/	22	23	27	**25**
11 Building	*ns*	55	56	32	**36**
12 Metal skills	/	72	65	32	**38**
13 Wood skills	/	*ns*	41	31	**33**
14 Car repair	/	*ns*	50	24	**29**
15 Food craft and trade	*ns*	30	31	24	**25**
16 Mechanical, energy	30	41	39	33	**36**
17 Industrial technologies	41	28	43	ns	**33**
20 Business and trade	28	54	39	26	**33**
21 Transport, logistics	/	52	55	57	**56**
22 Accountancy, management	38	48	25	63	**43**
23 Secretarial	/	23	13	ns	**18**
24 Edition	*ns*	/	*ns*	42	**41**
25 Beauty, hair styling	/	*ns*	31	15	**22**
26 health	/	/	39	20	**34**
27 Hotel and catering	/	41	30	22	**24**
All	**35**	**39**	**37**	**27**	**31**

Small business hardly ever recruit their apprentices. For example, at the first level of secondary vocational training : 15% of hair dressing apprentices hired by their training firms, 22% in hotel and catering, 24% in the food trades. On the other hand, the new apprenticeship firms often recruit their former apprentices : between 52 % and 57 % hired in the transportation sector depending on the training level. between 38 % and 48 % in administrative and financial tertiary sector (higher education). In business and trade, health and car repair, limited recruitments at low training level and greater at higher training level. Two distinct strategies appears, in the first we see the permanent use of apprentices as low wages workers, in the second we observe a first selection for long time recruitment. In every vocational field both strategies exist but in varying combination. However, the training level in all these fields remains the most important : generally it is at college level that the probability to stay in the firm after training is the highest.

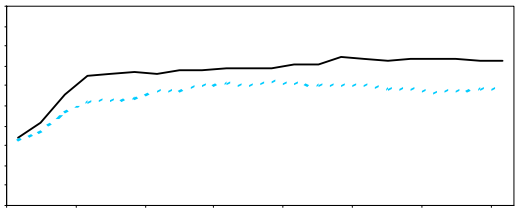
But, school to work transition also depends on the general economic situation, and almost all of the studies relating to the insertion of the young people in France show that obtaining a diploma plays an essential role. To take this into account, we compared two generations during their first three years on the labour market in the graphs on next page. It confirms the main result afore mentioned : in terms of access to employment the advantage that apprenticeships give is inversely proportional to the diploma obtained. That is : very high for non graduates, it decrease for higher educational graduates.

Percent of young insider in employment according to the diploma held 1998 and 2001 leavers, each month during three years

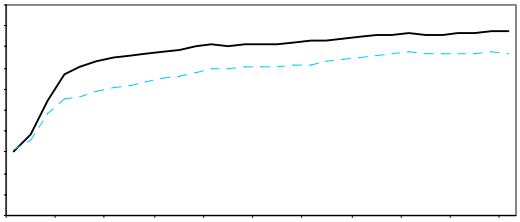
Non diplômés, génération 1998



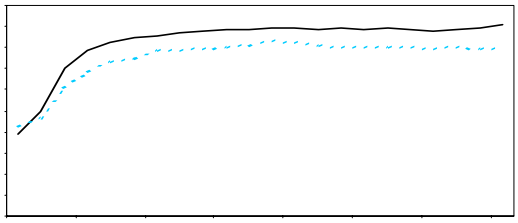
Non diplômés, génération 2001



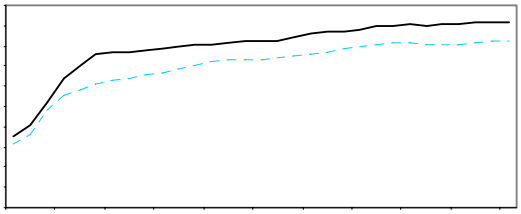
Secondaire court, génération 1998



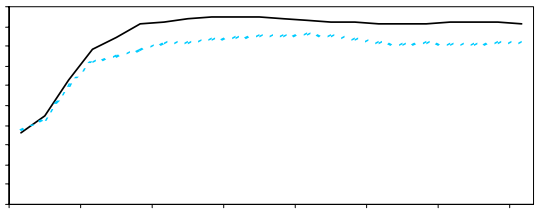
Secondaire court, génération 2001



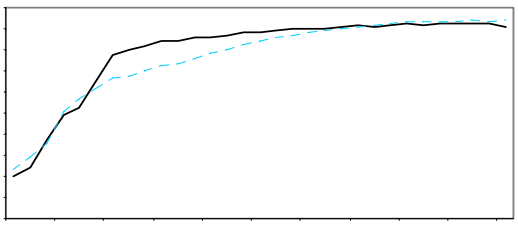
Secondaire long, génération 1998



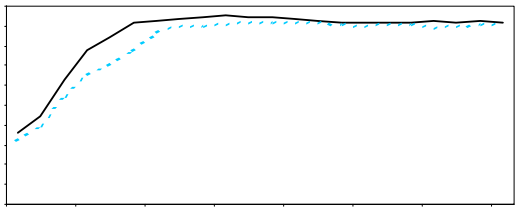
Secondaire long, génération 2001



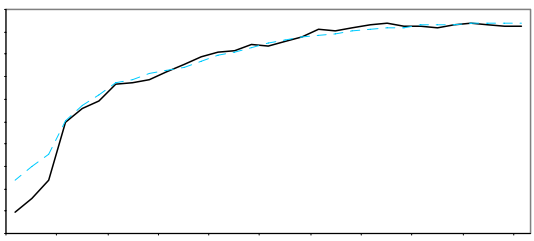
Supérieur court, génération 1998



Supérieur court, génération 2001



Supérieur long génération 1998



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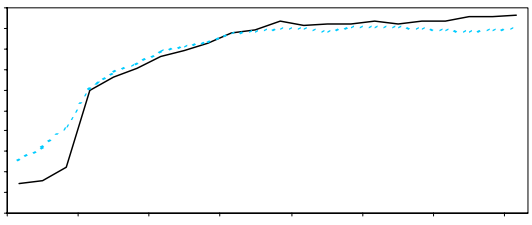

Trained by the companies, the apprentices should be paid better at the end of the first years of active life. On the one hand they are recognized as being immediately productive - thus attractive - and on the other hand their seniority on the labour market is higher than school leavers one. But in fact this not the case.

Median wages for full time employment three years after leaving initial training

Génération 98

Educational level / **training fields**	bachelors/post-graduate		vocational college		secondary vocational 2		secondary vocational 1	
	apprentices	school	*apprentices*	school	*apprentices*	school	*apprentices*	school
10 Agricultural	/	1651	1077	1103	976	964	964	945
11 Building	ns	ns	ns	1220	1056	1084	1021	1052
12 Metal skills	/	/	ns	1270	1067	1138	1057	1067
13 Wood skills	/	ns	ns	ns	1067	991	991	991
14 Car repair	/	ns	ns	1220	1067	1098	991	1037
15 Food craft and trade	ns	ns	1180	1104	1067	991	1037	991
16 Mechanical, energy	2287	2134	1404	1261	1147	1124	1067	1067
17 Industrial technologies	1783	2073	1372	1308	1207	1086	ns	1080
20 Business and trade	1779	1918	1274	1159	991	975	915	941
21 Transport, logistics	/	1702	1314	1156	ns	1040	1066	1067
22 Accountancy, management	1956	1982	1220	1067	ns	964	ns	953
23 Secretarial	/	/	1198	1029	1021	941	ns	896
24 Edition	ns	ns	/	1067	ns	ns	1024	1040
25 Beauty, hair styling	/	/	ns	ns	943	/	845	855
26 health	1849	1906	/	/	1133	1110	1052	939
27 Hotel and catering	/	1239	1147	1082	1067	994	972	991
All	**1928**	**1982**	**1266**	**1156**	**1067**	**1037**	**991**	**991**

For leavers of the first secondary vocational training level there is no discrepancy of median wages all training fields taken into account. The discrepancy is low (30 €) with the second secondary vocational training leavers, and it is only with the short higher education leavers that we can see a real difference (110 €). At this level, the wage benefit observed is systematic, whatever the vocational field. For all the other education levels the profit is not systematic. Thus, in some fields and depending on the training level, it seems that numerous school leavers have found better paid jobs. This paradox is explained by the jobs held by old apprentices (Mansuy, 1996 ; Bonnal, Clément, Mendes, 2005). More often they work in small companies where they exercise jobs in close connection with their vocational training. On the other hand school system leavers hold a broader variety of jobs that do not have a close connection with their initial training ; lot of them have catch better opportunities (Bonnal, Fleury, Rochard, 1999).

3. EMPIRICAL STUDY OF WAGES FOR SHORT HIGHER EDUCATION LEAVERS

In this part, we will consider, for short higher education leavers, one aspect of apprenticeship return to the labour market : the wage level. For France, most econometric models, based on young people of short secondary level, show that an apprenticeship is a good vocational education track. At least as good as school one in terms of wages and superior in term of employment opportunities. Is it true for apprentices at a higher level of education ? A brief review of other studies on this topic is necessary. In numerous countries the school-to-work transition for young people is a tricky problem and most of studies emphasize training to explain an easier access to employment. Focusing on wages we intend to examine the effect of a regular contact with firm during the training. In this paper, we test the wage three years after the leaving. After details about methodology and data used we will present the main results of the model as a first estimate of the median term effect of apprenticeship for pupils who have already “A levels”

3.1. Empirical background

Results on the school-to-work transition of both, school and apprenticeship-vocational training, are the matter of long-standing debate. There is a general agreement in most French recent works on the effectiveness of apprenticeship for young boys of short secondary level. Results obtained by controlling dimensions which have an effect on the choice of this training such as social origin, financial constraints, human capital or self-fulfilling beliefs also emphasize that networks acquired during training are very useful. An empirical study (Rebick, 2000) shows that more than half of university recruits graduates in Japan are provided by enduring contacts between employers and universities. Furthermore, Margolis, Simonnet (2002) show that "the educational track significantly influences the means by which jobs are found, favouring networks in particular, as well as having an independent direct effect on the speed of school-to-work transition and later earnings". Bonal, Mendès, Sofer (2002) show that male apprentices who are not recruited by their apprenticeship firm find their jobs faster or earn more than vocational school leavers. Sollogoub, Ulrich (2000) have also shown that, contrary to what they expected given apprentices social origins and school characteristics, in facts apprentices had easier access to the labour market. But like Mansuy (1996) they don't find any wages benefits. More recently, using data from the generation 92 and 98 surveys, Bonnal, Clement, Mendes (2004) shows that, whatever the economic situation, the effect of having a diploma remains high, whereas the effect of apprenticeships is strongly dependant of the conjuncture.

These economic models suggest that apprentices should have more recruitment opportunities than the others. And this could be the explanation of the origin of their easier school-to-work transition. But if they have more choice in jobs offers, why don't they maximise their advantages in terms of wages and professional career ? The characteristics of the samples studied enables to answer the question. Indeed, samples are composed exclusively of very low school level's young people whose capabilities are limited.

In these studies population was largely representative of apprenticeships but this is not true today. For "A levels" graduates who sign an apprenticeship-contract we can notice the contrary. It seems that they don't have real advantages in term of easy access to the labour market, but the benefit in terms of wages is significant. Does it come from individual characteristics not observed ? of type of jobs ? or does it pay for particular skills which the apprentices would have shown ? This question clarifies the policy of the firms which invest apprenticeships in higher education. If all things being equal, the fact of having been an apprentice does not provides any real bonus, this means that the investment of the firms is of pure opportunity (reduced wages and tax, short term contracts). If the model demonstrate a benefit which can be linked to apprenticeships, that means that the firms use here apprenticeships to build particular skills or to select individuals with strong potential.

3.2. Our analysis framework and method

Two dimension must be considered. The first one concerns individuals, the second one concerns firms. On one hand, all individuals having the A-level diploma and can access to higher education. Apprenticeships is no more a special course for people with fewer educational abilities, but now become a selective training. Young people who choose this vocational training must be accepted in the training centre and be selected by firms to sign a work contract. On the other hand, apprenticeship will be a real training invest and a means to lawfully employ young people at lower costs under short terms contracts for a quite long period.

In order to observe the existence of apprenticeship training effect on earnings, we developped a simple method. The main idea is to estimate a traditional earning function of Mincer. Obviously, this estimate must be done in two steps according to the Heckman's method, because only people in employment have declared a wage. The difficulty comes from using apprenticeship as explanatory variable in this model because it must certainly produces an endogenous bias. Actually, the training outcomes may comprise two effects : one specific training effect that we are trying to put in light and one self-selection effect. This self-selection effect expresses the endogenous bias. In fact, it supposes that our two populations present different unobserved characteristics and we assume that these characteristics play an important role in the choice of training type and the success in the professional career (Simonet, Ulrich 2000). There are different ways[1] to

[1] Also, we can use the Full Information Maximum Likelihood method or an Estimation of Average Treatments Effects. See Wooldrigde (2002).

deal with this point. We have choosen to adopt the same method as Barnow, Cain and Goldenberg (1981). This method[2] consists in integrating in the estimated earning equation one term representing corrected endogenous bias. So in the final estimation, we can interpret the real effect of the apprenticeship training. It is a three step method. Firstly, the probability to have chosen apprenticeship training is estimated, so we obtain a parameter in order to take into account endogenous bias in the following estimation. Secondly, we estimate the probability to be employed at the survey date, introducing this parameter correcting the first endogenous bias. In that then estimation only concerns individuals who have a job. Finally, the earning function is computed with a selection bias parameter and an endogenous bias corrected parameter.

For all these estimations we have used different explanatory variables groups according to the three steps of the model.

The variables applied to estimate the probability of having chosen apprenticeship training are : gender, the age at the end of elementary school, the class followed (general, technical, vocational) after the first secondary school, the "A levels" (technical, vocational or general), father's occupation, the mother activity, the parents origin and the geographical location (countryside, cities, large cities).

To estimate the probability to be employed the same variables we already use and some other explanatory variables such as diploma (graduate or not), the vocational field, the professional experience before the current job, place of residence and family situation at this date, feeling of discrimination during the job search period.

The estimation of the earning function is estimated by usual covariates : human capital, variables characterizing the current job such as the job occupation, the job seniority, the job contract and those which identify the nature of the firm as the sector of activity and their Geographical location.

3.3. Data

For our analysis, we use the « Generation98 Survey » of Céreq[3]. This survey provides detailed data on educational experience and school-to-work transition periods. Individuals were interviewed three years after the end of their training, in 2001. So, we dispose with precision of three years of their professional starting career on the labour market. Each period of employment is well documented.

Our database is composed of 5774 units representing 82 546 individuals who finished their training at the end of technical or vocational college. At this stage, we had already selected people[4] in order to compare our two groups. Actually, apprentices are not represented in every vocational fields at this level of training ; a large share of vocational training exist only in school. So, by grouping fields items, we have taken into account the two way of preparing a vocational diploma – apprenticeship and school -. In addition, health field has been withdrawn from the sample because the vocational training which seems very close to apprenticeships in pedagogical terms is not in fact an apprenticeship contract[5]

Our sample[6] include about 10 percent apprentices, and without selection it would include about 8 percent. Individuals who have selected industrial fields of vocational trainings are more numerous than those who have chosen tertiary fields. Men are more numerous than women. At the survey date more than 90 percent of the whole sample is occupied. Apprentices, although they fail their exam more often (68% are graduate compared to 78% at college), obtained a job a little bit more frequently because they are closely linked with the apprenticeship firm. For instance, 34 percent of them who have a job at the query date, were hired by the apprenticeship firm at the end of training and among vocational training college 15 percent of leavers where recruited by the firm in which they completed their placement.

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[2] Already choosen by Sollogoub Ulrich (1999). Details about this method in apprendix.

[3] Céreq : French Research Center for the analysis of occupations, vocational education and training

[4] In fact, the number of school leaver two years after A-level can be estimated at 153400 individuals in 1998.

[5] In fact, individuals follow a training like apprentices do. And they have no problem of school-to-work transition.

[6] See table II.0

3.4. Results

The two main results of this empirical work are : at this qualification level there is not an easier access to the labour market for apprentices but there is a vocational training effect on the wages three years after finishing initial vocational training. This effect is positive and is to apprentice's advantage. So, it seems that, at this level of vocational college, firms use apprenticeships to build particular skills or to select individuals with strong potential.

Our first model[7] intend to study the probability to signing an apprenticeship contract after "A levels". Ceteris paribus it shows that men, whose mothers work, living in largest cities, who have early on followed vocational training classes, and have a vocational A-levels have the most chances of choosing apprenticeship vocational training at the college level. However, women, or individuals of foreign origin, or who have a technical "A levels" or whose father is a worker have a lower probability of becoming apprentice.

Secondly, looking at the probability of being employed, we find that the type of training has no significant influence on this probability. Few variables have a positive effect, such as being a graduate, having a professional experience during training, having be hire under open-ended contract for his first job, or having fewer six months of unemployment during the three years long on the labour market. Neither explanatory variable of human capital, nor gender covariate is relevant in this step, but geographical location and having followed an hotel trade training undervalue the chances of being employed at the survey date. What is important to note is that there is no endogenous bias[8].

Thirdly, the earnings function estimation gives standard results[9]. For instance, the contract form, the occupation level, the nature of the firm or the sector of activity are significant covariates. People recruits under open-ended contracts earn about 6,5% more than others in a short term contracts job. A private organization pays 3,5% above that of an administration. On average, wage of an administrative senior executive is arisen of 21% compared to an administrative technician. As usual, we note that men earn more money than women, and this also concerns graduated people. But, less usual, we note also a significant influence of the fields of training

At least we must point out that there is a significant effect of the training type. Individuals with an apprenticeship training seem to earn more (2,8 %) than others with a classical professional training. This result does not seem biased. How can we interpret this fact ? Rather than believing that apprentices have unobserved attributes which make them more productive in employ (note they have a lower rate of success at the exam than others), we would better think that firms are sensitive to this training. We establish that more than half apprentices are straightaway in employ after training (only a third for others) but the wage benefit do not come only from seniority in training firms. Actually, around 60% of apprentices are not employed in their training firms. So it seems that apprenticeship develop particular skills or select individuals attractive for firms.

[7] See Table II.1.

[8] The table II.2. does not present the endogenous term because it is no relevant and affects the parameter of the covariate "type of training".

[9] See Table II.3.

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Appendices

Table 1 • Descriptive Statistics

		People from apprenticeship training	People from classic training
Demographic factors			
	Male	57,7 %	52,5 %
	French origin	94,5 %	91,6 %
	Foreign origin	5,5 %	8,4 %
	Father is an executive or a technician	28,1 %	28,9 %
	Father is a worker	50,8 %	53,3 %
	Father is employed	80,4 %	81,9 %
	Mother is employed	70,5 %	62,2 %
Education			
	Late at the end of elementary school	13,3 %	13,6 %
	Followed a first level of secondary vocational school	33,1 %	16,2 %
	Agricultural	13,3 %	6,1 %
	Industrial	21,9 %	12,2 %
	Mechanical	11,0 %	22,7 %
	Transport	2,9 %	2,2 %
	Trade	24,4%	21,2 %
	Accountancy - Finance	15,8 %	20 %
	Hotel trade - Catering	4,5 %	4,8 %
	Secretariat	6,1 %	10,8 %
	Graduate	68,6%	78,0 %
	Studied in large cities	32,0 %	26, 0%
	Studied in cities	52,5 %	59,0 %
	Studied in countryside	15,5 %	15,0 %
After school leaving			
	Immediately in employ	56,8 %	34,8 %
	Job in apprenticeship firm	34,4 %	-
	Number of months in employ	29	28
	More than 12 months unemployed	16,7 %	23,7 %
	Low than 6 months unemployed	76,4 %	65,6 %
	Live at parent's home	48,2 %	57,2 %
	first job with open-ended contract	47,3 %	27,1 %
	first job with short time contract	44,9 %	59,9 %
	first job with special short time contract	7,8 %	13, 0 %
	Felt discrimination	9,5 %	11,2 %
Situation in 2001			
	In employ	92,7 %	90,9 %
	Average earning	1320	1210
	Employed in private sector	95,4 %	90,2 %
	Employed at full time	95,2 %	94,4 %
	Average seniority in job	22	20
	Executive	10,9 %	7,9 %
	Intermediate	46,1 %	44,5 %
	workers	41,3 %	46,5 %
	Job in apprenticeship or training courses firm	39,4 %	15,0 %
	Work in Paris	24,8 %	19,9 %

Table 2 • Probit model to go through apprenticeship

Explanatory variable		Parameter	Std error
Intercept		-1,3783 **	0,0775
Gender			
	Male	0,1101 **	0,0471
	Female	-	-
"A levels"			
	Vocational	0,706 **	0,09
	Technical	-0,1207 **	0,0541
	General	-	-
secondary school			
	Vocational by Apprenticeship	0,5381 **	0,1923
	Vocational by school	0,2155 **	0,0684
	General	-	-
Age at the end of elementary school			
	Younger	-0,1412	0,1255
	Older	-0,1339 *	0,0725
	Normal	-	-
Father occupation			
	Executive or Technician	-0,0932	0,0685
	workers	-0,1316 **	0,061
	Craftsmen, Trades people	-	-
Mother employment			
	Employed	0,1533 **	0,0496
	Unemployed or Housewife	-	-
Parents origin			
	Both foreign parents	-0,3813 **	0,1067
	One foreign parent	0,1266	0,1124
	Both French parent	-	-
Geographical place			
	Large cities	0,1615**	0,0593
	countryside	-0,0227	0,0649
	cities	-	-
Observations	5774		
% from Apprenticeship	10,58 %		
-2 Log Likelihood	3644,92		
Pseudo R^2	6,54%		

Notes : This model serves to treat the eventual endogenous fact for the following models
* indicates a coefficient significant at the 10% level, ** indicates a coefficient significant at the 5% level.

Tabe 3 • Probit model to be employed at the date of enquiry

Explanatory variable		Parameter	Std error
Gender	Male	-0,0863	0,0659
	Female	-	-
"A levels"	Vocational	0,00762	0,1192
	Technical	-0,00016	0,0583
	General	-	-
Secondary school	Vocational by apprenticeship	-0,1922	0,2317
	Vocational by secondary school	0,1388 *	0,0820
	General	-	-
Age at the end of elementary school	Older	0,0248	0,0764
	Normal or Younger	-	-
Diploma	Graduate	0,2530 **	0,0581
	No graduate	-	-
Type of vocational training	Apprenticeship	-0,1500	0,1310
	Classic	-	-
Field of the training	Agricultural	0,1792	0,1283
	Industrial	0,00065	0,1192
	Mechanical	-0,0263	0,0889
	Transport	0,0379	0,1779
	Trade	-0,1305	0,0962
	Accountancy - Finance	0,0507	0,0982
	Hotel trade - Catering	-0,3192 **	0,1331
	Secretariat	-	-
Number of unemployed months before this job	Low than 7	0,3180 **	0,0816
	more than 11	-0,4359 **	0,0833
	between 7 and 11	-	-
Type of first job contract	Open-ended	0,1409 **	0,0642
	specific short time	-0,4378 **	0,0648
	Short time or without first job	-	-
Experience during training (Yes/No)	training course	0,3945 **	0,1351
	minor job	-0,0820	0,0610
	regular job	0,1145	0,1054
Father occupation	Executive or Technician	-0,0613	0,0575
	Others	-	-
Father employment	Employed	0,0685	0,0647
	Unemployed	-	-
Mother employment	Employed	-0,00154	0,0525
	Unemployed	-	-
Parents origin	Both foreign parents	0,0529	0,0962
	One foreign parent	-0,0629	0,1270
	Both French parent	-	-
Feeling of discrimination during the job search period	Yes	-0,2189	0,0704
	No	-	-
Dwelling	At parents place	-0,0388	0,0682
	in pair but not at parent's place	0,000380	0,0787
Geographical place	Big cities	0,0271	0,0640
	Countryside	-0,1175 **	0,0675
	Cities	-	-
Observations	5774		
% employed	90,89 %		
-2 Log Likelihood	3135,42		
Pseudo R^2	11,0%		

Notes : the endogenous factor is not present in this model because it is not relevant and so becomes the parameter of the explanatory variable meaning the training type interpretable

* indicates a coefficient significant at the 10% level, ** indicates a coefficient significant at the 5% level.

Table 4 a • Selection-Corrected model of Log of Monthly Earnings for individuals employed at the date of enquiry

Explanatory variable		Parameter	Std error
Intercept		6,5129 **	0,0293
Gender	Male	0,0909 **	0,0204
	Female	-	-
Diploma	Graduate	0,0237 **	0,0076
	No graduate	-	-
Type of vocational training	Apprenticeship	0,0329 **	0,0085
	Classic	-	-
Field of training	Agricultural	-0,0808 **	0,0153
	Industrial	0,0504	0,0385
	Mechanical	-0,032 **	0,0154
	Transport	0,034 **	0,0104
	Trade	0,0346 *	0,0206
	Accountancy - Finance	-0,0027	0,0121
	Hotel trade - Catering	-0,0039	0,0117
	Secretariat	-	-
Number of employed months before this job		0,0045	0,019
Type of first job contract	Open-ended	0,0131 *	0,0071
	Others	-	-
Type of current job contract	Open Ended	0,0643 **	0,0081
	Public policies short time	-0,1577 **	0,011
	Short time	-	-
Occupation	Craftsmen, Trades people	-0,0767 **	0,0006
	Administrative senior executive	0,2126 **	0,0087
	Engineer	0,2503 **	0,0141
	Other senior executive	0,0242	0,0237
	Technician - Expert	0,0174	0,0191
	Other Technician and Expert	-0,0266	0,0258
	Operative	-0,0763 **	0,0088
	Employee	-0,0853 **	0,0226
	Administrative technician	-	-
	Administrative technician	-	-
Sector of activity	Agricultural	-0,0254 **	0,0111
	Industrial	0,0154	0,0167
	Energy	0,1024 **	0,012
	Building	-0,0202	0,0153
	Trade	-0,0612 **	0,0093
	Hotel trade - Catering	-0,0807 **	0,0205
	Services to individuals	-0,0185	0,0161
	Public sector	-0,0371 **	0,0087
	Sector missing	0,0006	0,0215
	Services to firms	-	-
Time job	Full time	0,3672 **	0,026
	Part time	-	-
Seniority in current job		0,0005	0,0147
Square current job tenure		-0,00001	0,0294
Type employer	Private	0,0349 **	0,0001
	Administration	-	-

* indicates a coefficient significant at the 10% level, ** indicates a coefficient significant at the 5% level.

Table 4b • Selection-Corrected model of Log of Monthly Earnings for individuals employed at the date of enquiry

Explanatory variable		Parameter	Std error
Job location	Paris and its suburbs	0,132 **	0,0158
	Other localization in France	-	-
Children	Yes	-0,0165 **	0,0082
	No	-	-
Husband or wife employment	Employed	-0,0045	0,0119
	Unemployed	-	-
Occupation of husband or wife	Executive	0,0273 **	0,0089
	Not	-	-
Dwelling	At parents place	-0,0274 **	0,013
	In pair not at parent's place	-0,0085 **	0,0012
	Single not at parent's place	-	-
Factor for the endogenous bias		0,0055	0,0107
Factor for the selection bias		-0,0567 *	0,0314
Observations	5248		
R^2	47,33 %		

* indicates a coefficient significant at the 10% level, ** indicates a coefficient significant at the 5% level.

METHOD OF CAIN, BARNOW AND GOLDBERGER (1981)

- Stage 1 : Probability to be an apprentice

Here is the equation that evaluate this probability :

$A^* = \gamma Z_1 + u$ *(1)*

$A = 1$ *si* $A^* > 0$

$A = 0$ *si* $A^* < 0$

Z_1 is composed by the covariates in Table 2.

- Stage 2 : Probability to be in employ at the enquiry date

Here is the equation that determine this probability :

$E^* = \rho Z_2 + \alpha_1 A + \delta_1 \lambda^* + v$ *(2)*

$E = 1$ *si* $E^* > 0$

$E = 0$ *si* $E^* < 0$

Z_2 is represented by the covariates in Table 3.

λ is the term to correct the endogenous bias. It takes into account the correlation between the both error terms -u and v- of the equation (1) and the equation (2). Thanks to it, we obtain an unbiased estimation of parameter α_1.

Now we calculate λ as the method of Cain, Barnow and Goldberger :

$$\lambda^* = E[u / Z_2, A] = AxE[u / Z_2, A = 1] + (1 - A)xE[u / Z_2, A = 0]$$

$$\lambda^* = Ax\frac{\phi(\gamma Z_1)}{\Phi(\gamma Z_1)} + (1 - A)x\frac{-\phi(\gamma Z_1)}{1 - \Phi(\gamma Z_1)}$$

ϕ and Φ are respectively the normal density function and the normal cumulative density function.

- Stage 3 : Log of monthly earnings estimation

$Y = \beta X + \alpha_3 A + \delta_3 \lambda^* + \eta_3 \kappa^* + \varepsilon$

The covariates of X are reported in Table 4

λ^* is the term to correct the endogenous bias and κ^* represent a term to correct the estimation[10] because we only compute on the individuals in employ.

[10] It is necessary to correct the standard error in the third step because some estimated terms have been introduce (for instance the term of endogenous bias). See the method of Murphy and Topel (1985) or Heckman, Ichimura, Smith and Todd (1998, in Econometrica 66, pp 1017-1098).

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