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Schooling, Training and Transitions:

An Economic Perspective

(STT)

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TSER-STT

(Schooling, Training and transitions)

Final Report

Co-ordinated

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SUMMARY

1. EXECUTIVE SUMMARY

INTRODUCTION

The primary objective of this research was to bring together the work and experience of European economists who have contributed to the field of education and training. We aimed to exploit the wealth and diversity of European institutions and data to develop further an expertise in comparative analysis and a deeper understanding of the mechanisms which have shaped schooling and training systems, and labour market transitions (from school to work, and from job to job), somewhat differently across countries.

Transitions serves as a useful unifying theme for this research project as they link successive individual states over time: 1) school to school; 2) school to work; 3) work to work; and 4) work to inactivity. Transitions therefore describe the adjustments which occur as a result of economic growth, structural change and policy interventions. This research project examined schooling, training, and transitions at various points of an individual's life cycle.

Theoretical and empirical analysis of three topics has been carried out, as described below.

I - A comparative analysis of schooling systems.

II - The transition from school to work.
Two sub-topics are analysed here:
Types of transition
Wage rigidities

III - Training and labour market flexibility
In which three sub-topics have been studied:
Supply of training
Turnover/flexibility
Labour force greying

This report consists of a summary of the results found in 57 Working Papers published in our (STT) project Working Paper Series from February 1997 to July 1999. Twenty three of these Working Papers have already been published, seven are in the process of revision, and seventeen have been submitted. The journals concerned are amongst the best international or national academic publications in economics.

I - A COMPARATIVE ANALYSIS OF SCHOOLING SYSTEMS

The goal pursued here is to provide a comparative analysis of schooling systems from an economic perspective. It was motivated by the need, first, to give our group of European economists a sound understanding of schooling systems through the cross-fertilisation of research efforts and sharing of knowledge, and, second, to relate subsequent training and transitions, which are the principal subjects of our research programme, with prior schooling.

I . 1 –QUESTIONS ADDRESSED IN OUR WORK

Our work provides some clues why schooling systems across countries share some factors in common but differ according to others. We obtain stylised descriptions of schooling systems

from indicators established by international organisations. We then supplement these data with the answers given by education experts in sixteen countries to a questionnaire tailored to our needs.

Schooling systems differ in the way they differentiate, in the way they sort and select students, and in the way they cooperate with firms to produce vocational skills. All systems teach the basic cognitive skills (reading, writing, elementary mathematics) in the first years of schooling. Labour market participation requires specific vocational skills that build on the basic cognitive skills. The training trajectory, from basic cognitive skills to specific vocational skills, differs widely between countries. In the formal schooling system these differences refer to:

1/ The extent, nature and flexibility of differentiation.
Schooling systems may differ in the age at which students are sorted into separate schools or separate curricula. In some systems, choices have to be made at an early age and are virtually irreversible. In other systems, choices come later, or can be easily corrected. Such differentiation may cater to differences in cognitive abilities and vocational interests of students. A number of questions can be raised. How much and by what criteria are students differentiated over level and types of education in different countries? At what age is this carried out? What are the effects of early differentiation (e.g. at age 12, as in the Netherlands) on the overall production of human capital? Is early differentiation efficient? Does social background still play a major role in educational choice?

2/ The ease of entry
Some systems are relatively open (e.g. French universities) with easy access by students to the institutions of their choice. Other systems are relatively closed (e.g. British universities) with selection at the entrance level for tertiary education. What are the costs and benefits of educational systems with tight admission rules compared to those which are less selective? Can the quality of education be improved without tightening selection criteria?

3/ The positioning of specific vocational education
All schooling systems provide young people with a gradual transition from general to specific vocational education. The provision of vocational skills may be part of the formal schooling system (schools producing carpenters, dentists or engineers), completely outside it (nurses' in-service training, after general secondary education), or may cut across both categories, as in apprenticeship programmes combining formal schooling with on-the-job training and work experience. What determines this division between formal schooling and less formal education? How can transitions through the system be made more efficient?

4/ The effects of school quality differences
In some systems there are quality differences between schools in terms of expenditure per pupil (e.g. in Spain, UK and the USA). In other countries there are virtually no quality differences. What do we know about such school quality differences, and what are their effects?

5/ Last, our work yields some tentative answers to **key policy issues**:
on curriculum differentiation: early or late?
on access to higher education: open or closed?
on vocational training programmes: schools or firms?

II – THE TRANSITION FROM SCHOOL TO WORK

The transition from school to work has been an important issue for thirty years. However, our understanding of this period of working life has been profoundly modified by the rise of youth unemployment and by increasing government involvement in the provision of training programmes. The transition from school to work is no longer guaranteed to be short and simple, but is now a more complex process characterised by the succession of periods of employment, training and unemployment until the "final" job is obtained. Youth unemployment has become an acute problem in many European countries, especially for those with lower levels of education. We lay particular emphasis on this in our work.

The first topic studied is *types of transitions*: the transition from apprenticeship to work, compared to the transition from vocational school to work represents our first comparison of types of transitions. We also analyse the main variables influencing the ease or difficulty of obtaining a job in this context.

Another important factor influencing school to work transitions is *wage rigidities*. This is the second topic of this section. Clearly, labour market regulation such as minimum wages may have an effect upon transitions, especially for the youngest and least qualified workers. This is what we showed here, at least for the case of France.

II. A – TYPES OF TRANSITIONS

Our analysis is mainly concentrated on the *microeconomic* aspects of school to work transitions, using longitudinal data whenever possible. Although a number of papers are concerned with the more educated, most of the analysis is devoted to those with lower levels of education. Much of the research is comparative, in the sense that the question addressed is analysed in several papers using data from at least two countries.

II.A.1 – QUESTIONS ADDRESSED IN OUR WORK

This topic is analysed in fifteen papers[1], most often in terms of transitions in the youth labour market.

1/ The question of **the efficiency of apprenticeship** and of **vocational training** has been at the centre of our research. Four papers consider this question, using data from France, the Netherlands and Norway

A first important issue regarding vocational training is the matching of the skills supplied to labour demand. Vocational school students are believed to develop fewer abilities to link theory and practice than do apprentices, as the latter are able to establish a permanent link between what is learned at school and how to implement it. Moreover, if, as it is likely, general training is more profitable to youth when it is carried out jointly with specific training, apprenticeship should be more efficient than vocational school in overcoming the difficulty of matching youths' technical capacities and firms' needs.

[1] Some of these are mainly concerned with the comparison of schooling systems, or of job mobility. These will also be mentioned separately in the corresponding part of the final report.

A second important issue is the transferability of skills acquired during apprenticeship to firms other than those carrying out the training. Apprenticeship provides more specific human capital than does vocational school. Apprenticeship thus confers an advantage on those who remain in the firm after the end of the apprenticeship contract. Their probability of obtaining a high-quality long-duration job should be greater. For those apprentices who leave the training firm, part of the specific human capital acquired is lost. Whether they have more difficulty in finding a job than do vocational school leavers depends on the general human capital acquired. On the one hand, apprentices accumulate general capacities that can not be acquired in school where the work environment is only simulated (obedience, work discipline, work in teams etc.). On the other hand, training received in vocational school might be transferable to a wider range of sectors. This transferability of skills may also depend on the functioning of the labour market. If job-specific skills and firm attachment are particularly important in the labour market, apprenticeship should facilitate the school to work transition, even if the contract with the training firm is not renewed. If, on the contrary, performance in different jobs is sought after by firms, vocational school might be more efficient.

A third issue concerns uncertainty about the quality of the newly-qualified young worker. This uncertainty is obviously higher for vocational school leavers than for ex-apprentices. There is also uncertainty on the workers' side with respect to the kind of job best-suited to their capacities and their wishes. Such uncertainty can prevent the employer and the young worker from establishing a long-term relationship. Apprenticeship, as opposed to vocational school, should reduce this uncertainty for both the employer and the young worker, through the experience acquired during apprenticeship. We therefore expect ex-apprentices to be more likely to establish long-term contractual relationships.

A fourth and last issue concerns differences in observed and unobserved characteristics of ex-apprentices and vocational school leavers. These characteristics may influence the school to work transition, irrespective of the type of training received. It is indeed likely that the choice between apprenticeship and vocational school depends on youths' preferences. Participants may also be selected by the administrators of the training programmes according to some criteria, in particular by firms that provide the apprenticeship contract. This implies a *selectivity bias* which may conceal the true benefits or disadvantages of one kind of schooling over the other.

2/ Key variables in explaining transitions

The Spanish and Norwegian teams, with eight papers between them, have analysed this topic in depth. The results provide interesting comparisons of two very dissimilar countries with respect to the ease of youth labour market transitions. Of particular interest are gender comparisons, and the effect of different levels of schooling upon youth employment: Norway seems to be atypical relative to the former and Spain is atypical with respect to the latter. We shall summarise here a paper which has the more macro-economic goal of testing the links made by some authors between the size of the labour market and its efficiency in the matching process. More precisely, the paper tests uses British data to test the hypothesis of constant returns in the matching function embodied in most bilateral search models. The question raised here is that of the efficiency of larger labour markets, such as the European Union, in dealing with unemployment.

3/ Four papers address the question of **job competition and over-education**. Most European countries have raised, sometimes at a very rapid rate, the level of youth schooling and training (for example, Spain, Norway and the U.K.). A higher general level of education level is expected to improve overall labour market performance (regarding employment as well as job qualification), as evidenced by the better situation of highly educated individuals in the labour market. However, issues regarding identification and causality are clearly important here[2]. Three points raise doubts regarding the benefits to be expected from an increase in the general level of schooling:
The macroeconomic correlation between economic development and educational spending might simply reflect an increase in the *demand* for education, as income increases with development and education is a normal good.
Similarly, the correlation at the microeconomic level between education and employment might reflect an underlying self-selection process, whereby the most able individuals choose greater levels of education.
A higher general level of schooling might result in over-education and increased job competition, *i.e.* lead to the substitution in low skilled jobs of young workers with higher levels of education for those with lower levels of education, with no benefit in terms of employment or labour productivity.

Results are provided for Norway and for France (where an original theoretical model of job search dealing with job competition is developed and tested), and for a number of different countries reviewed in a meta-analysis.

4/ Temporary work contracts and their possible beneficial effects upon youth employment are analysed in two papers using data from France and Spain. The question here is whether short-term contracts represent a genuine probation period for young workers before a permanent job. If this is the case, they can be considered as beneficial, as they provide employers with means of selecting the best candidates for a job, thus improving the quality of the employer/employee match. They will also be beneficial for young workers, as they provide them with, at best, a permanent job at the end of the temporary contract (or before), and, at worst, when they are not offered a permanent contract, with some work experience, which is generally valued in the labour market. An alternative, less positive perspective is that temporary contracts are used by employers as a cheaper and/or more flexible tool for employment adjustment which allows them to avoid otherwise strict regulations concerning permanent jobs. In this case, temporary contracts become a permanent instrument of flexibility for firms: workers are systematically fired at or before the end of the contract and replaced by others, while young workers may experience several successive periods of work and unemployment without ever being offered a permanent job.

II.B – WAGE RIGIDITIES

Much of the effort regarding this subtopic has been spent in the analysis of the effects of minimum wage policies. Minimum wages have always been a controversial policy. Some claim that a minimum wage guarantee prevents people from sinking down into poverty. Opponents claim that minimum wages create serious unemployment problems, especially

[2] These point are reviewed in Nilsen and Risa (1999)

amongst the young. Another controversy has been whether or not minimum wages encourage young people to undertake education and training.

II-B.1 – QUESTIONS ADDRESSED IN OUR WORK

The project has generated six papers within the topic minimum wages and wage rigidities. Three papers try to estimate the possible negative employment effects from minimum wage increases using a *transitional approach.* Two papers then ask whether minimum wages increase or decrease education and training. These latter papers take a more theoretical approach, with some empirical support. The last paper deals with labour market dualism.

1/ Minimum wages and transitions.

Our empirical work on the employment effect of minimum wages uses individual level panel data on wages and employment. This allows us to estimate the impact of minimum wages *for those concerned*, rather than for the population as a whole. If the minimum wage increases, for example, some people will now be affected by the minimum wage who earlier were unaffected. Do people belonging to this group transit more often out of employment than a reference group, for instance those workers earning marginally above the minimum wage both before and after the change? This analysis is carried out for France (with a comparison to the US) and for Norway.

2/ Minimum wages and education.

Even though minimum wages may have negative employment effects, it is possible that youths who were excluded from the labour market undertook more education to regain access to the job market. In a second best world, could minimum wages be efficiency improving? Two papers from the project deal with this question but deliver contradictory answers. What lies behind this disagreement?

3/ Labour market dualism.

In a competitive model, differences in work conditions will be compensated by wages, so that jobs with poor work conditions will have higher wages. A rival theory, labour market segmentation, suggests that some workers are able to achieve both good jobs and high wages, while others are not. One paper from the project seeks to test which of these theories best fits French data.

III – TRAINING AND LABOUR MARKET FLEXIBILITY

Considering the working life and professional careers of individuals in greater detail, three topics have been studied.
The supply of training
Turnover and flexibility
Labour force greying

The beneficial aspects of training on productivity channel through the production process and the organisation of work. Thus, progress in the understanding of this basic effect of human capital requires that we open the “black box” of both production and the learning process within firms. Labour market flexibility also has an effect on training efforts. Conversely, workers may be more inclined to quit if there are few opportunities for promotion in the firm. Finally, due to demographic changes, the average age of the employed workforce is

increasing. One pertinent question is how to improve labour market flexibility when the workforce is ageing.

III.A - SUPPLY OF TRAINING

To complement work undertaken in other areas of this programme, specifically that on vocational preparation for the school to work transition and on the link between labour turnover and human capital formation, a subgroup was convened to review, evaluate and work on the issue of the supply of work-related training.

Our specific concern here was to avoid becoming involved in what is already a heavily-researched area, and one which has its own EU-funded programmes of action and research. Instead, we have sought to consider the supply of *employer-provided* work-related training as either a complement to or substitute for more general human capital development. We were aware that significant differences exist between member states in the extent to which employer-provided training represents part of the vocational pathway into stable employment. We decided, therefore, that without this strand to our research programme, we would risk developing only a partial understanding of the process of the school to work transition.

As a first step, we prepared a comparative review of research and data resources available within the European Union relating to the supply of employer-provided training. Together with an overview of the relevant economic theories, one of the papers presents a critical review of empirical work covering the returns to employer-provided training from the perspective of the firm. It then considers evidence on participation in employer-provided training and presents results from an empirical study of the correlates of such training across the European Union.

While conducting this review we became aware of the significant efforts taking place elsewhere to monitor within a comparative framework recent changes in both the quantity and quality of employer-provided training. For our own work we thus decided to focus more closely on one significant methodological and definitional issue. One particular innovation in this part of the research programme is our move away from the more traditional approach to the study of *formal* work-related training to encompass a broader definition of learning at the workplace.

III.A.1 QUESTIONS ADDRESSED IN OUR WORK

1/ The definition of 'formal' training

The definition of 'formal' training gives rise to a number of issues which only become apparent in a comparative framework. It is usually taken to include all planned and purposeful activities which are undertaken within a contract of employment and which are designed to improve individual productivity. Thus, short courses are included, as are apprenticeship programmes and periods of instruction either on-or off-the-job[3].

[3] We use the phrase 'off-the-job' to indicate a spell of training which takes place within a contract of employment, but not as part of the day-to-day tasks associated with that employment.

2/ Government provided training for young people

An important element of the supply of training is that provided by governments for young people. This project has therefore provided a description of the history, evolution and process of the provision of this training in the UK.

3/ The role of young people's wage expectations

We have also examined the role of young people's wage expectations in the transition process between school and work.

III.B – TURNOVER AND FLEXIBILITY

Matching, a term often used to describe the quality of the "fit" between a worker and a firm, is a concept widely appealed to in labour economics. A good part of the literature on education and on job training, for example, appeals to the benefits that a better match between worker and firm might be thought to engender. Other work on turnover in the labour market has emphasised "job shopping" by workers (and, equally, "worker shopping" by firms) as being essentially a process of search for a good match. Another literature has emphasised the importance of a good job match in explaining workers' productivity

Mobility refers both to the movement of workers between jobs (both within and between firms), and to the creation and destruction of jobs themselves. As such, it involves both external and firms' internal labour markets. Considering the end of an employer-employee match, it is obviously important to distinguish between those that are initiated by the worker (quits) and those that are firm-initiated (layoffs). It is also of importance to relate individuals' mobility decisions to the "tightness" of the outside labour market, with this latter typically being measured as the ratio of unemployment to vacancies (the U/V or Beveridge curve).

There is no unanimously-accepted single theory of mobility. Below we present a number of different approaches to internal and external mobility. We note that the lack of relevant information on training and some of the characteristics which lead to a good match (both in terms of their level and of their evolution over time) has stimulated the development of alternative theories explaining the supply of and demand for particular skills and job conditions, professional careers and the evolution of wages with job tenure and experience, and other factors influencing matching and mobility. Additional information regarding the characteristics of the job match may therefore provide useful information for distinguishing between competing theories of mobility.

III.B.1 QUESTIONS ADDRESSED IN OUR WORK

The questions are divided up into two broad areas. We first present those that concern labour market mobility.

Our work on labour mobility has been to a large extent empirical. Our aim has been to use European data to test various theoretical predictions about the labour market. The data is often panel, following the same individuals (or firms) over a number of years. In addition, some papers have been able to use linked employer-employee (LEE) data to model wages and mobility more accurately.

Six questions are addressed in relation to labour market mobility. We analyse the following topics.

1/ Is mobility profitable for workers?
We use long-run American and German panel data are to model mobility from the worker's side. Do those who change jobs earn more than they would have if they had stayed? We then use Norwegian LEE data to examine more closely the firm's side of the mobility relation, examining job creation and job destruction. We especially ask how labour turnover is related to education and gender.

2/ Re-employment probabilities as a function of sex and age using individual data.

3/ Does the absolute size of the pool of workers searching matter? We ask whether there are increasing or constant returns in the matching function.

4/ The factors determining whether an individual finds temporary or permanent employment in the labour market, again with a focus on education.

5/ The relation between internal mobility (promotion) and education and tenure, with a special emphasis on gender differences.

6/ The relationship between training and job tenure and wages
Here we ask specifically what percentage of specific human capital is lost as a result of a job move?

The remaining questions refer to matching. They can be grouped into two broad issues.

7/ Do workers' responses to job satisfaction questions provide useful information about the same workers' future quit behaviour?
This will not be the case if answers to job satisfaction questions cannot be compared between individuals, or if job satisfaction contains no useful information.

Once we have established that job satisfaction predicts quits, we then ask

8/ How is job satisfaction determined?
This question has been the focus of a series of recent papers in labour economics, ending a barren run where such questions were thought to be the preserve of psychologists. This revival is due partly to the recent availability of large-scale datasets in which such information appears, partly to a seeming increased willingness of economists to take individuals' subjective evaluations of their experience in the labour market seriously.

III.C – LABOUR FORCE GREYING

The increase in the life-expectancy of the population and the decline in birth rates have resulted in an increase in the proportion of elderly people. Despite the fact that people are now expected to live longer in good health - and thus live in circumstances in which they are able to work - the labour force participation rate of older workers (aged 55 or more) has declined dramatically over the past thirty years.

In our work on this topic, an overview is presented of the causes and consequences of labour force greying. In accordance with the general objective of the TSER/STT project, particular attention is paid to the role of education and training on labour force greying and to labour market flexibility of older workers.

III.C.1 – QUESTIONS ADDRESSED IN OUR WORK

1/ The causes of the decline in labour force participation of older workers
Here we consider the causes of the decline in the labour force participation of older workers, in terms of both the demand and the supply side of the labour market.

2/ Changes in the educational attainment of older workers
One of the most remarkable social developments of the past decades in Western countries has been the increase in the level of education. We relate this rise in education levels to training. Despite this increase, older workers are still less likely to participate in on-the-job training than are younger workers.

3/ Labour market flexibility of older workers
Current socio-economic policy debates, especially those in Europe, are to a large extent dominated by the belief that the labour market needs to become more flexible. Two types of labour market flexibility can be distinguished: internal flexibility and external flexibility. We analyse both types of flexibility in terms of the age of the workforce. Do the factors determining job mobility become more unfavourable as the workers age?

4/ How to increase the labour force participation of older workers?
A key question faced in many countries is how to increase the labour force participation rate of older workers As the OECD points out, the extent to which the labour force will age will be strongly influenced by trends in retirement patterns (OECD, 1998, p.124). Measures to increase the labour force participation rate of older people are both addressed both at the demand and the supply side of the labour market. With respect to the latter, measures have been taken in some countries to make early retirement less financially attractive.

Schooling and training may also help to increase the labour force participation of older workers. If both firms and workers invest in training they both have an interest in continuing the employment relation in order to recover their investment costs. Furthermore, older workers themselves view training as an indication that they are still considered valuable by their employer. In this sense training also helps to keep older workers in employment and helps to change the value of work relative to retirement.

MAIN RESULTS AND POLICY IMPLICATIONS

Some of our results appear to be robust; others need further work in order to be confirmed. Considering the **comparison of schooling systems**, our research shows that:

1/ One implication of the economic analysis of schooling, which is that educational efforts and resources should be essentially driven by market forces in the aggregate, is largely validated. A first confirmation comes from the fact that, in our papers, we find the now

standard inverse relationship between schooling returns and the student population. Another piece of evidence comes from the conclusion that the dispersion of aggregate educational outputs between a large sample of industrialised countries is rather small, and there are clear signs of convergence. Hence, at the most aggregate level, schooling systems do not seem to matter much and market forces are prevalent.

2/ A second implication of the economic analysis of schooling which is investigated here is that higher resources should be associated with higher earnings, i.e. market returns to education and higher academic attainment. One important result here is that the way in which resources are allocated within schools is as important as differences in resourcing levels across schools or school districts. It is also shown that a low pupil-teacher ratio significantly increases the unit cost of education, as does early streaming and decentralisation. Since a higher pupil-teacher ratio compensates for the overcost of streaming, differentiated education systems allow more crowded classrooms in order to maintain the unit cost of education at the same level as that in non-differentiated systems. Another important finding is that higher resources in the form of early streaming or a lower pupil-teacher ratio do not only raise the unit costs of education but also seem to increase the academic attainment of pupils.

3/ A last economic implication of the economic analysis of schooling, which we put to the test, is that schooling systems may matter under certain circumstances. Two of these have been investigated here:

A first key policy issue is whether curriculum differentiation should be early or late.
Some findings seem to corroborate one major implication of a theory of educational systems developed in one paper: since ability can be detected earlier than talents, it is not optimal to make an intensive use of differentiation by cognitive ability too early, say at the lower secondary level.

A second key policy issue is whether access to higher education should be open or closed. It is shown that the use of selection at the university entry level is reduced essentially by the amount of differentiation at the upper secondary level, the quality of secondary education, and the typical duration of study in universities. In short, there seems to be a trade-off between differentiation in schools and selection at university entry level. Although theory tells us that selection at entry economises on student wastage and the costly use of continuous filtering, the political difficulty of introducing selection at entry in countries with a baccalaureate system may have been partially circumvented by increasing quality and differentiation of secondary schools at the upper level, and also by augmenting the normal length of studies at university.

One last key policy issue is whether schools or firms should provide vocational training. The education experts interviewed in our study judge vocational training as being more efficient when firms are involved in its organisation, which is ultimately correlated with longer tenure and lower labour turnover in the economy. Thus, schools need the involvement of firms, because firms are probably more efficient than schools in defining the kind of training they need and in evaluating skill-specific talents.

This last result is corroborated when we look at the **transition from school to work.** One important result here is that to be trained in a firm as an apprentice is more efficient in helping youth to be employed during the school to work transition than training provided in

school only. The benefits of apprenticeship are nevertheless mitigated by the fact that, for France only, it is found that ex-apprentices seem to have lower wages than do vocational school leavers.

When studying key variables in the school to work transitions, we find the standard negative relationship between the time taken to find a job and the level of education. As is true in every country, the time required to find a job is shorter for those with higher levels of schooling, with, notably, the exception of Spain, where youths with upper secondary education are more likely to remain unemployed than youths with a higher, but also a lower, level of education. Another exception is found in Norway: paradoxically (when compared to other countries), females have shorter search periods and longer job durations than males. But, as is more common, they also have lower wages.

Another interesting result, from four papers and more countries is that we show no evidence of phenomena such as job competition or an increase in over-education: the widespread and strong increase in youth education observed in most European countries does not seem to have had the negative consequences indicated by the job competition or over-education models. Although clearly the least-educated young workers experience the greatest difficulties in finding a job in all European countries, the main reason seems to be their own lack of appropriate schooling to fulfil (possibly new) job requirements rather than a competition with better-educated youths for unchanging low skilled jobs. These findings, although still limited to a few studies, support policies of increased general education.

Another result, although it is still very preliminary, as it concerns only two countries, France and Spain, concerns labour market legislation. Both France and Spain have changed legislation so that fixed-term contracts in the labour market have become more widespread, alongside a general, more highly-regulated system of permanent contracts. The results of this policy in both countries do not seem very convincing, with respect to both a decrease in general unemployment or an easier transition from school to work for youths. Of course, a complete lack of flexibility could have led to an even worse outcome, but the results of the studies of our STT project seem to indicate that the co-existence of the two systems has negative side-effects, which possibly could be avoided by introducing some flexibility in the general system of work contracts.

Concerning **wage rigidities,** and their effect on the transition from school to work, we can draw some first conclusions: we have identified serious negative employment effects from minimum wage changes in France for those workers who are actually affected by such changes. We failed to duplicate this finding for the Norwegian system with union-bargained sectoral minimum wages. A full analysis of minimum wages should study also transitions into employment and the effect of firm hiring policies. The effects on skill formation and the more long-term labour market success of young workers should also be taken into account. However, the French evidence seems so strong that we can conclude that this type of minimum wage regime has a negative employment effect. The redistribution effects of the minimum wage system may still be beneficial enough to justify a French-type minimum wage scheme, but this question is outside the scope of this research project.

The main conclusions concerning the last topic, **training and labour market flexibility** are the following: looking first at the **supply of training,** it seems that informal training

('learning by doing') appears to have no impact upon either earnings or job turnover compared with formal training methods.

Some interesting results question the pessimistic consensus in the literature that UK government training policies have been ineffective. Indeed, for the UK, using sophisticated econometric methods, it is shown first that the long run effects of this training can be beneficial – specifically in relation to employment enhancement for women. It is also shown that different programmes have very different outcomes and cannot be treated in econometric terms as if they were identical – as most of the literature has done. More importantly perhaps, the government training policies which had a higher structured training content and a greater degree of compulsion were more effective.

A last conclusion in this section is that young people are not unemployed because they have unrealistic expectations of the wages they are worth in the labour market. Rather the results suggest that the length of their unemployment duration is more likely to be dependent on the available supply of jobs and training places.

Concerning **turnover and flexibility,** we first show that turnover is in itself not necessarily a bad thing. In a world of imperfect information, firms and workers are able to achieve better matches by engaging in job or worker shopping. Turnover may therefore allow better quality job matches to be achieved. The positive wage returns to workers from a certain amount of job mobility can be construed as evidence in favour of this hypothesis.

The analysis of turnover in the labour market has revealed the importance of education in understanding labour market flows. First, the better educated seem to obtain more training, and, in general, obtain better jobs. Their re-employment probabilities are greater than are those for workers with lower levels of education, and they are more likely to obtain permanent jobs. In this sense, the training and education of workers should yield appreciable dividends.

The careful analysis of turnover by different levels of education shows, however, that job destruction rates are not noticeably different by worker skill level, whereas job creation rates are higher for better-educated workers. If these results can be generalised, they suggest that measures to dissuade firing will not necessarily benefit lower-educated workers any more than they benefit other workers. Lower-educated workers are doing poorly in terms of hiring, not firing, and policy to aid them should therefore concentrate on increasing their skill levels. Alternatively, policies may be imagined which increase the demand for lower-skilled workers, such as wage subsidies.

Another interesting result is that both the rate of technological change and the structure of international trade provide information about likely future developments in the skill requirements of the labour market. This should inform the debate on the advantages and disadvantages of trade policy, and allow governments to prepare appropriate labour market and education policies in the light of trade developments.

The novelty of many STT papers lies in their use of job satisfaction data as a direct measure of the quality of the match in the labour market. They show that various measures of job satisfaction, available in European panel data, are very strong predictors of future quit behaviour. The fact that the correlation between job satisfaction and quits is found holding all

other standard variables constant underlines that job satisfaction responses contain useful information about future individual behaviour above and beyond the variables that are usually analysed.

An obvious following question to ask is "What brings about job satisfaction"? We argue against a simplistic view of the quality of the job match as a function of current wages and hours of work only. It is thus important to take into account explicitly measures of how well the individual fits into the job, and to consider jobs as flows of experience over time.
The determinants of a good job match, as measured by job satisfaction, seem to depend strongly on what one does, with whom one does it, and what one expected, as well as on more standard measures like pay and hours of work. This is an important finding for those interested in studying turnover in the labour market. In addition, the determinants of a good match differ by sex and by age. Jobs are much more complex than many economic studies suppose. In terms of policy implications, this implies that policy to encourage better quality matches needs to target a wide variety of aspects of the job, rather than just aiming at raising workers' productivity. Policy aimed at those who have difficulty in establishing long-term matches in the labour market (the unemployed and the low-skilled, particular), requires measures addressing not only their low productivity, but also the content of the jobs which these workers find, their ability to use their initiative, and the establishment of good relations with co-workers and managers.

The last topic studied was **labour force greying.** The first main conclusion here was that there is no significant overall difference between the job performance of older and younger workers. We then showed that the low labour force participation of older workers will become a cause of growing concern. How to increase the labour force participation of older workers will become a major policy issue. Schooling and training policies may be envisaged in this respect. If both firms and workers invest in training they both have an interest to continue the employment relation in order to recover their investment costs. Furthermore, older workers themselves view training as an indication that they are still considered to be of value to the firm or organisation. In this sense training also helps to keep older workers in employment and helps to change the value of work relative to retirement.

DISSEMINATION AND/OR EXPLOITATION OF RESULTS

Our activity here can be divided up into six major components.

Working Paper Series

Fifty seven Working Papers were produced. All submissions to this series were refereed (anonymously) by another member of the STT team, and revisions were carried out before the document appeared in the working paper series. The Table below describes the current the number of times these Working Papers have been presented at seminars and conferences, and their current publication status. The Working Papers were widely distributed.

Seminar and Conference presentations

One of the main methods of dissemination of our results, and of obtaining feedback from other researchers, is their presentation in front of a peer group. This presentation may either take place at national and international conferences, or at invited seminars. Our STT Working papers have been presented a total of 173 times (this is the current figure, and will undoubtedly rise, as a number of these papers have not yet been published).

Publication
Publication of our research ensures its widest possible dissemination. The Table shows that, to date, 23 of our STT papers have been published. In addition, 7 are under revision at journals, and a further 17 have been submitted. The publications comprise six book chapters and seventeen journal articles. The journals are amongst the best national and international journals in economics (including the *Journal of Public Economics*, the *Journal of Labor Economics*, the *Journal of Population Economics*, and *Labour Economics*).

Web Site
Given the growing use of the internet, both by the academic and non-academic communities, we established a home web page (at the university of Orléans: http://www.univ-orleans.fr/DEG/LEO/TSER). This page includes a short summary of the STT project, and of the management and responsibility structure. It also includes details of the title and authors of each STT Working Paper. The abstract of each working paper is available for examination or download as a PDF file. In addition, a hypertext link next to each Working Paper provides the e-mail address of the corresponding author of each article.

Internal Meetings
One of the goals of our project was to better acquaint researchers within the STT project with the work that other project members were carrying out. To this end, two types of internal meetings have been organised. The first of these consists in relatively informal Progress Group meetings, held individually at each of the Universities involved in this project. The second type of internal meeting was more formal in nature. Here, researchers from all of our STT institutions met together to present ongoing research work in a seminar-style format. A significant amount of time was set aside for questions and discussion after each of the presentations. In addition, roundtable General Meetings were held, at which progress in the STT project was discussed. We held six of these STT meetings: two at Orléans, and one each in Amsterdam, Malaga, Paris and Warwick.

Future Plans: Final Congress and Book
We have two large-scale plans for the future dissemination and valorisation of our research.

First, we wish to communicate our policy results to those who are directly concerned with the establishment of policy: representatives from the European Commission, policy-makers from national (British) government institutions (in the field of Employment and Education), and policy-makers from government institutions in other European countries. This is the aim of the conference we intend to organise in Warwick in Autumn 2000. The participants at the conference would include members of the STT research team, but also a number of members of other TSER research programmes with related themes, with the aim of cross-fertilisation of methodology, results and interpretation.

Second, publications disseminated in different journals do not provide a summary view of our work. This is why we think that it would be useful to publish a book which would gather and present the main methodology and results from our research. The book will consist of a number of the papers which we have produced throughout our research programme. All of the prospective chapters of the book will be revised, according to remarks and criticisms received. The book will also include a number of summary chapters, describing our main results, presenting general conclusions, and suggesting policy implications and directions for future European research.

Working Paper No.	*Title*	*Authors*	*Number of Presentations*	*Published or Forthcoming*	*Under Revision*	*Submitted*	*Journal/Book*
01-97	Minimum Wages and the Incentives for Skill Formation	Jonas AGELL & Kjell Erik LOMMERUD.	4	X			*Journal of Public Economics (1997)*
02-97	Minimum Wages and Youth Employment in France and United States	John M.ABOWD, Francis KRAMARZ, Thomas LEMIEUX, David N. MARGOLIS.	13	X			*in D.Blanchflower and R.Freeman (eds.), Youth Employment and Joblessness in Advanced Countries, NBER (2000)*
03-97	Bargaining, Compensating Wage Differentials and Dualism of the Labor Market. Theory and Evidence for France	Christophe DANIEL & Catherine SOFER	5	X			*Journal of Labor Economics (1998)*
04-97	Youth Unemployment, Specific Human Capital and Minimum Wage:a Comparison between France and Japan	Masahiro ABE, Charles CRIDELAUZE & Catherine SOFER.	5		X		*Journal of the Japanese and International Economies*
01-98	Season of Birth, Schooling and Earnings	Erik J.S. PLUG	1	X			*Journal of Economic Psychology (2000)*
02-98	Job Satisfaction, Wage Changes and Quits: Evidence from Germany	Andrew CLARK, Yannis GEORGELLIS & Peter SANFEY		X			*Research in Labor Economics (1998)*
03-98	Overeducation in the labor market: a meta analysis	Wim GROOT & Henriëtte Maasen van den BRINK	2	X			*Economics of Education Review (2000)*
04-98	Organization and efficiency of education systems: some empirical findings	Gérard LASSIBILLE & Maria Lucia NAVARRO GOMEZ	1	X			*Comparative Education (2000)*
05-98	Re-employment probabilites and returns to matching	Barbara PETRONGOLO	8	X			*Journal of Labor Economics (2000)*
06-98	Education, training and employability	Wim GROOT & Henriëtte Maassen van den BRINK	2	X			*Applied Economics (2000)*
07-98	From entering the labor market to obtaining permanent employment: An approach by education levels and marital status to processes followed by spanish youth	Juan A. CAÑADA-VICINAY, Aristides OLIVARES-MESA & José M. SUAREZ-GONZALEZ					
08-98	The impact of school Quality on labor Market success in United Kingdom	Peter DOLTON & Anna VIGNOLES	4			X	*Oxford Bulletin of Economics and Statistics*
09-98	Transitions from employment among young workers	Oivind Anti NILSEN, Alf Erling RISA & Alf TORSTENSEN	1	X			*Journal of Population Economics (2000)*
10-98	Job satisfaction, Wages and allocation of Men and Women	Wim GROOT & Henriëtte Maassen van den BRINK	2	X			*in E. Diener (ed.), Advances in Quality of Life Theory and Research, Kluwer. (2000)*
11-98	Apprenticeship versus vocational education: exemplified by the Dutch situation	Wim GROOT & Erik PLUG	1				
12-98	Instrumenting education and the returns to schooling in the Netherlands	Jesse LEVIN & Erik PLUG	1	X			*Labour Economics (1999)*
13-98	The Incidence and duration of work-related training in the U.K.	Wiji ARULAMPALAM, Alison L. BOOTH & Peter ELIAS	4		X		*Scottish Journal of Political Economy*
01-99	The evolution of returns to education in Spain 1980-1991	Gérard LASSIBILLE & Lucia NAVARRO GOMEZ	2	X			*Education Economics (1998)*
02-99	Duration in work after leaving school	Torunn Skumlien NILSEN & Alf Erling RISA					
03-99	University selectivity and employment: A comparison between British and French graduates	Jean-Jacques PAUL, Jake MURDOCH & Julien ZANZALA	3	X			*Proceedings of the Comparative Education Society in Europe, (2000)*
04-99	Work or retirement? Exit routes for Norwegian elderly	Svenn-Age DAHL, Oivind Anti NILSEN & Kjell VAAGE	4	X			*Applied Econometrics (2000)*
05-99	Transitions from school to work: search time and job duration	Espen BRATBERG & Oivind Anti NILSEN	6			X	*Oxford Bulletin of Economics and Statistics*
06-99	Staying on at school at sixteen: the impact of labor market conditions in Spain	Barbara PETRONGOLO & Maria Jesus SAN SEGUNDO	2		X		*Economics of Education Review*
07-99	The transition of workers from temporary to permanent employment: the Spanish case	Barbara PETRONGOLO & Maia Güell-ROTLLAN	3			X	*European Economic Review*
08-99	Youth transition from school to work in Spain	Gérard LASSIBILLE , Lucia NAVARRO GOMEZ, Maria Isabel Aguilar RAMOS & Carolina de la O SANCHEZ	3	X			*Economics of Education Review (2000)*
09-99	Apprenticeship versus vocational school: selectivity bias and school to work transition. Evidence for France	Michel SOLLOGOUB & Valérie ULRICH	4	X			*Economie et Statistique (1999)*
10-99	What really matters in a job? Hedonic measurement using quit data	Andrew E. CLARK	5			X	*Labour Economics*
11-99	Promotions in the Spanish labour market: differences by gender	Dolorès Garcia CRESPO	1		X		*Oxford Bulletin of Economics and Statistics (2000)*
12-99	Labor mobility and the accumulation of post schooling human capital	Juan A. CAÑADA-VICINAY				X	*Journal of Labor Economics*

13-99	Quantity versus quality of children. The effects of family structure and the break-down of matrimony on the education and labor paths daughters and sons	Juan A. CAÑADA-VICINAY & Irene RAMIREZ MEDINA	3			X	*Journal of Human Resources*
14-99	Disability and retirement as ways for elderly workers to leave the labor market early: a competing risk approach	Juan A. CAÑADA-VICINAY & José M. SUAREZ-GONZALEZ					
15-99	Is schooling a family thing? effects of grandparents, parents, brothers and sisters on the school choices	Erik PLUG	2			X	*Journal of Population Economics*
16-99	Compensating wage differentials for wage uncertainty	Joop HARTOG, Erik PLUG, Luis Diaz SERRANO & José VIEIRA	1			X	*Labour Economics*
17-99	Employer provided training within the European Union	Rhys DAVIES					
18-99	Employment policies at the plant level: job and worker flows for heterogeneous labour and heterogeneous plant in Norway	Kjell G. SALVANES	1				
19-99	Investment or production factors: alternative explanations of the demand for young workers in Norway	Jan Erik ASKILDSEN & Oivind Anti NILSEN	5			X	*Labour Economics*
20-99	Access to the first job: a comparison between apprenticeship and vocational school in France	Liliane BONNAL, Sylvie MENDES & Catherine SOFER	6		X		*Annales d'Economie et Statistique*
21-99	Learning by watching and the measurement of on-the-job training	Guillaume DESTRE, Louis LEVY-GARBOUA & Michel SOLLOGOUB	5				
22-99	Job creation, heterogeneous workers and technical change: matched worker/plant data evidence from Norway	Kjell G. SALVANES & Svein Erik FORRE	4			X	*Economica*
23-99	Unemployment of older norwegian workers: a competing risk analysis	Tone ingreid TYSSE & Kjell VAAGE	1			X	*Scandinavian Journal of Economics*
24-99	Reported job satisfaction: what does it mean?	Louis LEVY-GARBOUA & Claude MONTMARQUETTE	8			X	*Journal of Economic Behavior and Organization*
25-99	Vocational training as a force for equality? Training opportunities and outcomes in France and Britain	Laetitia HOCQUET	3	X			*International Journal of Manpower (1999)*
26-99	The incidence and effects of overeducation in the U.K. graduate labour market	Peter DOLTON & Anna VIGNOLES	5	X			*Economics of Education Review (2000)*
27-99	The effects of school quality on pupil outcomes: an overview	Peter DOLTON & Anna VIGNOLES	1	X			*In H.Heijke (ed.), 'Education, Training and Employment in the Knowledge-Based Economy', Macmillan (2000)*
28-99	The earnings and employment effects of young people's training in Britain	Peter DOLTON & G.H. MAKEPEACE	4		X		*The Manchester School*
29-99	Reforming A-levels:is a braoder curriculum better?	Peter DOLTON & Anna VIGNOLES					
30-99	The integration of youths into the labour market and the type of employment contract	Thierry PENARD, Michel SOLLOGOUB & Valérie ULRICH	5			X	*Journal of Labor Economics*
31-99	Union bargained minimum wages: are there any employment effects	Jan Erik ASKILDSEN, Kjell Erik LOMMERUD & Oivind Anti NILSEN	2			X	*European Economic Review*
32-99	Mortality Bias on Estimating Retirement Age Using National Labor Force Surveys: a note	Juan A. CAÑADA-VICINAY		X			*In "Towards an integrated system of indicators to assess the health status of the population", Col. Essays vol. 2, ISTAT, Rome (1999)*
33-99	Youth unemployment, reservation wages and the YTS scheme	Peter DOLTON					
34-99	Minimum wages and employment in France and the United States	John M. ABOWD, Francis KRAMARZ & David MARGOLIS	4			X	*Journal of Political Economy*
35-99	Job satisfaction and quits: theory and evidence from the German socioeconomic panel (1984-1994)	Louis LEVY-GARBOUA, Claude MONTMARQUETTE & Véronique SIMMONET	7			X	*Journal of Labor Economics*
36-99	The role of early career experiences in determining later career success: An international comparison	David MARGOLIS, Erik PLUG, Véronique SIMONNET & Lars VILHUBER	2				
37-99	The role of unobservables in the measurement of return to mobility: evidence from Germany and the United States	Véronique SIMONNET	5				
38-99	Education systems from an economic perspective: an international comparison	Louis LEVY-GARBOUA & Nathalie DAMOISELET	3	X			*in N.Bulle (ed.), Ecole et Société : Les Paradoxes de la Démocratie, Presses Universitaires de France. (2000*
39-99	Learning to work: the role of informal training	Peter ELIAS	3				
40-99	Is there job competition in the French labor market?	Marc GURGAND	6				
TOTAL			**173**	**23**	**7**	**17**	

2. BACKGROUND AND OBJECTIVES OF THE PROJECT

The primary objective of this research is to bring together the work and experience of European economists who have contributed to the field of education and training. Its aim is to exploit the wealth and diversity of European institutions and data to develop further an expertise in comparative analysis and a deeper understanding of the mechanisms which have shaped schooling and training systems, and labour market transitions (from school to work, and from job to job), somewhat differently across countries.

Transitions may serve as a unifying theme for the research because they link successive individual states together: 1) school to school; 2) school to work; 3) work to work; 4) work to inactivity, and describe the kind of adjustments which occur as a result of economic growth, structural change and policy interventions. Therefore, the research is about schooling, training, and transitions at various points of an individual's life cycle.

Theoretical and empirical analysis of three main related topics has been carried out:

I – A comparative analysis of schooling systems.

II – The transition from school to work.

Two sub-topics have been investigated here:

- types of transition
- wage rigidities

III – Training and labour market flexibility

In which three sub-topics have been studied:

- supply of training
- turnover/flexibility
- labour force greying

This report is a synthesis of the results found in some 57 Working Papers published in our project (STT) Series from February 1997 to July 1999, which are appended. 23 of these Working Papers have already been published, 7 are in the process of revision, and a further 17 have been submitted. The journals concerned are amongst the best international or national academic journals in economics (for example, the *Journal of Political Economy*, the *Journal of Human Resources*, the *Journal of Labour Economics*, the *Journal of Public Economics*, and the *Journal of Population Economics*; see the section on Dissemination and/or Exploitation of Results).

For each topic and/or subtopic, we have adopted a more or less similar presentation of the results: first an introduction, then a review of the main stylised facts and/or theoretical results found in the literature upon the subject. Another section contains a list of the questions we address, followed by a section devoted to the answers proposed using the results of our research, especially those published in the STT Working Papers Series. As, from the beginning of this research programme, we have systematically been concerned with the policy implications of our results, the final section for each topic or subtopic is devoted to policy issues. The report ends with a brief general conclusion.

3. SCIENTIFIC DESCRIPTION OF THE PROJECT METHODOLOGY

3.I A COMPARATIVE ANALYSIS OF SCHOOLING SYSTEMS

3.I .1 – MOTIVATION AND STYLIZED FACTS

The goal pursued here is to provide a comparative analysis of schooling systems from an economic perspective. It was motivated by the need, first, to give our group of European economists a good expertise of schooling systems by cross-fertilisation of research efforts and by sharing knowledge, second, to relate further training and transitions, which are the principal concerns of our research program, with prior schooling.

Our task was not easy because economists have theories of education, such as theories of human capital and screening, but they do not have a theory of educational systems. The reason for this state of affairs is that according to the simple human capital theory educational systems are unimportant. What really matters is the resources devoted to education, and educational resources are essentially driven by market forces in the aggregate. Of course, this conventional economists' view resists neither analysis nor observation but it is instructive to know how far we can go with this simple story and it is helpful for organising our further discussion and presentation of results. In order to have a theory of educational systems describing the differentiation of curricula and the sorting of students, we need to recognise the heterogeneity of skills and knowledge. The simple theory proposed in our work (see Levy-Garboua and Damoiselet) represents educational systems as producing two kinds of human capital. The cognitive skill is an intermediate output produced by « education » (i.e. a general ability-enhancing knowledge); and many sorts of occupation-specific skills are produced by « training » (i.e. skill-specific knowledge). We further assume for simplicity's sake that two alternative paths lead to the production of any specific skill. The « vocational path » just requires training and talent for the specific skill, but the « general path » requires

some amount of cognitive skill as well. The model shows that it is optimal to sort heterogeneous students, who differ by their innate ability and talents, into a general and a vocational path. The latter requires only training while the former uses both education and training. However, the optimal sorting rule does not merely consist of allocating the ablest students to the general path and the less able to the vocational path. Students should rather be sorted according to some combination of their ability and talent. This conclusion has a number of important consequences, discussed below.

This simple representation helps to interpret the major changes with which the educational systems in industrialised countries are now confronted. On one hand, the expansion of markets entails a growth in the division of labour and thus in the differentiation of specific skills. On the other hand, the indefinite growth of knowledge entails the endless transfer of knowledge from firms into schools and provokes what may be called on « educationalisation of training ». As the local separation of education and training is blurred, schools experience the « vocationalisation of education » which many faculty associate with a decline in educational standards. Moreover, students will spend more time shopping for their own specific training between schools and firms and will thus experience a longer period of transition from school to job.

3.I .2 – QUESTIONS ADDRESSED IN OUR WORK

Our work should provide clues for understanding what schooling systems have in common and why they differ across countries. We get a stylised description from the indicators collected by international organisations and supplement these data with the answers given by selected education experts from sixteen countries to a questionnaire tailored to our needs.

Schooling systems differ in the way they differentiate, in the way they sort and select students, and in the way they cooperate with firms to produce vocational skills. All schooling systems teach the basic cognitive skills (reading, writing, elementary mathematics) in the early years. Labour market participation requires specific vocational skills that build on the basic cognitive skills. The training trajectory, from basic cognitive skills to specific vocational skills, differs widely between countries. In the formal schooling system these differences concern:

1/ The extent, nature and flexibility of differentiation.

Schooling systems may differ in the age at which students are sorted into separate schools or separate curricula. In some systems, choices have to be made at an early age and are virtually irreversible. In other systems, choices come later, or can be easily corrected. Such differentiation may cater to differences in cognitive abilities and vocational interests of students. How much and by what criteria are students differentiated in the level and types of education in the different countries? At what age is this done? What are the effects of early differentiation (e.g. at age 12 as in the Netherlands) on the overall production of human capital? Is early differentiation efficient? Does social background still play a major role in educational choice?

2/ The ease of entry

Some systems are rather open (e.g. French universities) with easy access of students to schools of their choice. Other systems are rather closed (e.g. British universities) with strong selectivity at entry levels for advanced learning. What are the costs and benefits of an educational system with admission rules which are not very tight, compared to systems which are more selective? Is it possible to increase the quality of education without tightening selection criteria?

3/ The positioning of specific vocational education

All schooling systems provide young people with a gradual transition from general to specific vocational education. Provision of vocational skills may be part of the formal schooling system (schools producing carpenters, dentists or engineers), completely outside (in-service training of a nurse, after a general secondary education), or it may cut across both categories, as in apprenticeship programs combining formal schooling with on-the-job training and work experience. What determines this division between formal schooling and less formalised education? How can transitions through the system be made more efficient?

4/ The effects of school quality differences

In some systems there are quality differences between schools in terms of expenditures per pupil (e.g. in Spain, UK and the USA). In other countries there are virtually

no quality differences. What is the evidence, and what are the effects of school quality differences?

5/ Lastly, our work yields tentative answers to **some key policy issues**:

- *on curriculum differentiation: early or late?*
- *on access to higher education: open or closed?*
- *on vocational training programs: schools or firms?*

3.II TRANSITION FROM SCHOOL TO WORK

Transition from school to work has been considered as an important question for thirty years. But the vision of this period of working life has been deeply modified by the rise of youth unemployment and by increasing government involvement in the provision of training programs. Transition from school to work is no longer a brief period suggesting an immediate transition from school to work but a more complex process characterised by a succession of employment, training and unemployment period until the obtaining of a job that can be considered as a "final" job. Youth unemployment has become an acute problem in many European countries, especially at the lower levels of education, which we focus on here

The first topic studied is *types of transitions:* transition to work from apprenticeship, compared to transition to work from vocational school, provides a first comparison of types of transitions, as well as a study of the main variables influencing the ease or the difficulties of getting a job.

Another important factor influencing school to work transitions is *wage rigidities*, the study of which is the second topic of this section. Clearly, a work regulation such as a minimum wage may have an effect upon transitions, especially for the youngest and least qualified workers. This is what is showed here, at least for France.

3.II. A – TYPES OF TRANSITION

3.II.A.1 - INTRODUCTION

While the review of the state of the art previously proposed by C. Sofer and V. Ulrich (Review of the state of the art, part II, July 1997) remains relevant from a theoretical point of view, new analyses are imposed by changes in the features of transition from school to work. The analysis provided by STT members on this subject is essential in using the latest econometric tools to try to provide original results on this subject.

We mainly concentrated our analysis upon the *microeconomic* aspects of the school to work transition, using longitudinal data whenever possible. Although some papers are concerned with the more highly educated, most of the analysis is devoted to the lowest levels of education. Most work is comparative, in that each question addressed was analysed in several papers using data from at least two countries.

3.II.A.2 – STYLISED FACTS

Some recent research has stressed many important characteristics of the school to work transition in youth. In a recent report (OECD 1998) using data from Eurostat, it is shown that the rate of unemployment is still very high one year after the end of schooling in most countries from the south of Europe. In all countries, women and young men with the lowest level of schooling experience the greatest difficulties. Apprenticeship seems to protect against unemployment as exemplified by Germany. A high level of initial schooling not only reduces the risk of unemployment (see also Summers, 1990, and Layard *et al* , 1991), but also increases the likeliness of getting a permanent full time job. Half the jobs obtained on leaving school are temporary and one third are part time jobs.

Hannan and Werquin (1999) also raise the question of over-education: possibly, youth with the higher educational levels might simply push less educated ones out of low skilled jobs, at a high cost for society but with low general benefits.

3.II.A.3 – QUESTIONS

The project has generated fifteen papers, the main or more marginal[4] topic of which is transitions in youth. They address in detail the different points stressed above.

1/ The question of **the efficiency of apprenticeship** and of **vocational training** has received much attention from the TSER-STT research teams. Four papers focus on that subject, using data from three countries: France, The Netherlands, and Norway

A first important issue with vocational schooling is the matching of skills supplied to labour demand. Vocational school students are believed to develop fewer abilities to link theory and practice than apprentices do, because the latter are led to establish a permanent link between what is learned at school and how to implement it. Moreover, if, as is likely, general training is more profitable to youth when it is done jointly with specific training, apprenticeship should be more efficient than vocational schooling in reducing the difficulties of matching the technical capacities of young workers and firms' needs.

A second important issue is the transferability of skills acquired during apprenticeship to firms other than the training firms. Apprenticeship provides more specific human capital than vocational school does. Thus, apprenticeship confers an advantage on those who remain in the training firm at the end of the apprenticeship contract. Their probability of getting a job of high quality and of long duration should be increased. For those apprentices who leave the training firm, part of the specific human capital acquired is lost. Whether they have more difficulties finding jobs than vocational school leavers do depends on the general human capital they acquired. On the one hand, apprentices accumulate general capacities that can not be acquired in school where the work environment is only simulated (obedience, work discipline, teamwork...). On the other hand, training received in vocational school might be transferable to a wider range of sectors. This transferability of skills may also depend on the functioning of the labour market. If job-specific skills and firm attachment are particularly important on the labour market, apprenticeship should facilitate the school to work transition, even if the contract with the

[4] Among them, some papers mainly compare schooling systems, or of job mobility. They are also surveyed, for the corresponding part, in other chapters of this final report.

training firm is not renewed. If, on the contrary, high levels of performances in different jobs are better suited to firms' labour demands, vocational school might be more efficient.

A third issue concerns uncertainty about the quality of the young worker who is fresh out of school. For vocational school leavers, this uncertainty is obviously higher than for ex-apprentices. On the employers' side, ignorance about young workers' capacities and future productivity is very high. On the young workers' side, doubts about what kind of job is best suited to their capacities and to their wishes are also important. Such uncertainty can lead to the impossibility for an employer and a young worker to engage in a long-term relationship. Apprenticeship, in comparison to vocational school should reduce uncertainty both for the employer and for the young worker by allowing capitalisation of the experience acquired during apprenticeship. The likeliness for ex-apprentices of entering into contractual relationships of long duration should thus be increased.

A fourth and final issue is associated with the fact that ex-apprentices and vocational school leavers might differ in observed and unobserved characteristics, that could influence their school to work transition, irrespective of the type of training received. It is indeed likely that the choice between apprenticeship and vocational school depends on youth preferences. Participants may also be selected by the administrators of the training programs, in particular by firms that provide apprenticeship contracts. This may lead to an important selectivity bias which may conceal the true benefits or disadvantages of one kind of schooling over the other.

2/ Key variables in explaining transitions

The Spanish and Norwegian teams, with eight papers, have analysed this topic in depth, which provides interesting comparisons of two very dissimilar countries with respect to the ease of transitions in youth. Of peculiar interest are gender comparisons, and the effect of different levels of schooling upon youth employment: Norway seems to be atypical with respect to the first variable, and Spain with respect to the second. We shall also review in the same section a paper which has the more macro-economic purpose of testing the links made by some authors between the size of the labour market and its efficiency in the matching process. More precisely, the paper tests with British Data the assumption of constant returns

in the matching function embodied in most bilateral search models. The question raised here is that of the efficiency of larger labour markets, such as the European Union, in dealing with unemployment.

3/ Four papers address the question of **job competition and over-education**. Most European countries have increased, sometimes at a very rapid rate, the level of schooling and training of the young (Spain, Norway and the U.K., for example). A higher general education level is expected to improve overall labour market performance as evidenced by the better situation of highly educated individuals in the labour market, regarding employment as well as job qualification. However, issues regarding identification and causality arise here[5]. Three points might raise doubts about the benefits to be expected from an increase in the general level of schooling:

- The correlation at the macroeconomic level between economic development and educational spending might simply reflect an increase in the demand for education, as income increases with development and education is a normal good.
- Similarly, the correlation at the micro level between education and employment might reflect an underlying self-selection process where the most able individuals choose high education levels.
- A higher general level of schooling might result in over-education and increased job competition, i.e. lead to higher educated youth replacing youth with a lower level of education in low skilled jobs, with no benefits in terms of labour productivity.

Results are given for Norway, for France where an original theoretical model of job search dealing with job competition is developed and tested, and for different countries reviewed in a meta-analysis.

4/ Temporary work contracts and their possible beneficial effects upon youth employment are analysed in two papers with data for France and Spain. The question here is whether short term contracts are used as a genuine probation period aimed at selecting young workers before offering them a permanent job. In this case, they can be considered as beneficial, as

[5] These points are reviewed in Nilsen and Risa (1999)

they provide employers with the means of selecting the best candidates for a job, thus improving the quality of the employer/employee matching. They are also beneficial for the youth, as they provide them, at best with a permanent job at the end of the temporary contract or before, and at worst, when they are not offered a permanent contract, with some work experience, which is generally valued on the labour market. The competing, less positive approach for temporary contracts is that they are used by employers as a cheaper and/or more flexible tool for adjusting employment, allowing them to escape an otherwise strict regulation regarding ordinary jobs. In that case, temporary contracts become a permanent instrument of flexibility for firms, workers are systematically fired at the end or before the end of the contract and replaced by others, while young workers can experience several successive periods of work and unemployment without ever being offered a permanent job.

3.II.B – WAGE RIGIDITIES

3.II.B.1 – INTRODUCTION

Much of the effort within this subtopic has been spent in seeking to analyse the effects of minimum wage policies. Minimum wages have always been a controversial policy. Some claim that a minimum wage guarantee prevents people from sinking down into poverty. Opponents claim that minimum wages create serious unemployment problems, especially among the young. Another controversy has been whether or not minimum wages stimulate young people to undertake education and training.

In a famous overview, Brown *et al* (1982) summarise that a 10 % increase in the minimum wage reduces teenage employment by 1 to 3%, while it has no identifiable effect on the adult labour market. In the last decade or so, better microdata has become available for researchers, but results differ widely: Some find no negative impact on employment, some find serious adverse effects of minimum wage policies. Also, much research has focused on the American experience, while the European situation has been examined to a much lesser degree.

3.II.B.2 – STYLISED FACTS

The table below, which is reproduced from Dolado *et al*. (1996), gives a brief description of the minimum wage regimes in some European countries. One important

dividing line is between countries with statutory minimum wage regimes and union bargained, often sectoral, minimum wages.

Table 1 next page.

Much of the analysis in this project is centred around France and Norway. France has a system of government set minimum wages, and they are 'high', at least in comparison with US minimum wages. Norway's minimum wages are reached in union settlements – and they vary between sectors. Again, the minimum wage level is 'high'. It is therefore to be expected that the effects of minimum wages are different in the two countries, and they both are different from the US experience in that minimum wages are much closer to average blue-collar wages.

3.II.B.3 – QUESTIONS

The project has generated six papers within the topic minimum wages and wage rigidities. Three papers try to estimate the possible negative employment effects from minimum wage increases by using a *transitional approach.* Two papers ask the question if minimum wages increase or decrease education and training. These papers have a more theoretical approach, with some empirical support. The last paper deals with labour market dualism.

1/ Minimum wages and transitions.

Our empirical work on the employment effect uses individual level panel data on wages and employment. This gives us the possibility to estimate the impact of the minimum wage *for those concerned*, rather than in the population as a whole. If the minimum wage for example goes up, some people will now be affected by the minimum that earlier were unaffected. Do people belonging to this group transit more often out of employment than a reference group, for instance those workers earning marginally above the minimum wage both before and after the change? The analysis is performed for France (with a comparison with the US) and for Norway.

Table 1: Minimum Wage Systems in Europe and the USA

Country	Determination	Variation by:	Kaitz index (year)	% of workers at or near minimum	Youth minimum as % of adult minimum	Replacement ratio
Austria	Legally-binding collective agreement at industry level	Industry region, dependants, age, job tenure	0.62 (1993)	4%	Embodied in industry agreements	0.5
Belgium	Negotiated by unions and employers as part of national agreement	Age, job tenure	0.60 (1992)	4%	Small reduction for <23 (lower rates for short job tenure)	0.6
Denmark	Negotiated as part of collective agreements	Industry, age	0.54 (1994)	6%	40% (<18)	0.9
Finland	Negotiated as part of collective agreements	Age, occupation, industry, region	0.52 (1993)			0.63
France	Set by government constrained by formula	Age, training	0.50 (1993)	11%	80% (age 16); 90% (age 17) + schemes + 30-75% for trainees	0.57
Germany	Part of collective agreements, then extended	Age, qualifications, trainee status, region	0.55 (1991)		Embodied in industry agreements	0.63
Greece	Part of national collective agreement	Manual/non-manual, job tenure, marital status, qualifications	0.62 (1995)	20%	Lower rates for short job tenure	
Ireland	Joint Labour Committees in 16 low-paying industries	Age, industry, region, occupation, job tenure	0.55 (1993)		Varies; 63% (<18); 81% (<21) in hotels	0.37
Italy	Extension of collective agreements	Age, industry, job tenure	0.71 (1991)		Embodied in industry agreements	0.20
Luxembourg	Statutory minimum wage	Age, skill, family characteristics	0.56	11%	70% (<21)	
Netherlands	Statutory minimum wage	Age	0.55 (1993)	3.2%	34.5% (age 16) rising to 84% (age 22)	0.70

Norway	Negotiated as part of collective agreements	Industry, age, job tenure, job	0.64 (1993)			0.65
Portugal	Statutory minimum wage	Age, trainee status, industry	0.45 (1993)	8%	75% (<18)	0.65
Spain	Statutory minimum wage	Age, homeworkers, casual workers	0.32 (1994)	6.5%	66% (<18)	0.70
Sweden	Negotiated as part of collective agreements	Age, industry, job tenure, occupation	0.52 (1992)	0%	85% (<24)	0.80
Switzerland	Industry-level collective agreements (coverage 30%)	Age, industry	0.52 (1993)		Embodied in industry agreements	0.70
United Kingdom	Pre-1993 set by Wages Councils by industry; now only agriculture	Age, industry (more complex pre-1986)	0.40 (1993)		0% (<21) (1986-1993)	0.38
United States	Federal minimum wage (higher in some states)	Limited youth sub-minimum	0.39 (1993)	4%	No reduction	0.50

Note: We are grateful to Ana Rute Cardoso,Costas Kanellopoulos, Claudio Lucifora, Joep Konings and Erik Madsen for help in compiling this table.
Sources: Principally the *European Industrial Relations Review and ILO Yearbook of Labour Statistics*. Further details availables from the author

2/ Minimum wages and education.

Even though minimum wages can have negative employment effects, one could imagine that youth that were excluded from the labour market undertook more education to regain access to the job market. In a second best world, could minimum wages be efficiency improving? Two papers from the project deal with this question, and they deliver contradictory answers. What lies behind this disagreement?

3/ Labour market dualism.

In a competitive model, differences in work conditions will be compensated in wages, so that jobs with bad work conditions tend to be high-wage ones. A rival theory, on labour market segmentation, will have it that some workers have the power to achieve both good jobs and high wages, while others have not. One paper from the project seeks to test which of these theories fit French data best.

3.III TRAINING AND LABOUR MARKET FLEXIBILITY

Investigating now further the working life and professional careers of individuals, three important aspects have retained our attention:

- The supply of training
- Turnover and flexibility
- Labour force greying

The beneficial aspects of training on productivity channel through the production process and the organisation of work. Thus, progress in the understanding of this basic effect of human capital requires that we open the “black box” of production and of the learning process within firms. Labour market flexibility also has an effect on training efforts. Conversely, workers may be more inclined to quit if the opportunities for promotion in the firm are small. Finally, because of demographic changes, the average age of the employed workforce is increasing. The relevant question then becomes: how can labour market flexibility increase when the workforce is ageing?

3.III.A - SUPPLY OF TRAINING

3.III.A.1 INTRODUCTION

To complement work undertaken in other areas of this programme, specifically that which focuses upon vocational preparation for the transition from school to work and upon the links between labour turnover and human capital formation, a subgroup was convened to review, evaluate and contribute further research on the issue of the supply of work-related training.

Our specific concern here was to avoid becoming involved in what is already a heavily-researched area, and one which has its own EU-funded programmes of action and research. Instead, we have sought to consider the supply of *employer-provided* work-related training as either a complement to or substitute for more general human capital development. We were aware that significant differences exist between member states in the extent to which employer-provided training exists as part of the vocational pathway into stable employment. We decided, therefore, that without this strand to our research programme, we would be at risk of developing a partial understanding of the process of the transition from school to work.

As a first step in this area, Davies (1999) prepared a comparative review of research and data resources available within the European Union which are concerned with the supply of employer-provided training. Together with an overview of economic theories relating to the provision of employer-provided training, Davies presents a critical review of empirical work covering the returns to employer- provided training from the perspective of the firm, considers evidence on participation in employer-provided training and presents results from an empirical study of the correlates of such training across the European Union. The latter part of this study used detailed cross-tabulations from the EU Labour Force Survey (LFS) which were specially commissioned for this purpose.

3.III.A.2 STYLISED FACTS

Evidence from this analysis shows that there is considerable variation in the incidence of employer-provided training within Europe. Training participation varies

between all member states, although there is a significant divergence between the North and South of the Community. Variations in training participation can be explained to a certain extent in terms of different patterns in the industrial composition of employment between countries. However, quantitative comparisons in the participation and intensity of employer-provided training fail to consider qualitative differences in employer-provided training across countries. Davies argues that these qualitative aspects will reflect more subtle differences between economies. In particular, the content of employer-provided training is likely to be shaped by the relationship between the structure of workforce skills delivered by national systems of vocational education and training and associated patterns of production utilised by employers.

As an example of the more qualitative aspects of training, Davies references the work by Mason *et al* (1994, 1996) in a "matched pairs" study of food manufacturing plants within Britain, Germany, the Netherlands and France. In the three Continental countries, initial on-the-job training for process workers equipped them to switch flexibly as required between all main areas of operation. In the German plants this averaged only four months in length, reflecting the prior experience of trainees. In the Netherlands, newly recruited process workers received seven months initial training and in France approximately 12 months. In the British plants, initial on-the-job training for process workers averaged only two months and typically only covered a single task area. Continuing training in Britain and Germany mainly consisted of short external courses for maintenance and other technical support staff. In Germany however, training was largely undertaken by supervisors who had already attained craft status through the dual apprenticeship system. The incidence of training in the Netherlands appeared to be lower than that in Germany and Britain. However as with Germany, training within the Netherlands built upon an initial productivity advantage due to the extensive provision of initial vocational training.

Considerations such as these point to the importance of the reach and range of education systems in setting early standards and in determining what may be achieved by employers in the process of skill formation across Europe. Comparisons of training participation and intensity have to be considered in conjunction with the context and content of employer-provided training. The predominance in a particular country or region of certain types of firm, and of the associated patterns of human resource utilisation which these entail,

is the outcome of long and complex processes routed in their specific history (Regini, 1995). The institutions of education and training play an important role in shaping comparative advantage, which make different patterns of resource utilisation possible and viable.

With these *caveats* in mind, Davies explored the incidence of specific vocational training for those in employment in the EU Labour Force Surveys for the period 1992 to 1996. Across the EU12, member states divide between those providing significant amounts of specific vocational training to employees (Denmark, Ireland, Netherlands and the UK) and the rest. While differences in industrial structure account for a significant part of these variations, they do not account for the much lower rates of work-related training found in, say, France and Italy.

The empirical work we have undertaken is unable to shed further light on the reasons for these major differences. In part, this reflects both a strength of and one of the main weaknesses of comparative research. Economic theory predicts that the necessary conditions under which employers may provide work-related training are that it should:

1. increase the marginal productivity of the worker;
   and
2. decrease associated labour turnover.

If both conditions can be achieved, the employer is in a position to obtain a return on the 'investment' in training by paying the employee less than the value of their marginal product. This might be achieved if the productivity gains from training can be captured in whole or in part by the firm (i.e. firm-specific human capital), usually by increasing the earnings of the employee who has received training by less than the value of their increased marginal productivity.

While this economic view of training is relatively non-contentious, it seems unlikely that the differences we observe between certain countries in the incidence of employer-provided training result from variations in the extent to which firms can capture the productivity gains obtained from the workers they train. Instead, as Davies points out, the variations are more likely to relate to cultural and institutional differences in the preparation

which potential employees receive and in the expectations employees have over who will fund their training.

The German and Danish 'dual-system' of training, through which young people gain access to the labour market via apprenticeship schemes, yet undertake significant periods of study in educational establishments, is recognised as a type of partnership between the young trainee and the employer, supported by an institutional framework geared to provide high quality vocational preparation in a wide variety of occupational areas. This contrasts significantly with the 'mixed' system in the UK. Until recently, significant amounts of employer-provided training were available in the UK in only a small number of vocational areas, particularly engineering. These were essentially attempts by employers to guarantee their future supply of trained and experienced workers rather than any strategic tripartite 'partnership' between the state, the trainee and the employee. The collapse of demand in this sector in the 1980s led to a major decline in apprentice training in the late 1980s, a situation not reflected in Germany.

Through this review we became aware of the significant efforts taking place elsewhere which are attempting to monitor within a comparative framework the recent changes taking place in both the quantity and quality of employer-provided training (e.g. INBAS, 1999). To advance our work in this area, we decided to focus more closely upon a significant methodological and definitional issue. A particular innovation in this part of the research programme arose as we attempted to move away from the more traditional approach to the study of *formal* work-related training to encompass a broader definition of learning at the workplace.

3.III.B – TURNOVER AND FLEXIBILITY

3.III.B.1 INTRODUCTION

Matching, a term often used to describe the quality of the "fit" between a worker and a firm, is a concept widely appealed to in labour economics. A good part of the literature on education and on job training, for example, appeals to the benefits that a better match between worker and firm might be thought to engender. Other work on turnover in the labour market has emphasised "job shopping" by workers (and, equally, "worker shopping" by firms) as being essentially a process of search for a good match. Another literature has

emphasised the importance of a good job match in explaining workers' productivity (see, for example, Mangione and Quinn, 1975, and, more recently, Patterson *et al*., 1997).

Mobility refers both to the movement of workers between jobs (both within and between firms), and to the creation and destruction of jobs themselves. As such, it involves both external and firms' internal labour markets. Considering the end of an employer-employee match, it is obviously important to distinguish between those that are initiated by the worker (quits) and those that are firm-initiated (layoffs). It is also of importance to relate individuals' mobility decisions to the "tightness" of the outside labour market, with this latter typically being measured as the ratio of unemployment to vacancies (the U/V or Beveridge curve).

There is no unanimously-accepted single theory of mobility. Below we present a number of different approaches to internal and external mobility, but none describes all of the salient aspects. As in Mincer (1988*b*, 1993) and Topel and Ward (1992), we note that the lack of relevant information on training and some of the characteristics which lead to a good match (both in terms of their level and of their evolution over time) has stimulated the development of alternative theories explaining the supply of and demand for particular skills and job conditions, professional careers and the evolution of wages with job tenure and experience, and other factors influencing matching and mobility. Additional information regarding the characteristics of the job match may therefore provide useful information for distinguishing between competing theories of mobility.

3.III.B.2 STYLISED FACTS

As in Parsons (1978), we distinguish two major elements which the study of the nature of job attachment has analysed. First, Stigler's (1961, 1962) optimal search model in a world of incomplete information is the milestone of matching models, subsequently developed by Jovanovic (1979*a*, 1979*b*, 1982 and 1984). Second, the emphasis in Oi (1962) and Becker (1964 and 1975) on firm-specific human capital, and the analysis of human capital accumulation in Ben-Porath (1967), established the core of the training-mobility relationship. This model was further developed by Mincer (1962, 1974, 1988*a*, 1988*b* and 1993). These two approaches are, in principle, not mutually exclusive, but rather complementary, as shown in the synthetic article by Mincer and Jovanovic (1981).

Matching models generate turnover as a result of improved information as time goes by. Under the assumption that there are neither “good (bad)” employees nor “good (bad)” employers, but only “good (bad)” matches, Jovanovic (1979*a* and 1979*b*) presents two complementary approaches to matching. In the first, that of experience, the quality of the worker-job pairing is learnt after the match takes place; in the second, that of search, agents learn about their comparative advantage by sampling and experiencing a variety of jobs. The combination of uncertainty and worker and job heterogeneity generates mobility. As Topel (1986) notes, job-matching models provide no clear prediction concerning the returns to mobility, as there are two offsetting effects. From the perspective of experience, high wages may reflect the success of the match and we should thus expect a positive cross-sectional correlation between earnings and experience simply because a good job match is more likely to survive. From the search approach, the expected value of a higher wage offer is an increasing function of the time spent searching for a job. In this case there are incentives to quit, so tenure may be positively associated with job turnover and a return to voluntary mobility can be expected. However, after the probation period good pairings are more likely to survive, and so voluntary mobility should decline with the passage of time. Jovanovic (1984) analyses the heterogeneity between quits and layoffs in the context of changes in (the perceived value of) market opportunities.

The pioneering work by Bartel and Borjas (1981) finds positive returns to mobility for young people, but that these gains decline with age. This is largely due to the adverse effects of layoff unemployment and to exogenous quits where there is an underlying hedonic trade-off between remuneration and other preferred working conditions. Later work by Mincer (1986) corrected the selectivity bias related to the heterogeneity of “movers” vs. “stayers” and distinguished short-term wage changes resulting from transition from longer-run changes represented by a shift in the tenure-profile of wages. More recently, using panel data, Topel and Ward (1992) estimate wage growth within and between jobs. Their results showed that over two-thirds of total life-cycle earnings growth occurs during the first ten years of work experience, and that more than a third of early wage growth is related to job changes, while larger wage gains due to transitions are associated with declines in subsequent mobility. This is the framework in which Véronique Simonnet's analysis is based.

The analysis of labour flows in terms of unemployment and vacancies (Blanchard and Diamond, 1989) extends the scope of matching models and permits the systematic treatment of time. The bilateral search models of Diamond (1982) and Pissarides (1990) explore the returns to matching under different assumptions and specifications of the appropriate hazard rate. Diamond posits that the matching function may exhibit increasing returns, since search effort on one side generates a positive externality (thin market) on the other. Pissarides adds a second, negative, externality (congestion) amongst agents on the same side, so that the returns to matching depend on the sign of the net externality. In this case, the hypothesis of constant returns becomes more plausible. This is the subject of the work by Barbara Petrongolo, and Güell-Rotlan and Barbara Petrongolo.

Similarly, the analysis of turnover forces us to look in greater depth at the process of firm birth, expansion and contraction, and the appropriate differences by sector, region and age (vintage) of existing plants. These have been analysed by Dunne *et al.* (1989) and Davis and Haltiwanger (1992). The latter explore counter-cyclical fluctuations in the job re-allocation rate and find that they result from variations in representative plant-level employment movements, where job reallocation over time differs sharply by plant age, size and ownership. Kjell Salvanes, and Kjell Salvanes and Svein Forre combine matching and human capital to explore job creation, replacement and destruction flows in a world where innovation and technical change are key determinants of requirements for firm-specific skills.

The effect of human capital accumulation on mobility (through education, training and labour market experience) differs according to the type of human capital considered. Specific training will increase internal mobility but reduce external mobility, since it raises a worker's productivity only in the present firm and does not affect his/her wage outside of the firm. However, general training will increase both internal and external mobility, as it increases a worker's productivity outside the firm as well as inside. In other words, it raises the worker's alternative wage and the set of potential jobs amongst which he/she can choose. Following Becker (1964), Hashimoto (1981) and Arnott and Stiglitz (1985), an important implication of this basic human capital model is that workers should pay for all of their general training, and part of their specific on the-job-training, in the form of lower starting wages but a higher rate of wage growth with tenure. The resulting wage-tenure schedule is incentive-compatible, as both employees and employers obtain a return on their

investment. On the other hand, there is a positive correlation between ability, general education and on-the-job-training and, therefore, more able and educated workers should exhibit steeper wage-tenure profiles, and match to positions with more job-specific skills. This correlation also implies that employers will require higher ability applicants for positions requiring more training (see Barron *et al.*, 1989), and will thus screen job applicants more intensively. Furthermore, as stressed by the firm-specific human capital literature, training investments will decline with workers' experience. Mincer (1962 and 1974), Mincer and Jovanovic (1981) and Mincer and Higuchi (1988) find evidence of this relation using indirect measures; Barron *et al.* (1989) and Mincer (1993) support this finding using direct measures. This model suggests that layoff will be more costly for higher-tenure workers, as they have accumulated greater amounts of firm-specific human capital (see Jacobson *et al.*, 1993, for some recent evidence). Juan Cañada-Vicinay (STT Working Paper 12-99) further considers this question.

Empirical evidence of such correlations does not prove that these theories of turnover are valid, as both agency and efficiency wage theory also imply negative relationships between tenure and turnover, and between mobility and wages. The agency model of Becker and Stigler (1974) and Lazear (1981) shows that it may be in a firm's interest to pay wages (at a point in time) that differ from productivity – below productivity at the beginning of the match and above productivity at the end of the match. Workers who accept these "deferred compensation schemes" are effectively lending money to the firm, a loan which is repaid only later on in the match. In this case, workers have no incentive to leave the firm until late in the match (as their "loan" would not be paid back otherwise). Firms can thus invest in their workers' human capital in the knowledge that these workers are not about to quit. The selectivity model of Salop & Salop (1976) comes to a similar conclusion, as does efficiency wage theory (Stiglitz, 1974 and 1986, Yellen, 1984, Parsons, 1986, and Layard *et al.*, 1991). These models are all based on incentive-compatible contracts between the firm and its employees. Earnings growth with tenure is here explained by firms' strategies to reduce uncertainty and attract suitable workers: wages act as an incentive for the workers whom the company wishes to retain.

Other labour market theories which impinge on wages and mobility include those of labour market segmentation (Doeringer and Piore, 1971, and Taubman and Wachter, 1986)

and of unions (Lewis, 1986) which both involve, in different ways, the presence of barriers to mobility and different professional careers. Within-job discrimination and occupational segregation can produce similar consequences, as shown by Duncan and Hoffman (1979), who relate earnings distribution to professional careers and to the quality of company service for both men and women. Lazear and Rosen (1990) analyse gender occupational discrimination in terms of pre- and non-market activities. Using gender as a signal, they conclude that higher promotion ability thresholds for women are both privately optimal and socially efficient, as the higher expected value of home time implies a higher probability of separation for women. Dolores García-Crespo further considers this question.

As the above has shown, one key element of mobility in the labour market is the quality of the match between the worker and the firm. However, despite its importance in models of turnover and productivity in the labour market, there is no real agreement about how matching might be measured. One approach is to treat matching as a hedonic variable and deduce it from observed behaviour. According to this line of argument, a job from which a worker quit, or from which the firm fired the worker, was not one in which the match was good. Although it is undoubtedly true that workers quit a job because the match is a bad one (and firms fire workers for the same reason), the drawback of this approach is that quits and layoffs occur for many different reasons, some of which have little to do with matching. Using turnover as a measure of match quality then risks to at best muddy the waters, at worst to lead to wrong conclusions about how the labour market works.

In this project, we have considered a novel way of measuring the quality of the match. Instead of inferring it from future behaviour, we consider that workers' reported levels of job satisfaction in the job provide a useful measure of how well the worker fits into the job. This kind of analysis is relatively unusual in economics, but is very widespread in other social science disciplines, such as psychology, sociology and management. As opposed to the approach taken in other disciplines, in economics we have the advantage of large-scale datasets concerning many thousands of individuals. In addition, many of these are panel datasets, meaning that the same individual is interviewed a number of different times, usually at roughly one-year intervals.

The advantages of panel information are two-fold in this analysis. First, individual's reported job satisfaction at a certain point in time can be related to their future decision to leave their job. Early research on this topic related individuals' job satisfaction at time *t* to their intention to quit their job, also measured at time *t*. As this latter might be thought of as just another way of identifying dissatisfied workers, it is not clear that much can be explained by demonstrating that the two are strongly negatively correlated (that is, those who are most satisfied are least likely to say that they want to quit). With panel data, job satisfaction at time *t* is shown to be a strong predictor of future actual quits: what workers say about their job is a useful predictor of what they will, in the future, do. The analysis of an observed behaviour in the labour market also reassures some who are squeamish of analyses based uniquely on what people say. The fact that job satisfaction predicts behaviour shows that someone who says that they are dissatisfied with their job really is more likely to quit from that job in the future than is another person (the same in all other respects) who reports high job satisfaction.

The second advantage of panel data is somewhat more technical. Repeated observations on the same individual allow controls to be introduced for unobserved fixed effects. In plain English, this means that we can still use information on different individuals to see if job satisfaction predicts quits, even though some people may have been born difficult to satisfy, and others may have some inbuilt predilection to quit their jobs.

It should be noted that all of this analysis is based on the quality of the match as reported by workers, and the relation of this to workers' future behaviour. On the other side of the coin, it would be of great interest to have information on the firm's evaluation of the match, and to relate that to future layoff or firing decisions. Such information is routinely collected by firms, as a result of internal performance evaluations, but is not made available to outside researchers. We know of no suitable data source which would allow such an investigation to be carried out.

3.III.B.3 QUESTIONS

The questions are divided up into two broad areas. We first present those that concern labour market mobility.

Our work on labour mobility has been to a large extent empirical. Our aim has been to use European data to test various theoretical predictions about the labour market. The data is often panel, following the same individuals (or firms) over a number of years. In addition, some papers have been able to use linked employer-employee (LEE) data to model wages and mobility more accurately.

Six questions are addressed in relation to labour market mobility. First long-run American and German panel data are used to model mobility from the worker's side. In particular:

1/ we ask whether mobility is profitable for workers

Do those who change jobs earn more than they would have if they had stayed? We then use Norwegian LEE data to examine more closely the firm's side of the mobility relation, examining job creation and job destruction. We especially ask how labour turnover is related to education and gender. The next question relates to:

2/ re-employment probabilities as a function of sex and age using individual data. We also ask:

3/ whether the absolute size of the pool of workers searching matters or not, *i.e.* we ask whether there are increasing or constant returns in the matching function. The fourth question relates to:

4/ the factors determining whether an individual finds temporary or permanent employment in the labour market, again with a focus on education.

The fifth question deals with:

5/ the relation between internal mobility (promotion) and education and tenure, with a special emphasis on gender differences.

6/ The last question with respect to mobility relates training to job tenure and to wages, and asks specifically what percentage of specific human capital is lost as a result of a job move?

The remaining questions refer to matching. They can be grouped into two broad issues. The first question addressed is:

7/ whether workers' answers to job satisfaction questions provide useful information about the same workers' future quit behaviour. This will not be the case if answers to job

satisfaction questions cannot be compared between individuals, or if job satisfaction contains no useful information.

The second broad question, once we have established that job satisfaction predicts quits, is:

8/ how job satisfaction is itself determined.

This question has been the focus of a series of recent papers in labour economics, ending a barren run where such questions were thought to be the preserve of psychologists. This revival is due partly to the recent availability of large-scale datasets in which such information appears, partly to a seeming increased willingness of economists to take seriously individuals' subjective evaluations of their experience in the labour market.

3.III.C – LABOUR FORCE GREYING

3.III.C.1 INTRODUCTION

The increase in the life-expectancy of the population and the decline in birth rates have resulted in an increase in the proportion of elderly people. Despite the fact that people are expected to live more years in good health - and thus live in circumstances in which they are able to work - than ever before, the labour force participation rate of older workers - i.e. workers aged 55 and older - has declined dramatically during the past thirty years.

In this paper an overview is presented of the causes and consequences of labour force greying. In accordance with the general objective of the TSER/STT project, particular attention is paid to the role of education and training on labour force greying and to the labour market flexibility of older workers. Furthermore, this paper serves as an overview of the work that has been done within the framework of the TSER/STT project on labour force greying. With respect to this, the results of the studies on labour force greying that have been carried out within the TSER/STT framework are summarised in this paper as well. Finally, the results of the analysis will be used to draw some policy conclusions.

3.III.C.2 STYLISED FACTS

Until the 1960s the labour force participation rate of men aged 60-64 was over 70% in most industrialised countries. By 1996 this had fallen to less than 20% in some

countries (for details, see Gruber & Wise 1998). As shown in Table 1, between 1979 and 1994 the labour force participation rate of people aged 55-64 declined in all OECD countries. Remarkably, the labour force participation seems to have increased somewhat since then. Between 1994 and 1997 some countries have seen a modest increase in the labour force participation of older workers. Despite these common trends of decline and recovery, there are marked differences in the labour force participation of older people across countries. In Belgium and the Netherlands the labour force participation of older workers is around 30% or less, while it is over 60% in the Scandinavian countries.

Table 1 Labour force participation rates of people aged 55-64 years in OECD countries (in percentages)

	1979	**1983**	**1990**	**1994**	**1997**
Belgium	..	30,6	22,2	22,7	23,1
Canada	54,2	52,1	50,0	48,7	48,4
Denmark	..	54,0	57,1	53,7	54,1
Finland	47,7	50,4	42,4	42,9	44,7
France	53,7	42,6	38,1	35,9	36,7
Germany	44,0	41,8	41,6	40,7	43,7
Ireland	48,6	48,4	42,2	88,1	86,6
Netherlands	38,6	33,3	30,8	30,0	32,7
Norway	65,1	66,4	63,1	63,3	67,7
Spain	48,1	44,6	40,0	36,8	37,8
Sweden	66,6	68,2	70,0	68,3	67,6
Switzerland	..	..	..	69,2	72,7
United Kingdom	..	..	53,0	52,1	51,7
United States	56,3	54,5	55,9	56,4	58,9

Source: OECD, Employment Outlook 1995, 1990, 1998

Despite the large differences in the labour force participation of older workers between European countries, there is a common trend to be distinguished. In Norway - one of the countries with a relatively high labour force participation rate of older workers - the number of workers aged 60 and older declined by 22% between 1975 and 1992. This was due to a decline in the male labour force participation rate. The female labour force participation rate in this age category increased slightly during this period (Dahl, Anti Nilsen & Vaage 1998). In the Netherlands the overall labour force participation rate of workers aged 55-64 declined from 39% in 1979 to 27% in 1996. As in Norway, this decline was the result of a strong decline in the male participation rate and a modest increase in the female participation rate. Between 1979 and 1996, the male labour force participation rate decreased from 65% in 1979 to 41% in 1996.

The fall in the labour force participation rate can partly be explained by the introduction of new (early) retirement schemes (see Kapteyn & De Vos 1998). In 1996 about 150 thousand people in the Netherlands received an early retirement pension. Larger than that are the disability benefit schemes. These are also quite frequently used as an exit route into early retirement. In 1996 there were around 814 thousand people receiving disability insurance. The large majority of them were aged 50 years or older. The importance of the early retirement and disability schemes becomes even more apparent if we relate them to the size of the labour force. In 1996 the total labour force in the Netherlands was 6,681 thousand people. So, as a share of total labour force, 2.2% of the population received an early retirement benefit and 12.2% received disability insurance. As noted by Dahl, Anti Nilsen & Vaage (1998), in Norway the disability and unemployment insurance schemes have functioned as informal early retirement schemes as well.

For demographic reasons (i.e. the greying of the labour force) the number of people on (informal) early retirement schemes is expected to rise even further, if nothing is done to stop this trend. In most countries younger generations tend to retire at a younger age than older generations (see Canada-Vicinay & Suarez-Gonzalez 1998 for evidence for Spain and Groot & Maassen van den Brink 1999b for the Netherlands). Similar trends can be observed in other European countries as well. In OECD (1998) the changes in the age composition of the labour force are summarised as follows:

- The age structure of OECD labour markets has changed considerably in recent decades

- There are large cross country differences in the rate of change in the age composition of the labour force;
- Reversing the trend towards early retirement will significantly increase the rate of change in the age composition in all countries compared with the trend over the period 1970-1995;
- Between 1970 and 1995 most countries experienced the labour market entry and initial ageing of the baby-boom generation. By contrast the period 1995-2020 will be characterised by increases in the shares of older workers.

4. CONCLUSIONS AND POLICY IMPLICATIONS

4.I A COMPARATIVE ANALYSIS OF SCHOOLING SYSTEMS

We bring new evidence on *three main* issues suggested by our *economic perspective*.

4.I.1 *The first implication of an economic analysis of schooling is that educational efforts and resources should be essentially driven by market forces in the aggregate.*

4.I.1.a Economists have typically verified this implication by computing rates of return to education. Erik Plug and Jesse Levin and Erik Plug revisit the simple OLS estimates from a Mincerian earnings function by using IV (instrumental variable) techniques. These are becoming increasingly popular among econometricians because returns estimated by OLS may suffer from endogeneity bias, ability bias and measurement error in the schooling variable. With two independent data sources, Levin and Plug for instance find IV estimates of the schooling return for the Netherlands of 4.5% and 5.0% compared to the corresponding

OLS baseline estimates of 2.4% and 3.6%. These findings are in line with those generally found in the literature; namely, OLS estimates of schooling returns are significantly biased downward. For Spain, Gerard Lassibille and Lucia Navarro-Gomez show that the returns to education have decreased between 1980-81 and 1990-91, while the returns to primary education have risen moderately. During the same period, Spain experienced substantial educational expansion. The inverse relationship between schooling returns and the student population is standard evidence of the role of market forces.

4.I.1.b Can we infer from this that returns to education have become lower on the depressed European labour market than they are on the North-American labour market? Or that overeducation has gained a larger incidence, and undereducation a lower incidence, on the former than on the latter? Wim Groot and Henriëtte Maassen van den Brink report the result of a meta-analysis of 25 studies on overeducation, from which they obtain 50 estimates for the incidence of overeducation and 36 estimates for the incidence of undereducation. Rather surprisingly, there appears to be less overeducation in European countries than in the United States. The average value of overeducation among studies for the United States is 26.3 % while among European studies it is 21.5 %. The same holds for the incidence of undereducation. The incidence of overeducation appears to have declined rather than increased over the past twenty years, and the same applies to undereducation. An alternative interpretation can be given to these estimates by noticing that workers' skills are not only acquired through education, but also through on-the-job training and work experience. As a result, workers with different levels of education may have similar skill endowments if the lack of formal education (undereducation) is compensated by skills obtained through training or experience. Conversely, overeducation may be compensation for the lack of other relevant productive skills necessary for the job.

The joint decline in overeducation and undereducation suggests that skill mismatches in the labour market have decreased since the 1970s, or that the dispersion in the mix between education and training has diminished over time. The point estimates obtained from the meta-analysis also indicate that the rate of return to a year of education required for the job was about 7.9 % in the 1970s and 1980s and increased to almost 12 % in the 1990s. The average rate of return to a year of education required is somewhat lower among

European studies than in the United States. The coefficients suggest that the « true » rate of return to a year of overeducation is about 2.6 % while the rate of return to a year of undereducation is –4.9 %. The latter coefficient is significantly different from zero at the 10 % level only.

4.I.1.c Instead of looking at how the returns from a given education are affected by changing labour market conditions, we could interpret the economic implication of human investments being driven by market forces the other way round. Barbara Petrongolo and Maria J. San Segundo examine the impact of labour market conditions on the decision to stay at school at sixteen. To answer this question, they exploit a natural experiment in Spain by observing three samples of sixteen and seventeen year-olds in 1987, 1991 and 1996. Since the length of compulsory education changed by law in 1990 (from 14 to 16), but implementation of the law was gradual, they are able to relate the decision of staying-on at school to the unemployment rate of the province of residence. On the one hand, it can be assumed that high youth unemployment rates are driving young people to postpone their entrance into the labour market, by reducing the opportunity cost of their educational investments. This tends to generate a positive effect of current youth unemployment on the probability of staying-on at school. On the other hand, an increase in adult unemployment would also increase the probability of expected future unemployment for young people and budgetary restrictions faced by families whose parents experience unemployment. It would thus reduce the expected returns to education and family income, and hence reduce the demand for schooling. These two counteracting effects are shown to operate so that, in the aggregate (i.e.. adult + youth), the unemployment rate is of little significance in determining the probability of staying-on at school at sixteen. It appears on the same data set that changes in family education are considerably more powerful in determining changes in staying-on rates in Spain.

4.I.1.d Louis Lévy-Garboua and Nathalie Damoiselet offer a stylised description of 16 educational systems. They draw from OECD (1996) measures of educational output at market value, for lower secondary, upper secondary, non-university and university sectors. Each system is described by the size of these four educational outputs, the share of technical and vocational graduates (dotted area), and various indicators of differentiation, screening

and inefficiency drawn from an especially designed questionnaire (STT 1997). For illustration, the following figures are displayed in appendix: France, Germany, Netherlands, Norway, Spain, UK and USA.

Then, they compute aggregate measures of educational output quality (HTOT), inequality (summarised by variance between levels INEQ) and the rate of transformation of the educational system in a generation (IH). These three aggregate measures of educational output (i.e., quality, inequality and quality change) appear in the following table, along with a subjective indicator for the « decline of educational standards » which simply reflects the opinion of selected experts and takes three possible values (0,1,2). While all of the sampled countries have undergone positive and often substantial quality change in a generation, educational experts do seem to think that educational standards have frequently declined.

Aggregate indices of educational output

COUNTRY	Educational output quality in 1994 (upper secondary=100) HTOT	Rate of quality change in a generation (%) IH	Inequality INEQ	Opinion on the decline of educational standards DECLINE
Austria	102.4	4.1	0.152	1
Canada	112.0	5.1	0.252	1.5
France	117.7	11.6	0.277	0
Germany	109.8	0.3	0.203	0.5
Greece	102.8	5.8	0.221	2
Hungary	105.8	NA	0.234	2
Italy	100.6	15.6	0.188	2
Japan	117.3	NA	0.215	1
Netherlands	104.7	3.8	0.192	0
Norway	127.4	16.8	0.165	1.5
Portugal	96.7	24.8	0.392	1
Russian Fed.	116.3	NA	0.219	1
Spain	102.8	16.0	0.248	1
Sweden	107.8	1.2	0.223	1
UK	117.9	13.4	0.263	1
USA	115.6	3.3	0.349	2

At an aggregate level, Norway turns out to be the best performer because it has managed to suppress school-leavers at lower secondary level and has developed a large vocational non-university sector. France, Japan, Russia, the UK and the USA are also good performers, but the latter are more unequal and have undergone less transformation recently than the first cited. The dispersion of aggregate educational outputs between these industrialised countries is rather small, and there are clear signs of convergence. For instance, countries like Canada, Germany, the Netherlands, Sweden and the USA have moved relatively slowly in comparison with developing countries like Italy, Portugal and Spain. So, at the most aggregate level, schooling systems do not seem to matter much and the market forces are prevalent.

4.I.2 *The second implication of an economic analysis of schooling which is investigated here is that higher resources should be positively associated with higher earnings, i.e. market returns to education and higher academic attainment.*

4.I.2.a Peter Dolton and Anna Vignoles use data from a unique British longitudinal survey to evaluate the effect of various measures of secondary school quality on both students' learning outcomes and their subsequent earnings at the age of 33. School quality is measured through the overall pupil-teacher ratio in students' schools (school level), the exact size of their English and Maths classes (classroom level), and by local government educational expenditure per student (financial resources). The results are mixed. Smaller pupil-teacher ratios improve students' academic performance at 0 level (UK). These results contrast with the US literature, which suggests that educational resources may affect earnings but not academic attainment (Card and Krueger 1996).

Another important result is that under certain specifications, the English and Math class size variables are significant but positively related to earnings. The most likely explanation seems to be that students' ability in Math and English and the size of their classes in these subjects are positively correlated, implying that schools assign more able students to larger classes. Teachers vary their teaching techniques according to class size. « Whole group teaching », which is the method that is more often used in larger classes, may be more

effective, counteracting any negative effect from the larger class size. Hence, under certain circumstances, the way teachers teach may be more important than the pupil- teacher ratio.

Perhaps the most important conclusion from this paper is therefore that the way in which resources are allocated within schools is as important as differences in resourcing levels across schools or school districts.

Future research should rely more on experimental data, which avoids some of the endogeneity issues and also highlights the need for better theoretical models of the production of education.

4.I.2.b Gérard Lassibille and Lucia Navarro-Gomez use various data bases to investigate the educational cost and production functions from a cross-section of countries. They regress unit costs as a percentage of GDP per capita in public and private secondary education as a function of an index of early differentiation I_1 (see below in 3.1), the pupil-teacher ratio and the degree of centralisation (share of state-level funding).

Adjustment of unit costs of education systems
as a % of GDP per capita

	coefficient		t
constant	48.242		9.81
I_1 (1)	- 7.747		2.26
Pupil- teacher ratio	- 1.008		4.39
Degree of centralisation	- 0.0563		2.52
R^2		**0.711**	

(1) I_1 = duration of common core syllabus/duration of compulsory education

I_1 = 1 for non-differentiated systems, and $I_1 < 1$ for differentiated systems

Their analysis confirms that a low pupil-teacher ratio significantly increases the unit cost of education, as do early differentiation and decentralisation. Since a higher pupil-teacher ratio compensates for the overcost of differentiation, differentiated education systems tolerate more loaded classrooms in order to maintain the unit cost at the same level as non-differentiated ones. Another important finding is that higher resources in the form of early differentiation or a lower pupil-teacher ratio do not merely raise unit costs of education but seem to increase the academic attainment of pupils. Higher resources and the size of the

private sector significantly and positively correlate with Mathematics test scores in grades 7 and 8, while class hours and centralisation are insignificant.

Adjustment of Mathematics Test scores
in grades 7 and 8

	Coefficient		t
constant	620.496		14.81
I_1	-187.817		2.17
Pupil- teacher ratio	- 5.633		3.08
Instructional time in primary level	0.012		1.52
Instructional time in secondary level (up to 13 or 14)	0.004		0.91
Size of private sector	0.796		3.68
Degree of centralisation	0.118		0.37
R^2		**0.452**	
N		**28**	

Fixed-effect model is corrected for heteroskedasticity by clustering observations by country.

4.I.2.c Instead of measuring how school resources affect students' academic attainment and lifecycle earnings, we examine here the corresponding effects of family resources. The latter either take the form of the human capital of parents, grandparents and siblings, or of family income and non-human wealth. Using the Dutch Brabant survey, Erik Plug finds that the human capital formation of boys is largely due to human capital transmissions from their parents and grandparents. For girls both parental human capital and parental income matters. These results suggest that credit market imperfections restrict the schooling decisions only for girls. In a similar vein, Juan Cañada-Vicinay and Irene Ramirez Medina examine the effects of marital dissolution upon the duration of studies and employment of children. Marital dissolution produces a sharp decline in family resources to the benefit of children. As predicted, they find a significantly negative effect of marital dissolution on the education of children, but the effect on employment is insignificant when education is held constant.

4.I.3 *The last economic implication of an economic analysis of schooling which we put to the test is that schooling systems may matter under certain circumstances*. Two of these have been investigated here.

4.I.3.a Schooling systems have to differentiate as a means for sorting students of heterogeneous abilities optimally. Nathalie Damoiselet has demonstrated with a formal model that a multi-stream, or differentiated, system produces more human capital than a common core system. Louis Lévy-Garboua and Nathalie Damoiselet compare sixteen educational systems by making use of synthetic answers given by experts to a specially designed questionnaire (STT 1997) and completing these data by indicators drawn from OECD (1996). They describe educational systems with respect to differentiation, share and quality of the private sector, vocational education, selection at university entrance, and the experts' judgements about inefficiencies, distinguishing primary, lower secondary, upper secondary and higher levels. Early differentiation (by grades, school and test) can be useful in sorting out students by their general ability if such an early detection is possible. Late differentiation (by options and preferences) serves another purpose of sorting out students by their occupation-specific talents and preferences. Both types of differentiation are found in various proportions and with various intensities. For instance, France, Germany, the Netherlands and the USA make an intensive use of both, while Canada, Italy and Japan hardly use any. Hungary and Sweden mainly differentiate on the general ability criterion while Austria, Greece, Norway, Portugal, Russia, Spain and the UK mainly differentiate on occupation-specific criteria. (It should be noted that the differentiation index used by Gerard Lassibille and Lucia Navarro-Gomez for their own study captured mainly early differentiation by general ability). In addition to these aspects of differentiation, other aspects, related to the number of options and curricula, freedom of choice of families, and private alternatives, are also considered. It is shown that private schools offer more freedom of choice than public schools by overcoming the latter's residential restrictions, and that the average quality of private schools relative to public is greater for primary and secondary education than for higher and vocational education (for which a simple explanation is given).

A key policy issue is whether curriculum differentiation should be early or late. Early differentiation by general ability was found by Lassibille and Navarro-Gomez to have a

positive and significant impact on Mathematics test scores in grades 7 and 8 (lower secondary). On the other hand, Louis Lévy-Garboua and Nathalie Damoiselet find that early differentiation by cognitive ability does not significantly reduce inefficiency at the lower secondary level and late differentiation by the skill-specific talents does not significantly increase inefficiency at the upper secondary level, where « inefficiency » is measured by the amount of stacking and inefficient routing at either schooling level. Their finding corroborates one major implication of their simple theory of educational systems: since ability can be detected earlier than talents, it is not optimal to make an intensive use of differentiation by cognitive ability too early, say at the lower secondary level. Moreover, the perceived decline in educational standards is a mere reflection of the fact that students are not being sorted only on the basis of their « educational » success (i.e. their cognitive ability), especially in the lower secondary level. But this trend is dictated by an efficiency motive in order to maximise the value of human capital net of education and training costs. Our interpretation for the perceived decline of educational standards (measured by DECLINE) is confirmed by the following regression:

DECLINE =	2.641	- 0.243 DIFLOW	- 0.0789 STTPRIM	**R^2= 0.605**
	(5.584)	(- 2.629)	(-2.675)	**N = 13**

STTPRIM designates the ratio of students to teaching staff in primary education for 1994, as given by OECD (1996: table P32 (public and private)). This is positively related to early differentiation if education expenditures are constrained. For a given budget, larger class size is the price for having more differentiation which obviously uses more teachers. Therefore, DIFLOW and STTPRIM both capture aspects of early differentiation and have a negative effect (significant at the 5 % level) on DECLINE. Indeed, the selected experts did not stress the decline of educational standards in France, Germany and the Netherlands which have strongly early-differentiated schooling systems on both accounts. The converse is true for Italy.

4.I.3.b Schooling systems also reflect widely different solutions for adjusting education to jobs in the presence of costly adjustment and youth unemployment. These solutions concern the places of screening and vocational training. Educational screening or filtering occurs both continuously (through downstreaming, class repeating and drop-outs)

and discontinuously (by restricted admission). Continuous and discontinuous screening are clear substitutes at university level; and the amount of filtering significantly increases with education level.

Jean-Jacques Paul, Jake Murdoch and Julien Zangala have measured the effects of more selective entrance requirements in universities upon the probability of future graduates being unemployed or entering high-grade occupations some time after leaving university. They use reasonably comparable survey data for France and the UK. Their main finding is that greater selectivity of universities has the expected effect on the school-to-job transition in both countries. However, this selectivity effect is significant on first-degree graduates in the UK while it is not significant before the DEA-DESS in France, which reflects the average duration of studies in these countries. A key policy issue is whether access to higher education should be open or closed. Louis Lévy-Garboua and Nathalie Damoiselet show from STT (1997) and OECD (1996) data that the use of selection at university entrance is reduced essentially by the amount of differentiation at the upper secondary level, the quality of secondary education (measured by its unit cost), and the typical duration of study in universities. More open universities tend to screen more intensively in the course of their studies, which results in higher drop-outs and class repeating and eventually has an adverse effect on youth unemployment (after controlling for quality and the general unemployment rate). In short, there seems to be a trade-off between differentiation in schools and selection at university entrance. Although the theory predicts that selection at university entrance economises on student wastage and the costly use of continuous filtering, the political difficulty of introducing selection at entrance in countries adhering to a baccalaureat system may have been partially circumvented by increasing the quality and differentiation of secondary schools at the upper level, and also by augmenting the normal length of studies at university.

One last key policy issue which can only be partly addressed here (see the extensive discussions on apprenticeship and vocational training in the part devoted to school to work transitions) is whether vocational training should be provided by schools or firms. Youth unemployment of upper secondary school-leavers is significantly related to the perceived inefficiency of vocational education after controlling for the general unemployment rate. Education experts judge vocational training as being more efficient when firms are

involved in its organisation, which is ultimately correlated with longer tenure and lower labour turnover in the economy. Thus, schools need the involvement of firms, because firms are probably more efficient than schools in defining the kind of training they need and in evaluating skill-specific talents.

4.II TRANSITION FROM SCHOOL TO WORK

4.II.A – TYPES OF TRANSITIONS

4.II.A.1 Apprenticeship versus vocational school

The main questions addressed by three of the papers presented on this subject is the following: From the viewpoint of the school to work transition, is apprenticeship that alternates training in school and in a firm more efficient than vocational education that is offered solely in school?

Different elements must be considered to answer this question as indicated by M. Sollogoub and V. Ulrich in their paper "*Apprenticeship versus vocational school: selectivity bias and school to work transition-evidence from France*" (1999).

These issues (the third one to a lesser extent) are the main purpose of the paper of L. Bonnal, S. Mendes and C. Sofer « *Access to the first job: a comparison between apprenticeship and vocational school in France* » (1999). By analysing a panel of youth who quit the French schooling system in June 1989 and who were followed until December 1990, those authors tried to measure the "pure" within firm training effect by comparing the transition from school to work of apprentices with different schooling levels with that of youth who have achieved the same schooling levels, but who have followed more traditional vocational schooling programs (i.e. have learnt mainly in school). They analyse access to the first job.

As noted above (fourth issue), ex-apprentices and vocational school leavers might differ in observed or unobserved characteristics that could influence their school to work transition as we noted, irrespective of the type of training received. This may lead to

important selectivity bias problems. **The authors do show evidence of a strong selection bias against apprentices at the CAP level, at least for males**. **Nevertheless, apprentices do better than vocational school leavers at the lowest level:** not only, on the whole, do they find a job more easily, but this job is generally of better quality (corresponding to a long term contract). Moreover, for males, even those who do not remain in their firm of apprenticeship do better than vocational school leavers. Only after a few months of unemployment does the situation slightly reverse.

The aim pursued by M. Sollogoub and V. Ulrich can be considered as a continuation of the paper by L. Bonnal, S. Mendes and C. Sofer, for the transition is analysed, also using French data, during a four year period.

The conclusions of this paper are very similar to those of the previous one: the authors conclude that **training in a firm alternating with training in classes is more efficient in helping youth to be employed during the school to work transition than training provided in school only**. The authors indicate that this result has to be interpreted with care even if the remarks formulated do not challenge the result obtained (a higher efficiency of apprenticeship). These remarks simply suggest that an extension of apprenticeship to all vocational diplomas prepared at a level lower than the *baccalauréat* in France or its generalisation to higher levels of education has to be accompanied by control of the training provided by firms and more importantly of their involvement in youth recruiting. Finally, the main conclusion is that if apprenticeship increases youth employment opportunities, the apprenticeship system should be developed. **Using Norwegian data, E. Bratberg and O.A. Nilsen (1999) also show that apprentices find a job relatively rapidly after having completed their education.**

Another important implication of the analysis provided by M. Sollogoub and V. Ulrich is the fact that **ex-apprentices seem to have lower wages than vocational school leavers**. Several explanations are offered by the authors. First, if the wage earned reflects productivity, this result may suggest that vocational school is more efficient than apprenticeship in increasing youth productivity. Second, the difference in wages between the

two types of training can also be attributed to differences in the behaviour of firms that employ ex-apprentices and those employing vocational school leavers.

The authors also emphasise the need to refine the measure of the school to work transition and propose several ways of analysing this critical period of working life.

The attempt to define the determinants of student choice between apprenticeship and vocational school indicates that those who choose apprenticeship experience considerable difficulties in secondary general school. Social and family background also play an important role in school guidance. Moreover, self-selectivity in the choice between the two types of training is found to be present (those who choose apprenticeship and those who choose vocational school are non-random subsets of all school attendees). Apprentices are older, they repeated more classes in primary and secondary general school, their parents are more educated and their number of siblings is smaller.

The latter results, concerning the determinants of student choice between apprenticeship and vocational school, proposed by M. Sollogoub and V. Ulrich can be compared to the results proposed by E. Plug and W. Groot in their paper « *Apprenticeship versus vocational education: exemplified by the Dutch situation.* ».

Based on Dutch data, the paper also tries to isolate the determinants of the choice between apprenticeship and vocational school. The results indicate that, as in France, there are differences between the two groups: apprentices are mostly male and technically orientated. Furthermore, they are more likely to have a history in vocational education and low educated fathers. This latter characteristic is the opposite of the one found for France, as mentioned above, by M. Sollogoub and V. Ulrich. It is also interesting to stress that, **contrasting with the French results, no significant differences in the life cycle wages of apprentices and of workers with a comparable level of education seem to appear in the Dutch case**.

4.II.A.2 Key variables explaining transitions from school to work

We will first present a paper which mainly raises a theoretical question, with a clear empirical application to European construction. This paper, by B. Petrongolo, *« Re-employment probabilities and returns to matching* » (1999), aims at testing the links made by some authors between the size of the labour market and its efficiency in the matching process.

More precisely, the paper tests with British Data the assumption of constant returns in the matching function embodied in most bilateral search models. This assumption is crucial to ensure the uniqueness of the unemployment rate along a steady growth path and indicate that the hazard rate (i.e. the probability of a transition out of unemployment within a short time interval, conditional on the worker being still unemployed when the interval started) should depend only on the degree of labour market tightness, measured by the vacancy/unemployment ratio, and not on the absolute size of the pool of searching agents as well. If instead, matching displays increasing returns, the hazard rate should depend positively on the size of the market after controlling for labour market tightness. If returns to scale in the matching technology are constant, then policy makers do not need to consider the size of the local labour market. **The results of the analysis provided by this paper indicate that the hypothesis of constant return to scale is not rejected. As a consequence, no automatic advantage against unemployment should be provided by a larger labour market.**

Finally, eight studies were dedicated to the study of transitions in youth using micro data.

The STT meeting in Malaga (1998) provided the opportunity to examine more closely the Spanish situation. In this country, the unemployment rate is one of the highest in Europe (20%). Unemployment is a critical issue for Spain not only because of its magnitude, but also because of its unequal incidence among groups of population. One of the most affected groups is the young population. In 1996, according to the Spanish Labour Force Survey (EPA), the unemployment rate exceeded 50 percent for age 16 to 19, and was around

40 percent for the group aged 20 to 25. The differences appear increased if we compare them with the groups aged 25 to 54 with an unemployment rate of 20% and those over 55 with a rate slightly above 10 percent.

Four papers were dedicated to the situation of the youth in Spain. Three others study the situation in Norway, thus permitting some comparisons (to the extent of the comparability of the data, which is not as good as we would have wished).

In the first paper by J. Cañada Vicinay, A. Olivares Mesa, J. Pinilla Dominguez and J.M. Suarez Gonzales, « *From entry into the labour market to fixed employment. An approach by education levels and marital status* » (1998), the determinants of the transition from school to work of the youth in Spain are analysed. The aim of this paper was to determine the impact of the education level, as well as the impact of the marital status on transition from school to work.

In the second paper, « *Youth unemployment in Spain: Main characteristics* » by I. Aguilar, L. Navarro Gomez et C. de la O Sanchez, determinants of the probability of being unemployed are isolated. The conclusions obtained by this research are the following:

The human capital accumulated by the youths is a relevant factor in explaining their labour situation. General and specific training increase the probability of employment. For men, the results show that it is preferable to carry out upper vocational education. For women, it is preferable to carry out upper secondary general education. Family variables appear as an important factor in determining labour opportunities for the youths. This research includes only the father's social background. In a later paper, however, G. Lassibille and L. Navarro-Gomez (1999) **show evidence that youth with an upper secondary level are more likely to remain unemployed than youth with a higher, but also a lower level of education. They are also the most at risk to be overqualified for their job.** This result seems to be specific to Spain, thus questioning the Spanish schooling system of upper secondary education.

Family obligations exercise a clear effect through the variable that shows if the youth is married at the present time. These obligations are translated into a smaller reservation wage that will diminish the probability of unemployment for men. In the case of women, the fact of maintaining a stable relationship will be valued negatively by the managers, decreasing the received offers and increasing the probability of unemployment. On the other hand, the existence of children will suppose a higher probability of unemployment in both genders. The fact of residing in the region of Andalucia, as well as living in big cities increase the probability of unemployment.

The fourth paper by A. Capparros Ruiz, L. Navarro Gomez and C. de la O Sanchez, « *Youth participation in the Spanish labour market: some evidence* » deals with the determinants of youth participation in the Spanish labour market. The authors chose to study mainly two samples (men and women) of young people with a low educational level to isolate those determinants.

For men, to present the highest probability of being active, the individuals must possess the following features: married, aged 26 to 30, living in a city between 20001 and 100000 inhabitants, with low vocational education, without doing activities not connected with the labour market, with three brothers, with no more than two children, with a spouse who has upper secondary education, with a father with primary education and a mother who did not complete primary education.

For women, individuals with the highest probability of being active are: single, aged 26 to 30, living in a city between 20001 and 100000 inhabitants, with upper secondary education, without doing activities not connected with the labour market, with more than four brothers, without children and with parents with primary education.

Three other studies using Norwegian data (Kirut) were proposed by E. Bratberg and O. A. Nilsen, (1999), by O..A. Nilsen, A.E. Risa and A. Tortensen (1998), and by T.S. Nilsen and A.E. Risa (1999)

The paper proposed by Espen Bratberg and Oivind Anti Nilsen, "*Transition from school to work: search time and duration*" deals with another aspect of transition from school to work. The situation in Norway is quite the opposite of the Spanish one, with a very low unemployment rate for youth. **One of the questions raised in this paper is whether the level of education affects the duration of spells of unemployment and employment. If there is competition for good quality jobs, the authors expect that individuals with a higher educational level are more likely to get a job immediately after finishing their education. However, education may also increase the reservation wage of the individuals. If so, then the effect of longer education will be the opposite, i.e. to increase the search period. In addition, a longer search period may be looked upon as an investment in getting a better job-match.** By analysing the length of the search period and the length of the job duration, the authors tried to shed light on these opposite theories, and to see whether one of them empirically dominates the other.

The results the authors obtained on Norwegian data are the following: **a negative correspondence is observed between time taken to find a job and level of education. As is true in every country, the time needed to get a job is shorter for those with higher levels of schooling**..

If education is important in finding a job quickly, the authors indicate that in Norway, as generally observed, education increases wages. Analysing the correspondence between education and job duration, the authors conclude that **a higher education is associated with a longer first job duration spell.**

Gender differences are observed. **Paradoxically (when compared to other countries), females have shorter search periods and longer job duration than males. But, as is more usual, they also have lower wages**. These findings are consistent with female labour force entrants having lower reservation wages than men. As indicated by the authors, this may be explained by the Norwegian maternity leave system, which is quite generous but requires a minimum of 10 months paid work previously to giving birth for eligibility. Females who plan to have a child may therefore accept lower paid jobs.

The paper by O.A. Nilsen, A.E. Erling and A. Tortensen is devoted to job exits, using a sample of young Norwegian workers (drawn from KIRUT data). As a matter of fact, as the transition from school to work becomes longer, access to the first job should no longer be the only matter of interest for research, as was already stressed in the paper by M. Sollogoub and V. Ulrich.

The authors insist on the fact that higher unemployment rates for youth do not necessarily result from higher unemployment duration but also from higher inflows from job exits. They show that many exits may be due to insufficient demand in some sectors. **Interestingly, they show no evidence of any adverse incentive effect from the social insurance system**. More work experience, a higher level of education and a higher income increase the probability of staying employed, although this finding could, at least partly, result from a selection bias. **It is also worth noting that family related variables play different roles for males and females, indicating that females still respond more in their labour market decisions to changes within the family**. In a later paper, though, T.S. Nilsen and A.E. Risa (1999) find a lower correlation between female labour market attachment and family related variables as compared to many previous studies. The only family related variable with impact is having an additional child in the observation period.

4.II.A.3 Job competition and over-education

Concerning the question of job competition and over-education, **interestingly enough, the results of four papers and more countries are mostly similar in that they show no evidence of phenomena such as job competition or an increase in over-education** (see also above, section I) **.**

As mentioned above, the paper proposed by E. Bratberg and O. A. Nilsen, "*Transition from school to work: search time and duration*" (1998), using Norwegian data, looks at whether the level of education affects the duration of spells of unemployment and employment. If there is competition for good quality jobs, the authors expect that individuals with a higher educational level are more likely to get a job immediately after finishing their education. But a longer search period may be seen as an investment in getting a better job-

match. In the latter case, the first job duration should also be longer for the better educated. T.S. Nilsen and A.E. Risa in *"Duration in Work after leaving School" (1999)* also look at the duration of the first job in that perspective, using slightly different data. If the authors do find in the first paper a negative correlation between the time before finding a job and the level of education, both papers also find that a higher education is associated with a longer first job duration spell. **Although the test needs confirmation, these results seem to merely validate the job matching hypothesis rather than job competition.**

M. Gurgand, in "Is there job-competition in the French labour market?" develops an original job search model aimed at testing the job competition hypothesis. Using French data, he estimates reservation wages for different educational levels and tests if the reservation wage of each category reacts to the number of job searchers in the categories with higher levels of education. That should be the case, with a negative impact, if individuals with different education levels compete in the same labour markets. Although he does find such an effect (but slight) for the intermediary educational level, no effect is found for the lowest educational level, even if its level of unemployment is the highest. **Thus, the test does not validate the job competition hypothesis.**

Finally , let us mention a result by W. Groot and H. Massen van den Brink (1998), although the paper is not concerned with transitions as its main topic. In *"Over-education in the labour market: a meta-analysis"*, the authors use a meta-analysis method based on the review of 25 papers from different countries, among which the United States, the Netherlands, the United Kingdom, Portugal, Germany and Spain, dealing with over-education. Their conclusion is that, although they do find that the overall incidence of over-education in the labour market appears to be about 25%, **no significant increase in over-education measured during the past twenty years is found.**

Although these results need to be complemented, they seem to indicate that neither the job competition model, nor the very similar approach of the increased over-education hypothesis find empirical support in our studies.

4.II.A.4 Temporary contracts

Looking now at temporary contracts, not surprisingly the two papers devoted to that subject use data from countries which are considered as having highly regulated labour markets, i.e. France and Spain. The first paper by T. Pénard, M. Sollogoub and V. Ulrich "The Integration of Youths into the Labour Market and the Type of Employment Contract" (1999) deals with the type of work contract and with the influence of this type on the quality of the insertion of the youth into the labour market. In France, two types of labour contracts are observed: the unlimited duration contract (contrat à durée indéterminée: CDI, i.e. permanent contracts), and the limited duration contract (contrat à durée déterminée: CDD, i.e. temporary contracts). 70 percent of newly registered contracts are now temporary in France, with a strong increase of this percentage in recent years, as in Spain as will be seen below.

From the viewpoint of the school to work transition, the development of temporary contracts can be analysed in two ways: permanent contracts provide young workers with a protection against unemployment because of the high firing costs associated with this kind of contract, but, conversely, they restrain the hiring of new and inexperienced workers. Temporary contracts help youth to be hired by firms but this kind of contract can generate frustration associated with the precarity of a situation in that case more likely characterised by short spells of employment and spells of unemployment. If workers generally prefer a long term relationship with their employer, permanent contracts may also be useful for the employer since it helps the development of specific human capital.

The analysis provided by the authors develops an original theoretical model. Its purpose is, firstly to analyse the quality of the employment relationship and, secondly, to show that temporary contracts can be used by the employers as a worker's effort device. The French data used include questions about job satisfaction.

The results show that the type of the working contract influences the quality of the relationship between workers and employers. Temporary contracts are associated with smaller wages and a reduced job satisfaction. As expected, youths do prefer permanent contracts and high wage jobs. Using a game theoretical model, the authors show that permanent contracts help co-operation between employers and employees to emerge because,

in this case, the opportunism of the employer is limited. By choosing a temporary contract, the employer discourages cooperation.

Even if temporary contracts help new hiring, and participate in the matching process that may lead to a permanent contract, they may also generate an inefficient relationship between employers and employees by restraining co-operation. These results question the opportunity of labour market policy measures for young workers, mainly aimed at helping to create new temporary contracts for them.

The same mitigated conclusions concerning the beneficial aspects of temporary contracts in youth employment are found in a paper by B. Petrongolo and M. Güell-Rotllan "The Transition of Workers from Temporary to Permanent Employment: the Spanish Case" (1999). The paper is not specifically concerned with transitions in youth, for it studies the reasons and the effects of the general increase in temporary contracts in Spain. But, as young people are also in Spain the main "beneficiaries" of this type of contract, the results obtained are highly relevant here.

The authors use a duration model to examine the determinants of the renewal of fixed-term contracts into permanent contracts in Spain. The results show that the probability of obtaining a contract conversion is positively affected by the human capital level of individuals, and has a spike toward the completion of the legal maximum for the duration of fixed-term contracts. It is also shown that the strong increase in the number of fixed-term contracts has been unaffected by the state of the Spanish business cycle, thus raising doubts about the effectiveness of this type of contracts in fighting against unemployment.

4.II.A.5 – POLICY IMPLICATIONS

One clear policy recommendation can be drawn from our results. It concerns the benefits of developing vocational schooling and training by the way of apprenticeship. The evidence for three countries shows no serious adverse effect of this kind of schooling, and seemingly large benefits, at least in Norway and France, in the protection it provides (relatively) against unemployment.

Two other results can be stressed, although they are still preliminary and need further research to be confirmed. The first one concerns job competition and over-education: the strong general increase in the level of education of young people observed in most European countries does not seem to have had the negative consequences indicated by the job competition or over-education models. Although clearly the least educated young workers experience the greatest difficulties in finding a job in all European countries, the main reason seems to be in their own lack of appropriate schooling to fulfil (possibly new) job requirements rather than in a competition with better educated youth for unchanging low skilled jobs. These findings, although still limited to a few studies, support policies of increased general education.

The second result is still more preliminary, as it concerns only two countries, France and Spain. These two countries have experienced a legislation allowing the development of fixed-term contracts besides a general, more highly regulated system of permanent contracts. The results of this policy in either case do not seem very convincing, regarding either a decrease in general unemployment or an easier transition from school to work for youth. Possibly a complete lack of flexibility could have led to an even worse situation, but what the results of the studies of our STT project seem to indicate is rather that the coexistence of the two systems has negative side-effects, which could be better avoided by introducing some flexibility in the general system of work contracts.

4.II.B – WAGE RIGIDITIES

4.II.B.1 Minimum wages and transitions.

Abowd-Kramarz-Lemieux-Margolis (1997) (AKLM) is in many respects the most important among our minimum wage papers. Here, the transitional approach to the study of employment effects from minimum wages is laid out. The paper contains results both for the US and for France. We concentrate here on the French results. Earlier studies on the effect of the minimum wage in France have reported small or no negative employment effects. This is quite surprising, given that minimum wages in France are nationwide and comparatively high. AKLM report *strong negative effects*. A 1% increase in the minimum wage increases the probability that a young man employed at the minimum wage will lose his job by 6%-7%.

This is not necessarily in contrast with the idea that minimum wage increases do not matter much for population wide unemployment rates, but it highlights that **for the subgroup that is affected by the minimum wage, negative effects can be substantial**.

Ideally, one would want to follow those displaced in a longer perspective. What changes in people's lives are set in motion by the fact that employment at the old minimum wage no longer is possible? It could also be that the minimum wage simultaneously leads to an influx of (other) youths from unemployment to employment, simply because their unemployment was voluntary – and the wage now offered makes work attractive. The transitional approach could also underestimate the negative employment effects – if employment protection means that those already in a job will not be fired because of a wage increase, but that new hires might suffer instead.

In a sequel paper, Abowd, Kramarz and Margolis (1999) (AKM) perform the same type of study, but this time the focus is not solely on young workers. **Again, the picture of strong negative employment effects is confirmed.**

Askildsen, Lommerud, Nilsen and Salvanes (1999) (ALNS) try to adapt the AKLM/AKM framework to a Norwegian setting. There is no statutory, nation wide minimum wage in Norway. Rather, minimum wages are industry-specific and set through bargaining between employers' federations and workers' unions. A large fraction of the Norwegian economy is covered by such minimum wages, but they are not the same in all sectors and there are also sectors where there is no minimum wage. Intuitively, one should expect that the employment effects of a minimum wage increase is less severe than have escape routes' to other sectors and must not necessarily go into unemployment. The analysis in ALNS builds on that in AKLM, and is more preliminary in nature. The results should therefore at this stage be viewed with some scepticism. As they stand, however, no serious negative effects on employment are found. **There is a small tendency that a minimum wage change triggers transitions between sectors**.

This *could* mean that union bargained minimum wages have less severe effects than administratively set national schemes, simply because they are more flexible in the sense that there are uncovered jobs available. Union set minimum wages are also likely to move in tandem with other union set wages, which reduces the incentive to substitute away from minimum wage labour. A further explanation could be that the union bargained minimum wage is high where unions are strong – and that strong unions also can

protect their members from losing their jobs after a minimum wage increase. This does not necessarily mean that employment effects are small, but that we have an insider-outsider dilemma where employment problems are created not by transitions into unemployment of the already employed, but by a lack of new job openings.

We think the marked contrasts between the French and the Norwegian experience are quite interesting from a policy viewpoint, and plan to pursue the issue further in future work.

4.II.B.2 Minimum wages and education.

Apart from their effect on employment, minimum wages can have effects on the skill formation in society. If minimum wages push the economy towards a higher education level, this might very well off-set any negative first-round employment effects.

Agell and Lommerud (1997) (AL) use a labour market model where employers must pay a fixed amount to install a worker in a job. After installation, the firm captures some part of the product of the worker. This simple model predicts, reasonably, that employers prefer to hire highly productive workers before less productive ones, and that there is a productivity cut-off below which workers will not be offered a job. This seems reasonable, but is in contrast to the predictions of a competitive labour markets model. In this setting a minimum wage is introduced. An increase in the minimum wage will tend to increase the productivity cut-off required to get employers to invest in a worker. Some workers can then be discouraged from trying to gain entry to the labour market, but many will "tip-toe" in order to get in, meaning that they increase their education effort. Under the assumptions of the model, **aggregate education will tend to go up – and this will typically be welfare increasing (only that education can increase too much)**. From an empirical viewpoint, this paper cautions us that we must consider not only the short-term effects of minimum wages (on employment), but also more long-term effects on education and lifestyle.

Abe, Cridelauze and Sofer (1997) (ACS) develop a story where minimum wages can deter investments in training. The starting point is a well-known model by Hashimoto (1981) that considers investment in partially specific human capital and turnover. Hashimoto´s model predicts rising wage profiles with job tenure. In the first part of the relationship the employee implicitly "pays" for the investment in partly general human capital by

accepting a low first period wage. ACS introduces a minimum wage into a variant of this model format. The minimum wage to some extent blocks the employee's possibility of paying for training with a low initial wage – and it is not possible to pay for training by lowering the second period wage either, as this would induce inefficient separations. **The consequence is lower investment in training**. The authors test the implications on data from Japan and France and find some empirical support. The contrast between AL and ACS shows us that relatively small differences in assumptions (for example about what sort of contracts that can be entered) produce conclusions that from a policy viewpoint are wildly different. Careful empirical work seems to be needed.

4.II.B.3 Labour market dualism

Daniel and Sofer (1997) test the relationship between wages and work conditions in France. For the whole economy they find **a negative effect between wages and good working conditions, but for the highly unionised sector a positive relationship applies**. One lesson from this is that when studying wages and employment in an economy as the French one, it would be important to try to use "full" measures of income. Regarding minimum wages, for example, one employer response to a minimum wage hike could be to worsen working conditions rather than firing people. This has, however, not been incorporated in our other empirical studies.

4.II.B.4 POLICY IMPLICATIONS

We have identified serious negative employment effects from minimum wage changes in France for those workers who are actually affected by such changes. We failed to duplicate this finding for the Norwegian system with union bargained sectoral minimum wages.

A full analysis of minimum wages should also study transitions into employment and the effect of a firm's hiring policies. Effects on skill formation and the more long term labour market success of young workers should be taken into account. However, the French evidence seem so strong that we can conclude that this type of minimum wage regime has a negative employment effect. If the redistribution effects of the minimum wage system are beneficial enough still to justify a French type minimum wage scheme, it is outside the scope of this research project.

4.III TRAINING AND LABOUR MARKET FLEXIBILITY

4.III.A - SUPPLY OF TRAINING

4.III.A .1 The definition of 'formal' training

The definition of 'formal' training gives rise to a number of issues which only become apparent in a comparative framework. Usually it is taken to include all planned and purposeful activities which are undertaken within a contract of employment and which are designed to improve individual productivity. Thus, short courses are included, as are apprenticeship programmes and periods of instruction either on - or off-the-job[6]. Using Labour Force Survey data for the UK, Arulampalam, Booth and Elias (1998) show that the distribution of employer-provided training by duration of training is heavily skewed across the age range of employees. Those who experienced long duration training (2-3 years) are likely to be involved in apprenticeship training and are typically aged 17-18 years in the UK. Very short courses (a few day's duration) are more likely to be newly recruited employees in their 20s and 30s. At the national level, therefore, great caution must be exercised in the analysis of information recording the distribution of such training among all employees. For cross-national comparison, the difficulties of comparing like with like increase for a related reason, namely the distinction between *formal* and *informal* training. Two of our papers are directed at this important definitional issue.

Destre, Levy-Garboua and Sollogoub (1999) present a theoretical and empirical study which explores the boundaries between formal and informal training. Elias (1999) explores further the effects of formal various informal employer-provided training, presenting findings from an empirical exploration of the different effect of formal versus informal training on earnings and labour turnover. Using work history data from a survey of 19 and 20 year olds in the UK who undertook a vocational route to the labour market, his study

[6] We use the phrase 'off-the-job' to indicate a spell of training which takes place within a contract of employment, but not as part of the day-to-day tasks associated with that employment.

shows that **informal training ('learning by doing') appears to have no impact upon either earnings or job turnover compared with formal training methods.**

In another strand pursued by the members of this sub-group, Sollogoub and Ulrich (1999) address directly issues related to:

4.III.A .2 The mode of delivery of vocational training.

Their interesting study of French youth examines closely the boundary between vocational training supplied within a contract of employment (apprenticeships) and that which is provided in vocational school. (see also above, section II.A). After adjusting for selectivity bias, the authors conclude that **apprenticeship increases the likelihood of employment during the first years in the labour market but that vocational school raises later earnings more than apprenticeship does.**

4.III.A .3 Government provided training for young people

An important element of the supply of training is the training provided by governments for young people. Work on this project has devoted attention to the description of the history, evolution and process of the provision of this training in the UK. Dolton (1993) described the economics of government intervention in the provision of training for young people in the face of potential market failure and set out the evolution of this provision in the UK since 1964 against the background of deteriorating labour market conditions for young people. The increasing involvement of the state through a series of different schemes (TOPS, YOP, YTS, YT) was accompanied by the demise of the traditional apprenticeship system. In this project the work by Dolton (1998, 1999) brings this description up to date by describing the regional element to this government provision of training and the introduction of the New Deal scheme for young people. These papers also present a preliminary assessment of the effect of these government schemes. Such assessment is plagued by the inherent difficulties associated with the lack of experimental studies with random assignment to the training treatment. The literature is reviewed and the pessimistic consensus in the literature that the UK government training policies have been ineffective is questioned. Indeed Dolton, Makepeace and Gannon (1998) **show that the long run effects of this training can be beneficial – specifically in relation to employment enhancement for women.**

Perhaps the most original contribution of the strand of research which has studied the supply of government provided training is the panel and duration econometric studies of training provision which have used the Youth Cohort Survey data from the UK. This research has used over 110,000 respondents from seven cohorts of young people aged between 16-19 over the 1985-1996 period. This work poses two principal questions. Firstly, how long does state training last – this turns out be a central question of policy importance since most young people who go onto state training do not complete the stipulated duration of the course. Dolton (1999) shows that it is inappropriate to analyse the duration of training with a single hazard exit model and he then analyses a competing risks model of the exit rate and destination state of those leaving state training. In this model it is important to distinguish between exits to a job and exits to unemployment. He shows that the conditional probability of exit from training to unemployment is always higher than the probability of exit to a job but that those who leave training earlier are relatively more likely to exit to a job than those who see out the complete government training spell. The second main question of concern to this research is whether the different forms of the government training intervention (namely YTS in its two different versions and YT) were different in their outcomes. **The results indicate that these programmes were very different in their outcomes** and cannot be treated in econometric terms as if they were identical – as most of the literature has done. **More importantly perhaps those government training policies which had a higher structured training content with a higher degree of compulsion are more effective.**

The use of panel estimation methods in the evaluation of training was also necessary using the YCS cohort data since the data indicate that 15% of government training spells are in fact repeat spells by the individuals who have already experienced a spell in a government training scheme. Dolton, Makepeace, Hutton, and Audas (1999) use a dynamic recursive model of the initial labour market state and all subsequent states to model the process of how young people transit between school, unemployment government training programmes and work. **The results indicate that a poor start, in terms of a period of unemployment or government training is difficult to overcome.** Clearly a person's educational and personal history is important in conditioning the probability of their successful transition. **However it is also demonstrated that a proportion of the 'blame' for difficult or problematic transitions histories is due to the individual's family**

circumstances, or the exogenous factors which they experience. More specifically - when or where they were born, and the unemployment rates they experience in their local and regional labour market. This report goes on to detail how the local and regional prospects of young people differ remarkably from depressed areas in the north of England to some of the prosperous regions of the south east.

4.III.A .4 The role of young people's wage expectations

A separate research paper (Dolton (1997)) examined the role of young people's wage expectations in the process of attempting to transit between school and work. The paper derives non-parametric estimates of the elasticity of unemployment duration with respect to the reservation wage and the elasticity of the reservation wage with respect to the benefit level. The paper then specifically develops a three state theoretical model of optimal transitions adapted from the literature and estimates the relevant transition equations using the YCS data. Explicit use is made of excellent reservation wage questions asked in the surveys. The results of this paper indicate **that young people are not unemployed because they are holding out unrealistic expectations of the wages they are worth in the labour market. Rather the results suggest that the length of their unemployment duration is more likely to be conditioned on the available supply of jobs and training places.**

4.III.A.4 – POLICY IMPLICATIONS

In summary, we have made significant advances in our understanding of the changing nature of employer and government involvement in the transition from school to work. We are aware of the difficult problems of cross-national comparisons, not just in terms of the definition of work-related training but also the profound institutional and historical differences in the modes of provision, scale and funding of such training. Certain key results should be singled out for mention here. First, Sollogoub and Ulrich (1999) show that accreditation for training is crucial for its success. This finding relates to the transferability of training, which in turn underpins to the issue of funding. Employees are not (and arguably should not) be exhorted to use their resources by increasing their efforts to train employees on accredited courses if the skills learnt are transferable. Second, Elias (1999) shows that employer-provided training needs to be delivered via formal (i.e. planned, organised) programmes if it is to be successful in raising earnings and decreasing mobility. Third,

Dolton (1999) shows that not all government training schemes are identical and cannot be treated as such and particular attention needs to be reserved for modelling training durations, repeat spells in government training and the complexity of different exit states from training in the school to work transition process.

The strength of our findings was enhanced via the opportunity we had to engage in cross-national dialogue and debate. The sharing of ideas, theories, data resources and methodologies contributed greatly to the development of our research in this area.

4.III.B – TURNOVER AND FLEXIBILITY

4.III.B.1 Mobility and Wages

Véronique Simonnet proposes an original measure of the effects of job mobility on wages using German (German Socio-Economic Panel) and American (National Longitudinal Survey of Youth, 1984-1993) panel data. This is a long-run evaluation, controlling for the evolution of labour market conditions, and taking into account the heterogeneity between movers and stayers. The two basic assumptions are as follows. First, to capture the full effect of worker displacement, it is necessary to evaluate the wage path over a number of years previous to the job separation. Second, a direct comparison between movers and stayers may lead to a downward bias in the estimated gains to mobility, given that observed behaviour depends on individual expectations regarding current and alternative jobs. Since bad (good) pairings are more (less) likely to end, the author uses the quality of the match (estimated, using a within regression, as the difference between the current wage and the reference wage) as an instrument to evaluate the quality of firm-worker matches, and to compare the quality of consecutive pairings.

The results confirm the consistency of the method used, as the return to mobility depends less on the observable characteristics of matching than on unobservable factors (which validates the use of within estimation methods). Furthermore, the comparative analysis between German and American workers reveals substantial differences in the effects of job mobility on wages. In both countries **cumulative job mobility has a negative effect**

on wages, but the results are stronger in Germany, where a negative effect of mobility appears after only two job changes, while in the USA a representative worker obtains positive wage returns in the first six job changes. This result is consistent with the observed fact that American workers are more mobile than German workers. Looking at the reason for the end of the match, in the United States those who quit obtain, on average, a positive wage return, while in Germany no difference (in terms of wage effects) is found between quits and layoffs.

4.III.B.2 Job Matching Technology and Temporary Contracts

Barbara Petrongolo explores returns to scale in the matching technology between unemployment and vacancies, using individual data from the British survey "In and Out of Work" (these data refer to 1987 and 1988). This approach is a novel one as most previous studies have used aggregate data. Two different duration models are used to test the hypothesis of constant returns in matching: a full parametric hazard rate with Weibull time dependence and Gamma unobserved heterogeneity, and a Cox proportional hazard which does not impose a particular form for the baseline hazard. Both specifications produce fairly consistent estimates.

The results obtained by Petrongolo are generally consistent with the pattern of job search and with previous results concerning re-employment probabilities for both men and women. The probability of receiving a job offer is positively correlated with individual education and local labour market demand for men. However, no local labour market effect is found in women's re-employment probabilities. Weibull estimates, with and without Gamma heterogeneity, reveal negative duration dependence in the hazard rate. The Cox specification shows that **the absolute size of the searching pool does not affect matching rates, so the data do not reject the hypothesis of constant returns in the U/V matching technology**.

Güell-Rotlan and Barbara Petrongolo examine the determinants of the renewal of fixed-term contracts into permanent contracts in Spain. The purpose of the paper is to evaluate the effects of the introduction of temporary contracts (in 1984) on the Spanish labour market over a ten-year period (1987-1996). The data base used is the matched EPA which follows each individual for six consecutive quarters.

The main findings are that the probability of obtaining a permanent contract is positively correlated with individual's human capital, and that the share of fixed-term contracts has increased monotonically over the decade analysed, and seems independent of the Spanish business cycle. Interestingly, **the Spanish labour market experienced record rates of gross job creation over this decade, but seems to have evolved into a dual system**, with two-thirds of wage earners retaining permanent status and the remainder working in a highly mobile temporary labour market where the unemployment rate is still over 20%.

4.III.B.3 Job Creation and Destruction

Kjell Salvanes, and Kjell Salvanes and Svein Forre, in two connected papers, examine the creation, replacement and destruction of jobs at the plant level in the manufacturing and financial (banking and insurance) sectors, using a unique Norwegian linked employee-employer data set. The analysis controls for the heterogeneity of workers by sex, age group and education levels, and the heterogeneity of employers according to plant size, technological level and the number of plants which the company possesses.

Kjell Salvanes' work shows that that gross job turnover (hiring plus firing) increases with education; this result is driven by job creation rather than job destruction. However, there is evidence of an asymmetric inverse U-shaped relationship between turnover and general education (the churning rate – the rate of replacement of workers for a given number of jobs - is highest for medium-educated workers, next highest for the less-educated, and lowest for the highly-educated). The sectorial analysis reveals a lower level of churning in the financial sector (as workers have higher average education in this sector). No significant gender effects in gross turnover are found. Young workers have higher churning rates, but there is no evidence that young women have higher turnover than young men. We would expect young women to have a higher churning rate than young men, as extended maternity leave by the former counts as churning; one explanation of the lack of a gender difference is that young men do more "job shopping" than do young women. The share of women in the plant's labour force positively correlated with the replacement rate. The rest of the proxy variables for plant-specific human capital show the expected signs. In particular, average tenure and experience are negatively correlated with the plant’s replacement rate.

Concerning the cyclical effects of jobs flows, job replacement is found to be pro-cyclical, indicating that quits dominate layoffs, while job destruction is counter-cyclical.

In the second of these papers, Kjell Salvanes and Svein Forre examine the net and gross job creation and destruction rates by different worker skill levels and plant types in more depth. The goal is to evaluate the trade and technology explanations for changes in the skill composition of the workforce. A strong substitution effect away from low-skilled workers towards medium-skilled and (especially) highly-skilled workers is found, in both the manufacturing and financial sectors. Job destruction rates by skill level are similar, so this difference comes from job creation. In other words, low-skill jobs are not disappearing faster than jobs of other skill levels, but the new jobs created (by both new and existing plants) are overwhelmingly of the higher-skill type. A positive correlation is thus found between workers' skill level and the innovation and technological characteristics of firms. A comparative analysis shows that the largest changes in skill composition have taken place: (i) between plants rather than within plants; and (ii) in established plants, although the entry and exit of plants has also generated significant worker flows. Salvanes and Forre conclude that **there is strong evidence of skill-biased technical change as an explanation for the observed change in the skill composition of the workforce. However, unlike a number of previous studies, they also find that trade has played a significant role, in that plants exposed to greater import competition have experienced higher rates of job displacement.**

4.III.B.4 Training and Mobility

Cañada-Vicinay considers the relation between training, tenure and mobility. The hypothesis tested is that professional training investment is always highest at the start of a spell of employment, but that training investment declines with the number of jobs previously held (*i.e.* training is lower in the second job than in the first, lower in the third than in the second, and so on). To test this hypothesis, a wage function is estimated with work experience split into consecutive (two or three) spells of employment, allowing a time profile of post-schooling investments that increase productivity and wages in the present job to be inferred. The comparison of the theoretical and estimated investment profiles provides an indirect measure of the part of specific training that is lost with job mobility. Three methods

are used: the two-spell earnings functions at the firm level estimated by Abraham and Medoff (1980); the author's own two-spell models estimated on French data (*Enquête des Conditions de Vie*, INSEE 1987); and an application of two- and three-spell models using Spanish data (*Encuesta de Discriminación Salarial de las Mujeres 1988)*.

The two-spell model is found to contain enough information to measure the specific human capital loss due to job mobility. **The comparative analysis shows that the time profiles inferred from the three different approaches have the same shape, although their levels are quite sensitive to the scope and to the specification of the earnings function**. The global market approaches for French and Spanish data show (much) higher levels than the firm approach of Abraham and Medoff. The descriptive specifications exhibit lower and flatter profiles than basic models for each sample. This comparative analysis leads us to examine the contribution of the general and specific components of professional skills to earnings, and the contribution of other factors, in particular those related to mobility returns that should be measured using search and matching models.

4.III.B.5 Internal Mobility

Dolores García-Crespo analyses the internal mobility of men and women, from the perspective of gender differences in promotion probabilities. The author makes novel use of a count data model and develops an application of the Oaxaca decomposition method to evaluate the relative contributions of differences of productivity and discrimination in explaining the lower promotion rate of women. The cross-section analysis is carried out using a Spanish data base (*Encuesta de Biografía y Conciencia de Clase 1991*) which includes biographical information at the ages of 25, 35 and 45.

The econometric analysis shows that a negative binomial model (such as a count data model) is an appropriate tool. **The results show that formal education and tenure are positively correlated with promotions, and that these effects are greater for women than for men. This result is important since it is consistent with the above-mentioned complementarity between general education and training which predicts that more educated workers should exhibit more successful careers and should match to positions**

with more job-specific skills. The analysis of discrimination reveals that gender is a relevant factor in determining promotions. Women are shown to receive fewer promotions than men with the same skills; discrimination is estimated to account for around 44 % of the observed gender difference in promotion probabilities.

The next two topics deal with the question of the quality of the match between the employer and the employee.

4.III.B.6 Job Satisfaction and Quits

The first two papers use European panel data to look at the relationship between workers' reported levels of job satisfaction and their future quit behaviour. Andrew Clark, Yannis Georgellis and Peter Sanfey use data (pertaining to the old West Germany only) from the first ten waves of the German Socio-Economic Panel (GSOEP), covering the period 1984-93. The sample is large, including 10750 and 7858 observations on 2459 and 2051 male and female respondents respectively (each individual is observed repeatedly, up to a maximum of ten times over the sample period). Job satisfaction data are obtained from the response to the question *"How satisfied are you today with your job?"*, respondents giving an integer response on a scale of 0 to 10, with 0 representing the lowest, and 10 the highest, level of job satisfaction.

Multivariate regression analysis (using a probit model as the dependent variable is binary: either a worker quit their job, or they didn't) is used to single out the relationship between job satisfaction and quits, holding a large number of other individual and job characteristics constant. In other words, imagine two workers of the same sex, age, education, region, with the same job tenure, wages and hours, in the same industry and occupation, and so on. Is the worker with a higher job satisfaction score less likely to quit than their "identical" counterpart with lower job satisfaction score?

The statistical results show that **workers who report dissatisfaction with their jobs are statistically more likely to quit that job in the future than are those with higher levels of satisfaction. This result is remarkably robust to specification changes**. This result is equally strong for men and women. By way of contrast, the workers' wages turn out

to be a not at all strong predictor of quits. One of the conclusions is thus that income seems to offer an incomplete picture at best of what determines worker behaviour in a job, as measured by the decision to leave it voluntarily or not. Another is that what workers say about their jobs in cross-section data seems to contain a wealth of information that is not picked up by standard survey measures of the characteristics of workers or their jobs.

The second paper, Clark, continues the analysis of job satisfaction and future quits, using detailed labour market spell data from the first five waves of the British Household Panel Survey (BHPS). The BHPS covers a random sample of approximately 10 000 individuals in 5 500 British households. The first five waves cover the period late 1991 to late 1995. Respondents in employment (around five thousand per year) initially rate their satisfaction levels with seven specific facets of their job (promotion prospects, total pay, relations with supervisors, job security, ability to work on one's own initiative, the actual work itself, and hours of work), and were then asked a final question, about their overall job satisfaction. All eight of these satisfaction measures are on a one to seven scale, where one corresponds to "not satisfied at all" and seven corresponds to "completely satisfied".

The innovation of this paper is to show that certain types of job satisfaction predict quits much better than do others. It is argued that, from this information, an index of "what matters to workers in their jobs" can be derived. **Satisfaction with the work itself turns out to be the best predictor of quits for the whole sample,** for men and women separately, and for the young. The second best predictor is satisfaction with pay, relations at work and initiative for men, women and young workers respectively. Initiative seems to matter more for young workers than for others. It is noticeable that satisfaction with job security is the least important facet of a job (in the sense of predicting quits from that job) for women. Last, satisfaction with hours of work, which is the worst quit predictor for the young, is second-highest for middle-aged workers, and highest for older workers.

The determinants of a good job match, as measured by job satisfaction, seem therefore to depend on what one does, and with whom one does it, rather than on pay and hours of work. This is an important finding for those interested in studying turnover in the labour market. In addition, the determinants of a good match differ by sex and by age: a

job that represents a good match for one group of workers will not necessarily do so for another.

4.III.B.7 What causes job satisfaction?

Given that job satisfaction is an important labour market variable, in explaining both productivity and turnover, it is of interest to ask what brings it about. Andrew Clark above inferred from quit data that some aspects of a job seem to matter more than others. A more direct way of finding out about the determinants of a good job match is to analyse job satisfaction responses directly. This is the approach taken by the first two papers in this section.

Wim Groot and Henriette Maassen van den Brink (STT Working Paper 10-98) use the first wave (1991) of the BHPS to address three questions: Why do women report higher levels of job satisfaction than men?; What is the relation between wages and job satisfaction?; and What is the relation between education and job satisfaction? To address these questions, the authors consider that job satisfaction is a function of wages, skill match, and job and individual characteristics. The wage is itself is also modelled as a function of job and individual characteristics, as well as the skill match. Wages and job satisfaction are thus jointly modelled. A variable of particular importance is the skill match, which is calculated using the individual's years of education compared to the average years of education in the individual's (two-digit) occupation. This allows individuals to be classified as over-educated, under-educated, or correctly educated.

The empirical results show that women are more often correctly matched (in terms of education) than are men. Women also seem to value aspects of a job, such as relations with others, that are easier to achieve than those valued by men (such as pay and career). Both of these reasons seem to lie behind women's higher levels of job satisfaction. Job satisfaction is also shown to be higher for those who are correctly educated or under-educated than for those who are over-educated; this helps to explain why job satisfaction amongst the higher-educated is not necessarily higher. **Last, earnings are shown to be a more important predictor of job satisfaction for men than for women**.

Louis Lévy-Garboua and Claude Montmarquette present a new, dynamic, model of job satisfaction, which is considered to be an expression of posterior choice: given what I now know, would I still accept my current job? This evaluation is argued to be inherently relative, as one compares what did happen with what one expected to happen when the current job was chosen. Individuals are argued to be satisfied with their job if the discounted sum of these evaluations, both in the past and the expected value in the future, is positive. Put alternatively, workers are satisfied with jobs which have lived up to (or have exceeded) expectations, and which are expected to continue to do so in the future. If there were no uncertainty, then all individuals would be satisfied with their jobs (they wouldn't have accepted them otherwise); it is the appearance of "surprises", both pleasant and unpleasant, which explain the diversity of job satisfaction responses.

This hypothesis is tested using information on just over two thousand workers from the 1986 Canadian General Social Survey. The estimated empirical results are consistent with job satisfaction resulting from a weighted sum of evaluations of the job compared to the best alternative. This sum is determined with respect to both what has happened in the past and to what is expected to occur in the future.

Last, Louis Lévy-Garboua, Claude Montmarquette and Véronique Simonnet relate the theory of job satisfaction developed in Lévy-Garbou and Montmarquette's paper above to quit behaviour, using data on men aged 25-40 from the first eleven waves (1984-1994) of the GSOEP. The underlying idea is very simple: the individual will leave his firm if the expected benefits of leaving are greater than the benefits of staying plus the cost of mobility. To test this model, information on expected future net benefits must be obtained. The authors obtain this from reported job satisfaction, which, according to Lévy-Garboua and Montmarquette, provides an evaluation of past experience in the job and of the likelihood that it will remain the best job in the future. The part of job satisfaction associated with past experience is thus subtracted from the overall measure to calculate the future job satisfaction component. This latter is argued to be the key variable in determining quit behaviour.

Panel data allow job satisfaction to be modelled as a function of past "wage rents" (the wage the worker received minus the wage that they could have received elsewhere). The

residual from this equation is then considered as the future component of job satisfaction. Finally, this latter is used as an explanatory variable in a quit equation. **The results show that the expected future value of the job match (compared to the other jobs which the individual could have) is a very significant predictor of quits; what has already happened in the job match is something like a sunk cost and will not affect future behaviour.**

4.III.B.8 POLICY IMPLICATIONS

This part of the project has taken a new look at the widely-addressed question of turnover in the labour market. The results regarding job mobility have a number of policy implications. First, as a number of authors have stressed, turnover is in itself not necessarily a bad thing. In a world of imperfect information, firms and workers are able to achieve better matches by engaging in job or worker shopping. This kind of turnover therefore allows better quality job matches to be achieved. The positive wage returns to workers from a certain amount of job mobility found in Véronique Simonnet's paper can be construed as evidence in favour of this hypothesis. Unfortunately, no data exists which would allow the same calculation to be made from the firms' point of view (a certain amount of worker replacement leads to better quality matches, either measured by higher productivity and wages, or by a longer duration of the match).

The analysis of turnover in the labour market has revealed the importance of education in understanding labour market flows. First, the better-educated seem to obtain more training, and, in general, obtain better jobs. Their re-employment probabilities are greater than those for workers with lower levels of education, and they are more likely to obtain permanent jobs. In this sense, the training and education of workers should yield appreciable dividends.

The careful analysis of turnover by different levels of education in Kjell Salvanes and Svein Forre's paper showed, however, that job destruction rates are not noticeably different by workers' skill level, whereas job creation rates are higher for better-educated workers. If these results can be generalised, they suggest that measures to dissuade firing will not necessarily benefit lower-educated workers any more than they benefit other workers.

Lower-educated workers are doing poorly in terms of hiring, not firing, and policy to aid them should therefore concentrate on increasing their skill levels. Alternatively, policies may be imagined which increase the demand for lower-skilled workers, such as wage subsidies.

It is also of interest to ask what has been behind recent changes in the skill composition of the workforce that have been seen to be unfavourable for the lower-skilled. Salvanes and Forre have shown that, in line with a number of other studies, skill-biased technological change is one of the key explanations. However, unlike some other investigations, it has also been shown that trade patterns have a role to play in determining the demand for workers of different skill levels. This suggests that both the rate of technological change and the structure of international trade provide information about likely future developments in the skill requirements of the labour market. This should inform the debate on the advantages and disadvantages of trade policy, and allow governments to prepare appropriate labour market and education policies in the light of trade developments.

A number of papers in this section have presented turnover as an indicator of a poor match between the worker and the firm. The novelty of the papers produced lies in their use of job satisfaction data as a direct measure of the quality of the match in the labour market. Various of them (Clark; Clark, Georgellis and Sanfey; Lévy-Garboua, Montmarquette and Simonnet) have shown that various measures of job satisfaction, available in European panel data, are very strong predictors of future quit behaviour. Economists typically study turnover as a function of a wide range of individual, job and macroeconomic variables (the job variables including industry, occupation, wages, hours and so on). The fact that the correlation between job satisfaction and quits is found holding all of these other standard variables constant underlines that job satisfaction responses contain useful information about future individual behaviour above and beyond the variables that are usually analysed.

The second part of this section then asked the question "What brings about job satisfaction". Wim Groot and Henriette Maassen van den Brink (STT Working Paper 10-98) showed that satisfaction is indeed partly determined by the quality of the match, measured here as the match between the worker's education and the education level that the job

requires. Lévy-Garboua and Montmarquette then took a long-term view of job satisfaction, arguing that it is a function of both past job-related benefits and of the expected relative benefits of the job in the future. Again, both papers argue against a simplistic view of the quality of the job match (which is here argued to be measured by job satisfaction) as a function of current wages and hours of work only. It thus important to take into account explicitly measures of how well the individual fits into the job, and to consider jobs as flows of experience over time.

The determinants of a good job match, as measured by job satisfaction, seem to depend strongly on what one does, with whom one does it, and what one expected, as well as on more standard measures like pay and hours of work. This is an important finding for those interested in studying turnover in the labour market. In addition, the determinants of a good match differ by sex and by age: a job that represents a good match for one group of workers will not necessarily do so for another.

Last, the work on job satisfaction or the quality of the job match have shown that, in general, many factors, other than wages and hours of work, are important. Jobs are much more complex than many economic studies suppose. In terms of policy implications, this implies that policy to encourage better quality matches needs to target a wide variety of aspects of the job, rather than just aiming at raising workers' productivity. In light of the ranking of job characteristics established by Andrew Clark, policy aimed at those who have difficulty in establishing long-term matches in the labour market (the unemployed and the low-skilled, particular), requires measures addressing not only their low productivity, but also the content of the jobs which these workers find, their ability to use their initiative, and the establishment of good relations with co-workers and managers.

4.III.C – LABOUR FORCE GREYING

4.III.C.1 The causes of the decline in labour force participation of older workers

To analyse the causes of the decline in the labour force participation of older workers, we have to look both at the demand side of the labour market and at the supply side. If we look at the demand for labour the emphasis is on the relative productivity of older workers. The general idea here is that at older ages productivity declines or at least no longer increases. As wages of older workers continue to increase and are not adjusted downwards, older workers become relatively unproductive. The relation between productivity and wage costs also becomes more unfavourable, as older workers tend to be absent from work because of sick-leave more frequently than younger workers. The theoretical underpinning of the notion that older workers earn more than their value of marginal product is to be found in the work of Lazear (1979) and Lazear & Rosen (1981).

Taken from the supply side of the labour market we should emphasise the increased availability of pension plans and early retirement schemes. The institutional early retirement schemes that were introduced in some countries during the beginning of the 1980s when unemployment was high, can be seen as the major explanation of the decline in the labour force participation of older workers. Early retirement of older workers was at the time seen as a way to create job opportunities for young people. **An important effect of these early retirement schemes has been that it has changed the preferences for leisure over work of older people. The expectation of earlier retirement that these institutional arrangements have produced may perhaps not be an ever lasting legacy, but will surely prove difficult to change again.**

The generosity of the various formal and informal early retirement schemes are an important contributing factor as well. In Norway the replacement rates for the disability and unemployment insurance schemes are 62-80% of last earned gross income (Dahl, Anti Nilsen & Vaage 1998 and Tysse & Vaage 1998). In the Netherlands the replacement rates for these schemes are 70% of last earned income. Because of the working of the tax scheme, for most people early retirement means only a small drop in income. These generous replacement rates have made the option of early retirement an offer most older workers can and will not refuse.

In their analysis of early retirement in Norway, Dahl, Nilsen & Vaage (1998) conclude that there are both push and pull factors that affect early retirement. **Push factors, such as the unemployment rate and industry variables, have a significant effect on early retirement. A pull factor like income appears also to be of importance in determining the transition out of the labour force.**

4.III.C.2 Changes in educational attainment of older workers

One of the most remarkable social developments of the past decades in all western countries has been the increase in the educational level of the population. This increase is best illustrated by comparing the educational attainment of different age groups. As can be seen in Table 2, of the population in OECD countries aged 55-64 years in 1992 about 38% has attained at least upper secondary education. Of the population aged 25-34 years 65% has at least completed upper secondary education: an increase in the share of the population with at least higher secondary education of more than 70% in less than thirty years time.

Table 2 Persons having attained at least upper secondary education by age groups (in %), 1992

	25-34 years	*35-44 years*	*45-54 years*	*55-64 years*
Austria	79	71	65	50
Belgium	60	52	38	24
Denmark	67	61	58	45
Finland	82	69	52	31
France	67	57	47	29
Germany	89	87	81	69
Greece	52	39	26	17
Ireland	56	44	35	25
Italy	42	35	21	12
Netherlands	68	61	52	42
Norway	88	83	75	61
Portugal	21	17	10	7
Spain	41	24	14	8
Sweden	83	76	65	48
United Kingdom	81	71	62	51
OECD average	65	58	50	38

Source: OECD (1995), *Education at a Glance*, OECD, Paris

Despite the increase in the educational level of the older work-force, older workers are still less likely to participate in on-the-job training than younger workers. The figures in Table 3 illustrate this.

Table 3 Participation in enterprise-related training as a percentage of the employed labour force aged 25-64 years, by age group

	year	age 25-34	age 35-44	age 45-64	total
During the 12 months prior to the survey					
Canada	1991	32	35	23	30
Finland	1990	51	49	40	46
France	1992	43	27	11	27
Germany	1991	33	29	21	27
Netherlands	1990	...	...	...	34
Norway	1991	40	42	30	37
Sweden	1993	36	33	41	36
Switzerland	1993	42	41	34	38
United States	1991	37	43	33	38
During the 4 weeks prior to the survey					
Denmark	1991	17	17	11	15
Ireland	1992	5	4	2	4
Spain	1992	6	2	1	3
United Kingdom	1992	12	12	8	11

Source: OECD, Education at a Glance 1995, CBS Enquête Bedrijfsopleiding, 1990

4.III.C.3 Labour market flexibility of older workers

Current socio-economic policy debates, especially those in Europe, are to a large extent dominated by the belief that the labour market should become more flexible. Investments in human capital - such as education and on-the-job training - are seen by many as a tool to improve labour market flexibility (see, for example, OECD 1995). Two types of labour market flexibility can be distinguished: internal flexibility and external flexibility. Internal flexibility refers to the employability of workers (i.e. the number of tasks a worker can be assigned to, or the amount of assistance needed in the job) and to promotion from one job to another within the firm. External mobility can be distinguished into job to job mobility (change of employers) and exit routes from the labour market (into early retirement, disability, unemployment, non-participation, etc.).

The human capital theory leads one to expect that investments in education and training increase internal mobility but reduce external mobility. Human capital makes workers more employable and therefore increases internal mobility. This holds both for investments in general and firm-specific human capital. Investments in specific human capital also increase the opportunity costs of job to job mobility and transition out of the labour market, which lower external mobility: if the costs and benefits are shared, investments in firm specific human capital strengthen the employment relation.

Mincer (1991) argues that workers with more years of schooling are better at finding their most suitable employment and therefore have lower job to job mobility rates. Investments in general human capital are thus expected to decrease external mobility. The empirical evidence on the effects of general human capital on external mobility is mixed: some studies (e.g. Börsch-Supan 1990) find that higher educated workers have lower job turnover, while others find that education has no effect (Groot 1996, Groot & Verberne 1997, Lindeboom & Theeuwes 1991 and Mekkelholt 1993).

There is less ambiguity about the empirical evidence on whether higher educated workers are more likely to participate in the labour market (see for example, OECD 1996). The empirical evidence on the effects of education on retirement from the labour market is, on the other hand, less clear (see Hebbink, Kerkhofs, Theeuwes & Woittiez 1996).

If the worker contributes to the costs of it, investments in firm specific human capital are supposed to reduce the workers' quit rate (Oi 1962). In empirical studies it is generally found that on-the-job training reduces job to job mobility (Lynch 1991, Groot 1996, OECD 1993).

With respect to the relation between education and internal flexibility the available empirical evidence is again somewhat mixed: some studies find that more education is associated with higher promotion rates (see, McCue 1996), while others find that the effects are not significant (Groot 1996b, Groot & Maassen van den Brink 1996 and Lewis 1986). It is also found that on-the-job training increases the probability that one has a job that offers promotion opportunities, but conditional on being in a job offering promotion - i.e. jobs in an internal labour market - trained workers are not significantly more likely to receive promotion (Groot & Maassen van den Brink 1996).

Education and training are expected to make workers more employable within the firm. Greater employability increases internal flexibility, in particular if training takes the form of 'multi skilling': skills that enable workers to perform multiple tasks. Higher educated and trained workers are supposed to be more employable, i.e. they can be employed into more jobs within the firm and they need less supervising in their work. Empirical evidence for these hypotheses, however, is lacking.

Age is one of the most important factors that determine external mobility patterns. Job to job mobility among older workers is much lower than among younger workers, resulting in longer average tenure for older workers. Several reasons can be given for the decline in turnover with age. If we concentrate on supply side determinants and ignore institutional arrangements and causes that originate from the demand side of the labour market, several reasons can be distinguished.

The first argument stems from the human capital theory. Over the years, workers accumulate firm specific human capital, resulting in a firm related productivity gain. Changing jobs - and thus having to start all over again in a different firm - is likely to reduce the productivity - and consequently the wage - of the employee, because specific human capital accumulated at the old firm will be of little or no use in the new firm. More firm specific training therefore lowers mobility by raising the wage in the current job relative to the wage obtainable in another firm. If older workers have longer tenures and therefore more firm specific human capital than young workers, the wage gains of job to job mobility will thus be lower for older workers (Mincer 1962).

A second argument is provided by the job matching theory (Jovanovic 1979). If the quality of the match between employer and employee is not observable a priori, the job match is more of an experience good than an inspection good. Ex post observation of the actual productivity in a certain job may result in an adjustment of the (initial) rewards. Total compensation will increase if the match seems to work out. Assuming that long tenures reflect a good match between the worker and the firm, match specific rents may impede job mobility for older workers (with long tenures).

Another reason why firms and workers may not want to change partners is because they have engaged in an implicit contract with seniority wages (Lazear 1979). Such a contract involves a wage profile which is steeper than the productivity profile. Older employees with longer tenures are reaping the benefits of these contracts, because for them the wage will have risen above their productivity. This means their wage will be above the wage they would be able to get in another firm, therefore reducing the probability of a job change.

All of these theories predict an increase in compensation with tenure and age (i.e. a rising compensation for the worker that stays in the same job/with the same employer). Empirical evidence that wage gains - attributable solely to the increase in tenure - exist, is provided in Topel (1991). All this however puts a strong emphasis on the financial components of the compensation a worker gets and ignores the fact that workers can also obtain (positive or negative) utility from other aspects related to the job.

Another relevant issue is the mobility costs. Mobility costs are the costs due to the actual change of jobs. They contain financial and psychological costs directly related to the switch. Older people are probably more attached to their environment, have friends and family nearby, and may have invested in housing. As a result the switching costs are likely to be higher for them. **As older people have on average longer tenures they will have a stronger (emotional) relationship with their colleagues and employer, which will also make them less inclined to mobility.**

It must be noted that even if the switching costs are the same for the young and the old, older employees will have less working life left to make up for those mobility costs. This brings us to a final important point, the discount factor. Mobility costs are incurred only directly after the switch, as opposed to the financial and/or utility gains (or losses). The latter accrue to the employee in each of the remaining periods until retirement. This means that in

calculating the present value of the net gains or losses involved in the switch, the obtainable wage and utility differentials will have to be multiplied by an appropriate discount factor, which will be determined by both the number of remaining years in the (new) job and the discount rate. It may be expected that the differentials will be more heavily discounted by older workers. First because they have less remaining years to reap the benefits, but also because older workers may have higher time preferences and therefore a higher discount rate. **So, for older workers both factors are expected to diminish the value of future gains.**

There are some empirical studies that look at the changes in mobility patterns over the life-cycle. Using data for the Netherlands, Groot & Verberne (1997) explain why mobility rates decline with age. They disentangle the effects of the benefits and the costs of job mobility. They not only assume that job mobility is determined by wage differentials between jobs, but also take into consideration differences in working conditions.

The results show that all factors which determine job mobility become more unfavourable towards a change of jobs when the worker gets older. The simulation results show that the cost of mobility increase when the worker gets older. The parameter estimates of the structural model indicate that this is a tenure effect rather than a pure age effect. Tenure increases the cost of job mobility. As a result older workers with longer tenures have higher costs of mobility.

In Altonji & Shakotko (1987) it is found that an accumulation of ten years of tenure in a job is responsible for an increase in wages of less than 7%. The tenure coefficients in Groot &Verberne (1997)indicate that the cost of mobility increases by 0.3% per month for men and 0.9% for women, implying that over a ten year period the cost of mobility increases by 36 to 108%. That the increase in cost of mobility over a ten year period dominates the wage increase, may explain why job mobility rates decline so rapidly with age: **fairly soon in the life-cycle it seems, workers get moulded in their job and the costs of mobility exceed the benefits.**

Groot & Maassen van den Brink (1999a) look at the issue of internal flexibility, i.e. employability of workers within the firm. Employability is operationalised in two ways in this paper. First by the extent to which the worker can be assigned to other jobs or departments within the firm. This is referred to as ‘employability’ in the strict sense.

Secondly employability is measured by the way small problems at work are solved. This latter variable can also be seen as an indicator for productivity: the costs of production are less if workers do not need others to help them with small problems compared to a situation where they need colleagues or supervisors to assist them.

It is found that older workers with more work experience are more likely to solve problems on their own and less likely to do so with colleagues or with the help of a supervisor. The marginal effect of a year of tenure on the probability that problems are solved with the help of colleagues is 0.4%. The marginal effect of experience on the probability of solving problems on your own is 0.5% (-0.42% on the probability that problems are solved with colleagues and -0.6% on the probability that help of supervisor is needed).

4.III.C.4 The relation between wages and productivity of older workers

Two theories on the relation between wages and productivity over the working life can be distinguished:

- The theory of deferred payment or seniority wages (Lazear 1979 and Lazear & Rosen 1981);
- The human capital theory.

The seniority wage theory and the human capital theory yield opposing predictions on the relation between wages and productivity of older workers. If the costs and benefits of firm specific training are shared between the worker and the firm, the human capital theory predicts that for workers who have received training the value of productivity will exceed wages. The difference between productivity and wages will be the part of the productivity gain of training that is retained by the firm to cover its part of the training investment.

According to the theory of seniority wages firms retain part of the wage of workers at younger age in order to provide an incentive to maximise effort levels. Workers who remain in the firm receive this retained wage at an older age. This is done in the form of pay increases that are independent of changes in workers' performance. Consequently workers receive less in wages than they are actually worth at younger ages, while wages are higher than the value of productivity at older ages. An implication of this reward system is that employers may find it profitable to terminate the employment contract for older workers.

An obvious measure that avoids older workers becoming unprofitable for employers is demotion accompanied by a wage reduction for older workers.

There is little empirical evidence available on the relation between wages and productivity. However, a survey of the literature on the relationship between direct measures of job performance and age by Warr (1994) **concludes that there is no significant overall difference between the job performance of older and younger workers**.

There is also evidence available on the implications of the seniority wage and human capital theories, i.e. on the effects of on-the-job training for older workers and on the effects of demotion of older workers. In Groot & Maassen van den brink (1999b) it is found for the Netherlands that:

- Demotion is not a very common phenomenon: for only 5% of the workers aged 55 and older the last change of jobs within the firm was to a lower level job;
- Demotion is usually not accompanied by a reduction in wages. Most workers who have been demoted kept their original wages. For only 35% of the workers the demotion was associated with a reduction in wages;
- Reduced performance because of ageing of the worker is not very often mentioned as a reason for demotion. Health problems and the threat of dismissal are the most common arguments for demotion;
- Demotion leads to a significant reduction in job satisfaction. Demotion demotivates workers. Workers who have changed to a lower level job are especially dissatisfied with the work conditions and with the content of the job;
- Demotion does not result in workers wanting to participate longer in the labour market.

Especially the two latter findings warrant the conclusion that the advantages of demotion are very small. Demotion has more drawbacks than advantages and does not seem to be a solution for the low labour force participation rate of older workers.

Age-earnings profiles in most countries are inversely U-shaped. This is consistent with the human capital interpretation of wages over the life-cycle. Wages decline at older ages because of the depreciation of human capital or a decline in productivity because of biological ageing. However, in OECD (1998) it is argued that after controlling for education age-earnings profiles no longer slope downward later in the working life (OECD 1998, p.132).

In all countries investigated in OECD (1993) age-tenure profiles are positively sloped up to the age of approximately 55. After this age different cultural and institutional factors (like early retirement schemes) cause divergence of the age-tenure profiles, for some countries resulting in a decrease of average tenure with age. Countries with lower mobility rates display steeper age-tenure profiles (again up to 55), implying an even longer average tenure for older employees. Evidently, job to job mobility varies substantially with age. With most of the life-time mobility occurring early during working life, older people tend to have relatively stable relationships with their employers.

4.III.C.5 POLICY IMPLICATIONS

The low labour force participation of older workers is a cause of growing concern. There are several reasons why the low labour force participation rate of older workers is an increasing problem. Firstly, because of demographic changes the share of older people is increasing. At the same time the number of younger people is in some countries declining in absolute numbers. In some countries these two trends have resulted in tensions on the labour market and an increase in difficulties in filling vacancies and a marked decrease in the unemployment rate. As these demographic processes will continue for some time to come, it is important to increase the labour force participation rates in order to ease the tensions on the labour market. A second - and related reason - has to do with the financing of social security. With the greying of the population more and more people rely on social security benefits for their income. In most countries the social security benefits are financed through a pay-as-you-go system. With the decline in the number of young people who pay premiums and taxes for social security benefits and the increase in the number of social security claimants, it becomes more and more difficult to sustain the current social security system. An increase in the labour force participation rate of older workers would lower the number of claims by people who would otherwise have to rely on social security, while at the

same it increases the number of workers who contribute to financing the social security system.

How to increase the labour force participation of older workers?

The essential question faced in many countries is how to increase the labour force participation rate of older workers. As argued in OECD (1998), the extent to which the labour force will age will be strongly influenced by trends in retirement patterns (OECD 1998, p.124). Measures to increase the labour force participation rate of older people are both addressed to the demand side of the labour market and to the supply side. With respect to the latter, measures are taken in some countries to make early retirement financially less attractive.

Schooling and training may also help to increase the labour force participation of older workers. If both firms and workers invest in training they both have an interest to continue the employment relation in order to recover their investment costs. Furthermore, older workers themselves view training as an indication that they are still considered to be of value to the firm or organisation. In this sense training also helps to keep older workers in employment and helps to change the value of work relative to retirement.

4.IV GENERAL CONCLUDING REMARKS AND REQUIREMENTS FOR FUTURE RESEARCH

This two-year research project has brought us many benefits, and, hopefully, has also contributed to the stock of knowledge regarding the economic and social situation in Europe. It has also brought us some dissatisfaction.

The benefits are of different kinds:

- First, the co-operation of teams from different countries, with a large number of meetings and workshops has greatly improved the quality of our work, in that it has allowed the different teams to pool their resources in terms of references, data sets and methods. This has been particularly true for the younger participants in our teams, *i.e.* PhD students, who have benefited from an international environment in which to present and place their work.

- Second, the project has also led us to increase the quantity of our work, due to the constraints imposed by the various meetings, workshops and publication deadlines, so that the final outcome of more than fifty publications in our Working Paper Series is more than respectable.
- Third, the aims of the research were “to develop a good European expertise of education and training systems (first topic), gather comparable data and make some policy evaluations on transitions from school to work and from job to job (second and third topics), and give some new theoretical insights on institutions and labour markets.” It seems to us that we have fulfilled these aims, to which we could also add that we have obtained results which, in the majority of cases, yield policy implications.

Now, a few words about the reasons for expressing some regrets and/or wishes for the future: some of our results are still preliminary and need further work and validation, especially by increasing the number of countries used in international comparisons. Two obstacles have prevented us from doing so. The first one is time. A two-year project, even if extended for a few months, is not enough to fully exploit the possibilities for co-operation between our teams, and we hope that we shall be given the opportunity to continue and increase this co-operation in the future. The second reason is data: micro data from different countries are often very different and thus difficult to use with similar methods. Eurostat, which has been built to provide compatible information across European countries, is de facto unusable for econometric work, because access to individual data is not available. The hope we express here is that European countries will improve the compatibility and the access to micro data in the future.

With respect to the areas where the requirement for future research seem to us particularly important, one main objective of the current project was to understand the main factors behind inequality in education, the labour market and, more generally, in economic capacities and opportunities. It seems to us that one of the main challenges in Europe is to understand the link between education and training, one the one hand, and economic and social inequality, on the other, in order to reduce the latter. These

inequalities appear within the schooling system, develop during the individual's career, and can take an extreme form with the phenomenon of poverty and exclusion. They thus result from the interaction between structural and labour market developments. Future European research should look in depth at these interactions. Three aspects in our opinion deserve particular attention:

Educational inequality Different individuals or different groups, within the same educational system, have different chances of access to, or experience different outcomes from, the schooling system. Some of them experience various forms of wastage in the education process (inefficient learning). These inequalities should be analysed in the context of demographic movements and changing family structure.

Differences in lifelong earnings and training As there are an increasing number of panel data sets available in European countries, much more can be said about lifetime earnings and careers. Questions such as male/female differentials, or atypical employment and contracts could and should be studied in depth in the future.

Poverty and social exclusion: it should be studied in all its aspects, as well as the links between the different aspects of it, i.e. failure in schooling, long-term unemployment, policy measures aimed at fighting poverty and exclusion.

5. DISSEMINATION AND/OR EXPLOITATION OF RESULTS

The dissemination and valorisation strategy of our STT research project can be divided up into six major components

- Ø STT Working Paper Series
- Ø Seminar and Conference presentations
- Ø Publication (journal articles or book chapters)
- Ø Web Site
- Ø Internal Meetings
- Ø Future Plans: Final Congress and Book

Working Paper Series

A great deal of emphasis has been placed on our STT Working Paper series. Researchers were encouraged to submit their work for inclusion in this series. All submissions to this series were refereed (anonymously) by another member of the STT team, and revisions were carried out before the document appeared in the working paper series. All STT Working Papers were sent to the members of the STT project, as well as to a dozen outside personalities.

The Table attached describes the current status of each of our 57 STT Working Papers, both in terms of the number of times they have been presented at seminars and conferences, and their current publication status.

Seminar and Conference presentations

One of the main methods of dissemination of our results, especially at the preliminary stage, is their presentation in front of a peer group. This presentation may either take place at national and international conferences, or at invited seminars, at the

authors' home institutions or elsewhere. This is a key method of obtaining feedback from other researchers. Our STT Working papers have been presented a total of 114 times (this is the current figure, and will undoubtedly rise, as a number of these papers have not yet been published).

Publication

As researchers, our principal aim in writing is eventual publication, so as to ensure the widest possible dissemination of our analysis and results. The attached table shows that, to date, 23 of our STT papers have been published. In addition, 7 are under revision at journals, and a further 17 have been submitted. The publications comprise six book chapters and seventeen journal articles. The journals are amongst the best national and international journals in economics (including the *Journal of Public Economics*, the *Journal of Labor Economics*, the *Journal of Population Economics*, and *Labour Economics*).

Web Site

It is important that our publications reach the widest possible audience. Given the growing use of the internet, both by the academic and non-academic communities, we established a home web page (at the university of Orléans: http://www.univ-orleans.fr/DEG/LEO/TSER). This page includes a short summary of the STT project, and of the management and responsibility structure. It also includes details of the title and authors of each STT Working Paper. The abstract of each working paper is available for examination or download as a PDF file. In addition, a hypertext link next to each Working Paper provides the e-mail address of the corresponding author of each article.

Internal Meetings

As noted above, a great deal of effort has been expended to ensure that our research has reached the maximum number of people outside our own STT research community. It has not been forgotten, however, that one of the purposes of our project was to better acquaint researchers within the STT project with the work that other

project members were carrying out. To this end, two types of internal meetings (*i.e.* to which non-STT members were not invited) have been organised. The first, and most numerous, of these consists in Progress Group meetings, held individually at each of the Universities involved in this project. These meetings, relatively informal in nature, served to keep members up to date with the progress of the STT research that was being carried out at their own institution.

The second type of internal meeting was more formal in nature. Here, researchers from all of our STT institutions met together over a period of two to four days, at one of our home universities. These meetings consisted, to a large extent, in the presentation of ongoing research work, in a seminar-style format. A significant amount of time was set aside for questions and discussion after each of the presentations. In addition, roundtable General Meetings were held, at which progress in the STT project was discussed. The list of these STT meetings is provided below.

STT Meetings

Orléans, France	10 January 1997
Warwick, UK.	8-9 May 1997
Malaga, Spain.	7-11 January 1998
Paris, France.	5-6 March 1998
Amsterdam, Holland.	24-27 September 1998
Orléans, France.	4-7 January 1999

In addition, a number of Planning Meetings were held before the official starting date of our STT project.

Future Plans: Final Congress and Book

Our work on the dissemination and valorisation of our research results will not stop with the end of the contract. A number of the activities described above are obviously ongoing. In addition, we have two large-scale plans for the future. First, we wish to communicate directly our policy results to their potential users, *i.e.* policy makers from our different countries. This is the aim of the conference we intend to organise in Warwick in 2000. Second, publications disseminated in different journals do not provide a summary view of our work. This is why we think that it would be

useful to publish a book which would gather and present the main methodology and results from our research. These two plans are the subject of a submission to the *Accompanying Measures* programme of the European Commission (submitted December 10th 1999).

We propose the organisation of a conference, to be held at the University of Warwick in Autumn 2000. The prime purpose of this conference would be the presentation, dissemination and discussion of the main findings that have come out of our TSER research project. The participants at the conference would include, naturally, members of the STT research team, but also a number of members of other TSER research programmes with related themes, with the aim of cross-fertilisation of methodology, results and interpretation. In addition, we will invite representatives from the European Commission, policy-makers from national (British) government institutions (in the field of Employment and Education), and policy-makers from government institutions in other European countries (these countries being limited to those represented by STT members). The conference is scheduled to last for two days, during which we will be able to compare our research results with those emanating from other EC-funded international research programmes, and present our policy results and implications to those who are directly concerned with the establishment of policy in the fields of employment and education.

The conference will include presentation of our own research, but also that from members of other TSER research programmes. It is likely that we will ask policy-makers to act discussants for at least some of the papers presented. Other activities include a lecture by a well-known economist in these fields, and round-table discussions with respect to the policy implications of our work, where we plan the active participation of policy makers.

The book will consist of a number of the papers which we have produced throughout our research programme. All of the prospective chapters of the book will be revised, according to remarks and criticisms received. The book will also include a number of summary chapters, describing our main results, presenting general conclusions, and suggesting policy implications and directions for future European research.

Working Paper No.	*Title*	*Authors*	*Number of Presentations*	*Published or Forthcoming*	*Under Revision*	*Submitted*	*Journal/Book*
01-97	Minimum Wages and the Incentives for Skill Formation	Jonas AGELL & Kjell Erik LOMMERUD.	4	X			*Journal of Public Economics (1997)*
02-97	Minimum Wages and Youth Employment in France and United States	John M.ABOWD, Francis KRAMARZ, Thomas LEMIEUX, David N. MARGOLIS.	13	X			*in D.Blanchflower and R.Freeman (eds.), Youth Employment and Joblessness in Advanced Countries, NBER (2000)*
03-97	Bargaining, Compensating Wage Differentials and Dualism of the Labor Market. Theory and Evidence for France	Christophe DANIEL & Catherine SOFER	5	X			*Journal of Labor Economics (1998)*
04-97	Youth Unemployment, Specific Human Capital and Minimum Wage:a Comparison between France and Japan	Masahiro ABE, Charles CRIDELAUZE & Catherine SOFER.	5		X		*Journal of the Japanese and International Economies*
01-98	Season of Birth, Schooling and Earnings	Erik J.S. PLUG	1	X			*Journal of Economic Psychology (2000)*
02-98	Job Satisfaction, Wage Changes and Quits: Evidence from Germany	Andrew CLARK, Yannis GEORGELLIS & Peter SANFEY		X			*Research in Labor Economics (1998)*
03-98	Overeducation in the labor market: a meta analysis	Wim GROOT & Henriëtte Maasen van den BRINK	2	X			*Economics of Education Review (2000)*
04-98	Organization and efficiency of education systems: some empirical findings	Gérard LASSIBILLE & Maria Lucia NAVARRO GOMEZ	1	X			*Comparative Education (2000)*
05-98	Re-employment probabilites and returns to matching	Barbara PETRONGOLO	8	X			*Journal of Labor Economics (2000)*
06-98	Education, training and employability	Wim GROOT & Henriëtte Maassen van den BRINK	2	X			*Applied Economics (2000)*
07-98	From entering the labor market to obtaining permanent employment: An approach by education levels and marital status to processes followed by spanish youth	Juan A. CAÑADA-VICINAY, Aristides OLIVARES-MESA & José M. SUAREZ-GONZALEZ					
08-98	The impact of school Quality on labor Market success in United Kingdom	Peter DOLTON & Anna VIGNOLES	4			X	*Oxford Bulletin of Economics and Statistics*
09-98	Transitions from employment among young workers	Oivind Anti NILSEN, Alf Erling RISA & Alf TORSTENSEN	1	X			*Journal of Population Economics (2000)*
10-98	Job satisfaction, Wages and allocation of Men and Women	Wim GROOT & Henriëtte Maassen van den BRINK	2	X			*in E. Diener (ed.), Advances in Quality of Life Theory and Research, Kluwer. (2000)*
11-98	Apprenticeship versus vocational education: exemplified by the Dutch situation	Wim GROOT & Erik PLUG	1				
12-98	Instrumenting education and the returns to schooling in the Netherlands	Jesse LEVIN & Erik PLUG	1	X			*Labour Economics (1999)*
13-98	The Incidence and duration of work-related training in the U.K.	Wiji ARULAMPALAM, Alison L. BOOTH & Peter ELIAS	4		X		*Scottish Journal of Political Economy*
01-99	The evolution of returns to education in Spain 1980-1991	Gérard LASSIBILLE & Lucia NAVARRO GOMEZ	2	X			*Education Economics (1998)*
02-99	Duration in work after leaving school	Torunn Skumlien NILSEN & Alf Erling RISA					
03-99	University selectivity and employment: A comparison between British and French graduates	Jean-Jacques PAUL, Jake MURDOCH & Julien ZANZALA	3	X			*Proceedings of the Comparative Education Society in Europe, (2000)*
04-99	Work or retirement? Exit routes for Norwegian elderly	Svenn-Age DAHL, Oivind Anti NILSEN & Kjell VAAGE	4	X			*Applied Econometrics (2000)*
05-99	Transitions from school to work: search time and job duration	Espen BRATBERG & Oivind Anti NILSEN	6			X	*Oxford Bulletin of Economics and Statistics*
06-99	Staying on at school at sixteen: the impact of labor market conditions in Spain	Barbara PETRONGOLO & Maria Jesus SAN SEGUNDO	2		X		*Economics of Education Review*
07-99	The transition of workers from temporary to permanent employment: the Spanish case	Barbara PETRONGOLO & Maia Güell-ROTLLAN	3			X	*European Economic Review*
08-99	Youth transition from school to work in Spain	Gérard LASSIBILLE , Lucia NAVARRO GOMEZ, Maria Isabel Aguilar RAMOS & Carolina de la O SANCHEZ	3	X			*Economics of Education Review (2000)*
09-99	Apprenticeship versus vocational school: selectivity bias and school to work transition. Evidence for France	Michel SOLLOGOUB & Valérie ULRICH	4	X			*Economie et Statistique (1999)*
10-99	What really matters in a job? Hedonic measurement using quit data	Andrew E. CLARK	5			X	*Labour Economics*
11-99	Promotions in the Spanish labour market: differences by gender	Dolorès Garcia CRESPO	1		X		*Oxford Bulletin of Economics and Statistics (2000)*
12-99	Labor mobility and the accumulation of post schooling human capital	Juan A. CAÑADA-VICINAY				X	*Journal of Labor Economics*

13-99	Quantity versus quality of children. The effects of family structure and the break-down of matrimony on the education and labor paths daughters and sons	Juan A. CAÑADA-VICINAY & Irene RAMIREZ MEDINA	3			X	*Journal of Human Resources*
14-99	Disability and retirement as ways for elderly workers to leave the labor market early: a competing risk approach	Juan A. CAÑADA-VICINAY & José M. SUAREZ-GONZALEZ					
15-99	Is schooling a family thing? effects of grandparents, parents, brothers and sisters on the school choices	Erik PLUG	2			X	*Journal of Population Economics*
16-99	Compensating wage differentials for wage uncertainty	Joop HARTOG, Erik PLUG, Luis Diaz SERRANO & José VIEIRA	1			X	*Labour Economics*
17-99	Employer provided training within the European Union	Rhys DAVIES					
18-99	Employment policies at the plant level: job and worker flows for heterogeneous labour and heterogeneous plant in Norway	Kjell G. SALVANES	1				
19-99	Investment or production factors: alternative explanations of the demand for young workers in Norway	Jan Erik ASKILDSEN & Oivind Anti NILSEN	5			X	*Labour Economics*
20-99	Access to the first job: a comparison between apprenticeship and vocational school in France	Liliane BONNAL, Sylvie MENDES & Catherine SOFER	6		X		*Annales d'Economie et Statistique*
21-99	Learning by watching and the measurement of on-the-job training	Guillaume DESTRE, Louis LEVY-GARBOUA & Michel SOLLOGOUB	5				
22-99	Job creation, heterogeneous workers and technical change: matched worker/plant data evidence from Norway	Kjell G. SALVANES & Svein Erik FORRE	4			X	*Economica*
23-99	Unemployment of older norwegian workers: a competing risk analysis	Tone ingreid TYSSE & Kjell VAAGE	1			X	*Scandinavian Journal of Economics*
24-99	Reported job satisfaction: what does it mean?	Louis LEVY-GARBOUA & Claude MONTMARQUETTE	8			X	*Journal of Economic Behavior and Organization*
25-99	Vocational training as a force for equality? Training opportunities and outcomes in France and Britain	Laetitia HOCQUET	3	X			*International Journal of Manpower (1999)*
26-99	The incidence and effects of overeducation in the U.K. graduate labour market	Peter DOLTON & Anna VIGNOLES	5	X			*Economics of Education Review (2000)*
27-99	The effects of school quality on pupil outcomes: an overview	Peter DOLTON & Anna VIGNOLES	1	X			*In H.Heijke (ed.), 'Education, Training and Employment in the Knowledge-Based Economy', Macmillan (2000)*
28-99	The earnings and employment effects of young people's training in Britain	Peter DOLTON & G.H. MAKEPEACE	4		X		*The Manchester School*
29-99	Reforming A-levels:is a braoder curriculum better?	Peter DOLTON & Anna VIGNOLES					
30-99	The integration of youths into the labour market and the type of employment contract	Thierry PENARD, Michel SOLLOGOUB & Valérie ULRICH	5			X	*Journal of Labor Economics*
31-99	Union bargained minimum wages: are there any employment effects	Jan Erik ASKILDSEN, Kjell Erik LOMMERUD & Oivind Anti NILSEN	2			X	*European Economic Review*
32-99	Mortality Bias on Estimating Retirement Age Using National Labor Force Surveys: a note	Juan A. CAÑADA-VICINAY		X			*In "Towards an integrated system of indicators to assess the health status of the population", Col. Essays vol. 2, ISTAT, Rome (1999)*
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36-99	The role of early career experiences in determining later career success: An international comparison	David MARGOLIS, Erik PLUG, Véronique SIMONNET & Lars VILHUBER	2				
37-99	The role of unobservables in the measurement of return to mobility: evidence from Germany and the United States	Véronique SIMONNET	5				
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