Job performance and career prospects of auditors
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Chapter 1

Introduction

Recently, dual educational tracks have been set up in higher education next to the already existing full-time educational tracks. Dual tracks are not uncommon in the Dutch educational system. In intermediate vocational education (IVE) students could already choose between dual and full-time educational tracks. Dual educational tracks distinguish themselves from full-time educational tracks through the combination of studying and learning. In dual education learning and studying can be combined in two ways: by alternating periods of studying by periods of working or by working 3-4 days a week and studying 1-2 days a week during the training period.

In the beginning of the 90s the Dutch minister of education, Ritzen, initiated the introduction of dual educational tracks in higher education. The reason for this was that in the 80s and 90s graduates from higher education faced problems when entering the labor market. Graduates had problems with finding a proper job; job search until the first job took on average about nine months and unemployment among graduates was still quite high one year after graduating. Furthermore, the match between the education of the graduates and the first job was often quite poor (SEO, 1997). Graduates often changed jobs during their first years at the labor market in order to find a more suitable job. Ritzen believed that introducing dual tracks would make the transition from school to work easier for the graduates from higher education, since dual graduates in IVE had much higher employment probabilities right after graduating than their counterparts from full-time IVE (Van Imhoff and Ritzen, 1989, Van der Velden and Lodder, 1995). Dual graduates have more knowledge of the labor market than full-time educated graduates. This gives them a better access to the labor market than full-time educated graduates. Furthermore, the dual graduates have better opportunities to acquire skills needed at work but not taught at school, like social skills and practical experience, than students from full-time.
education. They can start working relatively quickly after hiring them whereas the graduates from full-time education often need more time and supervision before they can work independently. Another reason for the introduction of dual tracks was that the educational institutes did not adapt their curricula adequately to the changing needs at the labor market. Ritzen believed that through the close co-operation between educational institutes and firms when offering dual tracks the educational institutes would become more aware of the needs of the labor market than they used to be and that they would alter their curricula accordingly when needed.

However, the good experiences with dual education at the IVE level do not necessarily hold for higher education as well. In higher education students are prepared for other types of jobs than students at IVE. Furthermore, the students themselves may be different (e.g. differences in intelligence, in interest in theoretical subjects, in interest in practical subjects, in work attitude, in learning attitude, etc.). In order to see whether dual education makes the transition from school to work also easier in higher education one should compare the labor market experiences of dual and full-time educated graduates (prepared for the same occupational field) in higher education. This topic is the main theme of this Ph.D. thesis.

In this thesis job performance and labor market prospects between the two groups of graduates are being compared. Due to the fact that the new dual educational tracks have hardly any graduates yet, we have concentrated on occupational groups at the level of higher vocational education/university for which these two educational tracks have already existed for quite a long time. Furthermore, the number of graduates of these two educational tracks should be large enough to make empirical analysis possible. We have ended up with two occupations, namely nurses and financial auditors. For these occupations both educational tracks are well developed and have large numbers of graduates. Furthermore, for both occupations the corresponding education is at the level of higher education.

At the beginning of this research project it was the intention that for these two occupational groups graduates from the dual education would be compared with graduates from the full-time education on items such as job performance, wages and career paths. Research results for two different occupations would indicate whether the effects of introducing dual tracks would be the same for nurses and auditors. If the results would have been the same, the generalization of the results to other occupations would have been a small step to make. Unfortunately, in the third year of this project we had to decide to restrict ourselves to the auditors.

There were several reasons to stop the nursing project. We wanted to collect information on nurses working at the AMC (Amsterdam Medisch Centrum).
We wanted to compare the labor market histories and the job performance of differently educated nurses. We thought that the two groups of nurses were sufficiently large and that there would be enough young nurses of both training types (we expected the largest differences to occur during the first years at work). Unfortunately, a much smaller number of nurses was working at the AMC than we initially thought (less than 500). And on top of that there were hardly any young dual educated nurses and hardly any experienced full-time educated nurses. So the sample size would be quite small and the age distribution between these two groups was too different to make sensible comparisons possible. Furthermore, for the comparison on job performance we wanted the nurses' supervisors to rate the nurses on several items related to daily nursing practice. For this we would have needed the nurses' permission. Getting this permission or not is likely to depend on the performance of the nurses (well-performing nurses giving permission and poor performing nurses not giving permission) and would have resulted in selectivity in the sample of ratings for which we could not correct. These three problems together (small sample size, different age distributions and selectivity) made us decide to stop the research among nurses.

Here, the topics of the remaining chapters of this thesis are shortly summarized. Chapter 2 contains a short review of theoretical and empirical literature on educational psychology, human capital and labor economics, related to the topic of this thesis. Furthermore, work of Prais (1995) and Hoeben (1992) are discussed. Prais related productivity differentials between different western countries to the dominant type of vocational education in these countries. Hoeben analyzed the employer satisfaction with graduates from four types of intermediate vocational education in the Netherlands. Furthermore, this chapter summarizes the main results of the Ph.D. theses of Vaatstra (1996) and Meeuwissen (1999). Vaatstra investigated the effect of having an academic or a part-time (Nivra) training in auditing on auditing expertise. Meeuwissen wrote a thesis in which he analyzed inter-organizational mobility and the probability of becoming partner of an audit firm. Finally, some concluding remarks are made and the research questions of this thesis are formulated.

Chapter 3 presents a simple lifecycle model on training choice. It deals with the choice between a dual training and a full-time training. For simplicity it is assumed that income is the only variable which determines educational choice. Individuals choose the training type which maximizes the expected present value of lifetime income. An interesting feature of the model is that no assumptions are made about the income profile over time. In an extension of the model the effect of graduation probabilities on income and educational choice are also incorporated in the model.

Chapter 4 has a mixed character and consists of three parts. In the first part a description is given of the sectors in which auditors are working and the
main duties of these auditors. In the second part the two educational programs and their main differences are described. In the third part the costs and benefits during the training period of the two types of accountancy training are presented and compared.

Chapter 5 describes the data sets which are used throughout this thesis. There are two data sets. The first one is a download from the personnel records of a large Dutch audit firm. This is a panel covering the period 1992-1998 for all audit employees who were employed at 1-1-1992. This data set is used for the empirical analyses in chapter 7 and 9. The second data set has been collected by ourselves. In December 1998 we sent a survey to 3000 auditors of which 1600 responded. The survey contained questions on several issues like education, labor market history, current situation at the labor market, wages and personal characteristics. This data set is used in chapters 6, 8, 9 and 10.

Chapter 6 analyzes wages of auditors. This is done separately for auditors who are employee and for auditors who are self-employed ('zelfstandig gevestigde accountant')/partner of an (audit) firm. Chapter 4 showed that the full-time educated auditors have relatively much general human capital whereas the part-time educated auditors have relatively much specific human capital. It is expected that full-time educated auditors who are on the payroll earn relatively much compared to the part-time educated counterparts. There are no expectations beforehand on income differentials between differently educated self-employed auditors/partners. In the auditors survey the auditors could indicate which income category matched with their income. The income measure for employees is gross monthly wage. Income of self-employed auditors and partners is measured using two sorts of income, namely gross monthly wage and profit minus running costs. In order to correct for self-selection in education a switching ordered probit framework has been used. In this framework three equations are estimated simultaneously, namely a selection equation and two ordered probit equations (one for each educational regime). This model has not been used in the analysis of employers' income because of data limitations. The estimated income equations of employees and employers are used to calculate the net present value of lifetime income of the two educational types. It is expected that the net present value of lifetime income is higher for full-time education than for the part-time education, especially for the auditors who stay employee.

Chapter 7 analyzes job performance of audit employees of a large audit firm. A job performance indicator has been used which is directly linked to the salary growth of the audit employees. Two issues are investigated, namely which type of accountancy training makes audit employees perform best and do audit employees choose the education which makes them most productive (self-selection). We have used panel data covering the period 1992-1998. In this period about 2/3 of the 1992 audit employees left the firm. Leaving the audit firm is often
related to below standard performance. Therefore, an extended switching regression model has been estimated consisting of two job performance equations, an education equation and an attrition equation.

Chapter 8 investigates whether the two types of auditors differ in mobility. Here, the focus is on tenure. A duration model has been used which takes account of possible endogeneity in education. The model has been based on the switching regression model. It consists of two educational regime specific survival equations and an education equation.

Chapter 9 takes a closer look at whether type of accountancy training affects the time needed to become partner. Both data sets on auditors are used in this chapter. In most audit firms there is an 'up-or-out' policy; people are promoted to a higher job or have to leave the firm after having held a particular job for a few years. In the end, the best senior managers may become partner. With the data from the auditors survey it is investigated which personal and background variables affect the time until leaving the firm and the time until becoming partner. Here, a dependent competing risks model has been used with two exits out of being employed: leaving the firm and becoming partner of the firm. This has been done for both types of training separately. With the firm data it is investigated which other factors, in particular variables on current and past performance, affect time until leaving the firm. The econometric model used is quite similar to the econometric model used in chapter 8.

Chapter 10 is on the distribution of the differently educated auditors over five sectors. It investigates which factors, with the emphasis on accountancy training, affect sector choice. We expected to find relatively much full-time educated auditors to work outside auditing because of their relatively large amount of general human capital (which makes them more mobile through better outside options). For this analysis a nested logit model has been used.

Finally, chapter 11 summarizes the main results in chapter 2 to 10. Furthermore, elaborating on the experiences of the auditors it indicates what consequences introducing dual tracks in higher education may have on performance and career prospects of dual students.
CHAPTER I. INTRODUCTION

A field phenomenon is a continuous body of fluid with a velocity not zero. The term field is generally used to denote the space in which a field phenomenon exists.

In the study of fluid mechanics, various field phenomena are considered. These include the motion of a fluid in a duct, the flow of a fluid in a pipe, the flow of a fluid in a channel, and the flow of a fluid in a reservoir.

In each of these cases, the fluid is considered to be incompressible, meaning that its density remains constant. The fluid is also assumed to be inviscid, meaning that there is no friction between the fluid particles.

The equations governing the motion of a fluid are known as the Navier-Stokes equations. These equations describe the conservation of mass, momentum, and energy. The conservation of mass equation is:

\[ \nabla \cdot \mathbf{u} = 0 \]

The conservation of momentum equation is:

\[ \rho \left( \frac{\partial \mathbf{u}}{\partial t} + \mathbf{u} \cdot \nabla \mathbf{u} \right) = -\nabla P + \mu \nabla^2 \mathbf{u} + \mathbf{f} \]

And the conservation of energy equation is:

\[ \rho c_p \left( \frac{\partial T}{\partial t} + \mathbf{u} \cdot \nabla T \right) = \nabla \cdot (k \nabla T) + \mathbf{S} \]

Where \( \mathbf{u} \) is the velocity vector, \( P \) is the pressure, \( \rho \) is the density, \( c_p \) is the specific heat at constant pressure, \( T \) is the temperature, \( k \) is the thermal conductivity, and \( \mathbf{S} \) is the heat source.

These equations are typically solved numerically using various methods, such as the finite difference method or the finite element method. The solutions provide information about the velocity, pressure, and temperature fields within the fluid.