Faculteit Economie en Bedrijfskunde
Vakgroep Sociale Economie

QUALITATIVE ASPECTS OF ENTRY JOBS

DISSERTATION

Submitted at Ghent University,
to the Faculty of Economics and Business Administration,
in fulfilment of the requirements for the degree of Doctor in Economics

by

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Dankwoord

Na jarenlang beroep te doen op de kennis, het vertrouwen, het geduld en de steun van heel veel mensen, wil ik iedereen graag van harte bedanken.

Vooreerst wil ik de leden van mijn examencommissie oprecht bedanken. Het is enkel dankzij hun waardevolle inbreng dat ik erin geslaagd ben dit doctoraat te realiseren.
In eerste instantie dank aan mijn promotor prof. dr. Omey voor de geboden kansen en vooral het vertrouwen in mijn kunnen om een doctoraat te maken. Eddy, bedankt om ook mij daarvan te overtuigen. Tevens hartelijk dank voor de goede werking van mijn begeleidingscommissie en voor je steun in de keuze van het werken op een randdomein tussen economie en psychologie. Bedankt ook om me in contact te brengen met mijn co-promotor prof. dr. Hans De Witte, die mij steeds kon helpen met de arbeidspsychologische aspecten. Hans, bedankt dat je telkens opnieuw een glimlach op mijn gezicht kon toveren en voor je eindeloze motivatie!
Dank u wel aan prof. dr. Dirk Van de gaer en prof. dr. Gerdie Everaert voor hun talrijke opmerkingen en suggesties gedurende zeven begeleidingscommissies en daarbuiten. Het duurde even voor ik het zelf doorhad, maar bedankt Dirk en Gerdie dat ik steeds bij jullie terecht kon!
Bedankt ook aan de andere leden van mijn examencommissie prof dr. Henriette Maassen van den Brink en prof. dr. Peter Vlerick voor jullie waardevolle opmerkingen en suggesties naar aanleiding van de voorverdediging.
Bedankt tot slot dr. Walter Van Trier. Naast je vele werkzaamheden als SONAR coördinator was je steeds bereid om over papers te discussiëren en ik kon geen onderwerp bedenken of je kon de passende literatuur suggereren. Walter, bedankt voor je werk voor SONAR en voor de hulp aan mijn doctoraat.

Een heel oprechte dank u wel aan mijn co-auteurs. Het was een verrijking op jullie kennis beroep te kunnen doen en vooral het was leuk bij iemand terecht te kunnen om ideeën te bespreken!
Christian, thank you so much for all your patience and for sharing your knowledge with me, it was an honour and a real pleasure working with you!

Dank aan de vele SONAR collega's en in het bijzonder aan Tom. Bedankt Tom voor je geduld toen je me de SONAR data leerde kennen en voor je vriendschap in de jaren die erop volgden.
Bedankt ook aan mijn bureaugenoten doorheen de jaren: Tine, Jurgen, Nathalie en Dieter. Tine, ik ben blij dat we altijd bij elkaar terechtkunnen. Jurgen, je was een fantastische collega, ik mis je nog steeds. Dieter, ik ben blij dat ik je de laatste jaren echt heb leren kennen. Bedankt voor je vele steun en hulp! Toen overbevolking dreigde op ons bureau, was Arne's bureau een plekje waar ik altijd welkom was… bedankt Arne voor je vele steun op diverse vlakken. Bedankt ook aan alle andere collega's van de vakgroep en in het bijzonder nog aan Erna; voor wie op meer dan zes jaar nooit één vraag te veel was. Bedankt Erna voor je vele hulp bij kleine en grote problemen.

Bedankt aan al mijn vrienden: jullie steun en vriendschap is onvervangbaar! In het bijzonder dank aan Jeroen voor het warme medeleven en aan mijn sportvriendinnen voor de ontspannende momenten. Xavier en Frédéric, bedankt om altijd een luisterend oor te hebben.
Bedankt aan mijn schoonouders voor het vertrouwen en de hulp. Mama en papa, bedankt voor de kansen, enkel dankzij jullie ben ik geworden wie ik nu ben. Vincent, bedankt om me reeds meer dan 10 jaar graag te zien en alle ups en downs samen te beleven.

Tot slot een heel oprecht dank u wel aan iedereen die op één of andere wijze een steentje heeft bijgedragen aan mijn doctoraat hetzij door kennis hetzij door er gewoon te zijn. Hoe onbenullig jullie steentje misschien leek, voor mij was het telkens opnieuw een waardevolle steen om verder op te bouwen.

Elsy Verhofstadt
18 april 2007

Samenvatting

De afgelopen 20 jaar waren jobcreatie en de daling van de werkloosheid prioritaire beleidsdoelstellingen. Sinds kort staat ook de kwaliteit van het werk op de beleidsagenda. De Lissabon-strategie stelt de creatie van meer én betere jobs als globale doelstelling om volledige tewerkstelling te bereiken. Om de doelstelling van een hogere activiteitsgraad te bereiken zou werk lonend maken onvoldoende kunnen zijn en de kwaliteit van werk bevorderen essentieel. Kwaliteitsvolle jobs kunnen uittrede tegengaan en goede arbeidsvoorwaarden voorzien kan de productiviteit van ondernemingen bevorderen

Het welzijn van werknemers wordt door vele factoren beïnvloed: enerzijds door de karakteristieken van het werk zelf maar anderzijds ook door verwachtingen omtrent het werk, de waarden die men belangrijk vindt in het werk en diverse individuele- en omgevingsfactoren. In dit doctoraal proefschrift staan de karakteristieken van het werk centraal en ligt de focus op een aantal sleutelindicatoren die de arbeidstevredenheid en kwaliteit in de eerste job beïnvloeden. Voor onze analyses maken we gebruik van data over de transitie van school naar werk voor Vlaamse jongeren (SONAR-data).

De eerste vraag die we stellen betreft de relatie tussen het opleidingsniveau en arbeidstevredenheid. Op deze relatie na is het onderzoek naar de determinanten van arbeidstevredenheid vrij consistent. In de eerste bijdrage postuleren we de hypothese dat de positieve relatie tussen opleidingsniveau en arbeidstevredenheid die in vele studies wordt gevonden, het gevolg is van de invloed van jobkwaliteit op de tevredenheid. Onze empirische analyse bevestigt deze hypothese. Hoger opgeleiden blijken meer tevreden dan hun lager opgeleide collega's, maar deze samenhang is toe te schrijven aan het feit dat de hoger opgeleiden diegene zijn met de betere jobs. Wanneer we controleren voor indicatoren van de kwaliteit van het werk, wordt de correlatie tussen opleidingsniveau en arbeidstevredenheid negatief: de hoger opgeleiden zijn minder tevreden met hun eerste job. Verschillen in waarden of verwachtingen ten aanzien van werk kunnen een verklaring bieden voor deze verschillen. De grootste impact op jobtevredenheid is afkomstig van de jobkarakteristieken. De resultaten geven echter aan dat wanneer een lager opgeleide een kwaliteitsvolle job heeft, hij een hogere kans zal hebben om tevreden te zijn dan zijn hoger opgeleide collega in exact dezelfde job.

Het tweede belangrijke thema bouwt verder op twee sleutelindicatoren van kwaliteit op het werk: werkinspanning en autonomie, in de literatuur aangewezen als de belangrijkste determinanten ter verklaring van de daling in de Britse arbeidstevredenheid. We bestuderen de werkdruk in relatie tot hun autonomie in intrede jobs en maken daarvoor gebruik van het Karasek Job-Demand-Control (JDC) model. Dit model verfijnt de notie 'werkdruk als belastend aspect van het werk', door de balans tussen werkdruk en controle die men heeft over het werk (dit is de autonomie) te benadrukken. Enkel een job waarin hoge werkdruk samengaat met lage autonomie (een hooggespannen job) wordt verondersteld stressvol te zijn. Een job waarin hoge werkdruk gepaard gaat met hoge autonomie (een actieve job) resulteert in groei- en leermogelijkheden. De resultaten van onze analyse bevestigen alle hypothesen van het JDC model. Jobontevredenheid is hoger in

jobs met weinig autonomie en in jobs met veel werkdruk. Autonomie lijkt een buffer te zijn voor de negatieve impact van werkdruk op job ontevredenheid. De mate waarin jongeren nieuwe vaardigheden verwerven is hoger in jobs met veel autonomie en in jobs met veel werkdruk. Daarenboven versterkt autonomie de positieve invloed van werkdruk op de groeimogelijkheden.

In een volgende fase gaan we na of jongeren een looncompensatie krijgen voor de werkdruk die ze ervaren. Dit blijkt evenwel niet het geval te zijn voor jongeren in hun eerste job. Werknemers in hooggespannen jobs zijn er dus duidelijk slechter aan toe. Eerst en vooral hebben ze een stressvolle job en voelen ze zich (bijgevolg) minder tevreden. Daarenboven krijgen ze geen compensatie voor deze minder gunstige situatie. We observeren ook dat jongeren in een actieve job – en in het segment van jobs met veel autonomie in het algemeen - beter betaald zijn dan hun lotgenoten in jobs met lage controle. Deze resultaten leiden tot de conclusie dat er een dualiteit is op de arbeidsmarkt voor jongeren. Enerzijds de beter betaalde actieve jobs met gemiddeld genomen een hoge tevredenheid en anderzijds de minder betaalde en ontevreden makende stressvolle jobs.

Tenslotte stellen we de vraag of jongeren in een hooggespannen job mobieler zijn dan hun collega's in een actieve job. Onze resultaten bevestigen deze hypothese. Gebruik makend van verschillende modellen voor duurdata komen we tot de consistente vaststelling dat jonge werknemers in een hooggespannen job deze sneller verlaten dan jongeren in een actieve job. We onderzoeken ook of deze jongeren beter af zijn later in hun carrière. Een vergelijking van het jobtype in de eerste job met dat op 26 jaar leert dat een aanzienlijk deel van de starters in een hooggespannen job nog steeds in zo'n job zitten op 26 jaar. Voor diegenen die hun job gedwongen hebben verlaten, is het jobtype niet bepalend voor hun toekomstige kans op werkloosheid. Alhoewel starters in een hooggespannen job dus een vroeger slachtoffer zijn van gedwongen mobiliteit, heeft het jobtype geen invloed op de toekomstige kans op werkloosheid. Enkel het opleidingsniveau is een bepalende factor voor die kans. We kunnen dus besluiten dat de last van een hooggespannen job maar tijdelijk is. Er is echter een aanzienlijke kans om later in de carrière opnieuw in een hooggespannen job terecht te komen.

Het derde thema dat aan bod komt is de onzekerheid van het werk. We onderzoeken of tijdelijk werk voor schoolverlaters als een opstap kan fungeren naar vast werk. Met behulp van simulaties vergelijken we de transitiesnelheid naar vast werk tussen schoolverlaters die werkloos blijven en schoolverlaters die voor een tijdelijke job kiezen. Schoolverlaters die een tijdelijke job aanvaarden, hebben aanvankelijk een lagere transitie naar vast werk, waardoor een lager percentage een vast contract heeft op korte termijn (in vergelijking met de hypothetische situatie waarin deze jongeren werkloos waren gebleven). Op lange termijn (vanaf 40 maanden voor de steekproef van alle schoolverlaters, vanaf 21 maanden voor de steekproef van werkloze schoolverlaters) doen participanten in tijdelijke tewerkstelling het beter dan schoolverlaters die werkloos blijven tijdens hun zoektocht naar een vaste job. We kunnen besluiten dat gemiddeld voor onze steekproef van alle schoolverlaters een tijdelijke job de transitie naar een vaste job vertraagt. We vinden evenwel een sterk significant opstapeffect van tijdelijk werk voor de steekproef van werkloze schoolverlaters.

Summary

Over the past twenty years creating jobs and reducing unemployment were main policy objectives. In recent years work quality has entered the policy agenda. The Lisbon strategy sets the overall goal of moving to full employment through creating "not only more jobs but also better jobs. "Making work pay" may not be sufficient and fostering quality of work is essential to achieve the policy goals of higher employment rates. Good jobs can prevent exit from labour market, and providing good working condition can foster productivity of firms.

The well-being of workers is determined by many factors: on the one hand by characteristics of the work itself but on the other hand also by expectations, work values and individual and environmental factors. In this doctoral thesis the work features take a central place and we focus on a number of key indicators influencing well-being and quality in the first job. For the analysis we use data concerning the transition from school to work for Flemish youngsters (SONAR-data).

The first question we raise concerns the relation between education and job satisfaction. Research concerning the determinants of job satisfaction is rather consistent with the exception of the relation between the level of education and job satisfaction. In the first contribution, we hypothesize that the positive relationship between educational level and job satisfaction, found in several studies, results from the impact of indicators of job quality on satisfaction. Our empirical analysis confirmed this hypothesis. More highly educated workers seem more satisfied than their less educated counterparts. This association, however, is caused by the fact that the more highly educated also obtain a job of better quality. When we control for the indicators of the quality of the first job, the correlation between the level of education and job satisfaction becomes negative: the more highly educated report that they are less satisfied with their first job. Different work values or different expectations might explain these findings. The largest impact on job satisfaction was due to job characteristics. The results however indicated that when a lower educated worker obtains a job of good quality, his or her probability of being satisfied will be considerably higher than that of his higher educated counterparts, working in exactly the same job.

The second important subject of our contributions builds on the two key indicators of job quality: work effort and autonomy, by literature suggested as the main determinants to explain the decline in British job satisfaction. We study the workload in entry jobs in relation to the autonomy using the Karasek Job-Demand-Control (JDC) model. This model refines the qualification of 'workload' as burdensome aspect of work, by highlighting the importance of a balance between demands in the job (i.e. workload) and the control one can exercise in that job (i.e. the job autonomy one has). Only a job with high workload and low autonomy (a 'high strain job') is supposed to be stressful, whereas a high demanding job with a lot of autonomy (an 'active job') results in learning opportunities. The results of our analyses confirmed all hypotheses derived from the JDC-model, also the learning hypothesis for which empirical evidence is limited. Job dissatisfaction is higher amongst those with

low autonomy and amongst those with high workload. Autonomy seems to buffer the negative impact of workload on dissatisfaction. The extent to which people acquired new skills was higher amongst those who score high on autonomy and amongst those working under high workload. Moreover autonomy appeared to increase the positive impact of workload on learning.

In a next step we investigate whether young workers get a wage compensation for high workload. Our results do not support this hypothesis for young workers in their first job. Workers in high strain jobs are thus really worse off. First of all, they have a stressful job and (as a consequence) feel less satisfied. In addition to this, we have found that they are not compensated for this less favourable position. We also observe that young workers in active jobs - and workers in the high control segment in general - are better paid than their counterparts. These results lead to the conclusion of a duality in the labour market for young people. On the one hand the better paid active jobs with on average higher job satisfaction and on the other hand the less paid dissatisfying stressful jobs.

Finally we raise the question whether workers in a high strain job leave their job sooner than their colleagues in active jobs. Our results confirm this hypothesis. Using different models for estimating duration data we consistently find that young workers leave their high strain jobs sooner compared with those in active jobs. We also examine whether they were better off later on in their career. The results of a comparison the job type of the first job with the job type at the age of 26 show that a considerable part of the young starters in high strain jobs remain in a high strain job later on. For those who had to leave their first job, their job type does not influence the probability of being unemployed later on in the career. So, although starters in high strain jobs are premature victims of forced mobility, their initial job type does not affect their probability of becoming unemployed afterwards. Only the educational level was a relevant determinant of that probability. We can thus conclude that the strain of a high strain first job is only temporary. There is however a significant probability to remain in a high strain job later on in the career.

The third topic we handle is the insecurity of the job itself. We investigate whether temporary employment can act as a stepping stone for school-leavers. We compare the transition rate into permanent employment between school-leavers who stay unemployed and those taking up temporary employment. Simulations are used to investigate the effect of temporary employment on the transition to permanent employment. Workers who accept a temporary job have a low transition rate into permanent employment at the start of the temporary employment spell, which results in a lower fraction of those obtaining a permanent contract in the short run (compared with the hypothetical situation where these individuals remained unemployed). In the long run (from 40 months in the sample of all school-leavers, 21 one months in the sample of unemployed school-leavers) participants in temporary employment do better than school-leavers who remain unemployed during their search for a permanent job. So we can conclude that on average for all school-leavers taking a temporary job delays the transition to a permanent job for the observed sample. We do find a strong stepping-stone effect for our sample of unemployed school-leavers.

Contents

Setting, summary and critical reflection*

* I would like to thank all members of my doctoral jury for their suggestions with respect to this umbrella chapter. I am especially grateful to Walter Van Trier for his flow of very useful literature suggestions and his inexhaustible willingness to offer background information, and to Dirk Van de gaer for very useful reflections on earlier versions of this chapter. A special word of thanks to Tom Schatteman: our paper idea “the good, the bad and the ugly job” generated lots of inspiring material to write this chapter.

1. More and better jobs for Europe

Over the past twenty years one of the main policy objectives has been to create jobs and reduce unemployment. In recent years, work quality has entered the policy agenda. The concept of "quality in work" rose to prominence at the Lisbon European Council in March 2000. The Lisbon strategy sets the overall goal of moving to full employment through creating "not only more jobs but also better jobs". Since the Stockholm European Council in 2001, quality in work is also a general objective in the Employment Guidelines.[1] The subsequent Council Meetings have all kept quality in work on the agenda.

In its Communication, "Employment and social policies: A framework for investing in quality" (2001), the European Commission identified 10 main elements of quality in work within two broad dimensions, the characteristics of the work itself and the wider labour market context:

Dimension I: Characteristics of the job itself

1. *Intrinsic job quality*
2. *Skills, life-long learning and career development*

Dimension II: The work and wider labour market context

3. *Gender equality*
4. *Health and safety at work*
5. *Flexibility and security*
6. *Inclusion and access to the labour market*
7. *Work organization and work-life balance*
8. *Social dialogue and worker involvement*
9. *Diversity and non-discrimination*
10. *Overall economic performance and productivity*

This interpretation of the job-quality concept appears to combine the interests of workers and employers in one concept – "quality *in* work". Some aspects of job quality seem to be omitted (e.g. work effort and average pay), perhaps because they include conflicting interests between workers and employers. The last element – overall economic performance and productivity - clearly indicates the intended balance between workers and employers. Moreover Green (2006) argues that this list "appears to be largely driven by pre-existing policy objectives of the European Commission" and so "has the appearance of a repackaging exercise".

When we try to formulate some policy implications we will return to this European policy approach of taking the considerations of both workers and employers into account. However in our contributions

[1] The Guidelines present common priorities for the national employment policies of Member States.

we restrict our attention to the concept of quality *of* work and thus only focus on the well-being of workers.

In the next part we argue why well-being of workers is important for economists to look at. In the third part we define the different concepts more clearly and discuss our key indicators. Using these definitions and key indicators we then situate the different contributions of this doctoral thesis. In the fifth part we discuss the specificity of our sample of young workers. Afterwards we summarize the main results and we end with a reflection for further research and for policy.

2. Well-being and economics

Is well-being a subject for investigation in economics? Green (2006) states that, "Trying to understand the sources of well-being at work is exactly what labour economics should ultimately be about". However, doubts arise because the empirical information is mainly drawn from subjective reports of workers. Mainstream economists tend to believe what people do and not what they say. Sen (1973) argues that there are problems with the interpretation of behaviour as well. He thinks that, "We have been prone, on the one hand, to overstate the difficulties of introspection and communication and on the other, to underestimate the problems of studying preferences revealed by observed behaviour". Layard, one of Britain's most prominent economists, and proponent of "happiness" studies, argues in favour of happiness reports of individuals. Psychologists have found quite well correlated answers about the happiness of people whether they were asked themselves, whether their friends were asked or whether independent observers were asked (Layard, 2005). Layard defends interpersonal comparisons based on evidence from neuro-science. Neuroscientists have identified the areas in the brain which are active when people feel good and when people feel bad, and different methods give good correlations between reported feelings and brain measurements (Layard, 2003). Ward and Sloane (2000) argue that the level of satisfaction of workers reporting "very satisfied" may differ, but they will be less likely to quit and/or be more productive than workers reporting lower levels. Clark (1996) also mentions that psychologists and sociologists have been validating these data for years.

So we conclude, in line with Green (2006), that one should abandon the complete distrust of what individuals tell us, in a critical approach of careful validation and reliability testing of the data

The main argument for the use of these data despite their shortcomings is the correlations found between these "subjective reports" and other (economic) variables. Productivity, absenteeism and turnover are especially seen as influenced by job satisfaction (e.g. Hall, 1994). Freeman (1978) has introduced job satisfaction as an economic variable, pointing to its relationship with mobility behaviour. Clark (2001) offers a non-exhaustive overview of research papers, showing that "happiness measures predict observable future behaviours or outcomes".

Another reason for economists to study job quality and well-being is the relation between quantity and quality of jobs. Davoine (2006) investigated this relation and he came to the unambiguous conclusion of a strong correlation between quantity and quality of jobs. So "improving employment quality does not endanger employment growth". The comparative analysis also shows that there is "no trade-off between social and economic goals, between efficiency and equity".

The "Employment in Europe" reports of 2001 and 2002 (European Commission) analyse the relationship between quality in work, social inclusion and labour market dynamics. The reports conclude that there exist important synergies between quality in work, productivity and overall employment performance. Improvements in quality in work are important not just for the well-being of workers but also to promote social inclusion and drive up employment levels.

Economists thus have more than enough reason to study quality of work and job satisfaction. "Making work pay" may not be sufficient, and fostering quality of work is essential to achieve the policy goals of higher employment rates. Good jobs can prevent exit from the labour market, and providing good working conditions can foster productivity of firms. Moreover accidents at work and occupational disease have an economic cost. "Labour becomes a production factor, which could boost growth in a knowledge-based economy" (Davoine, 2006).

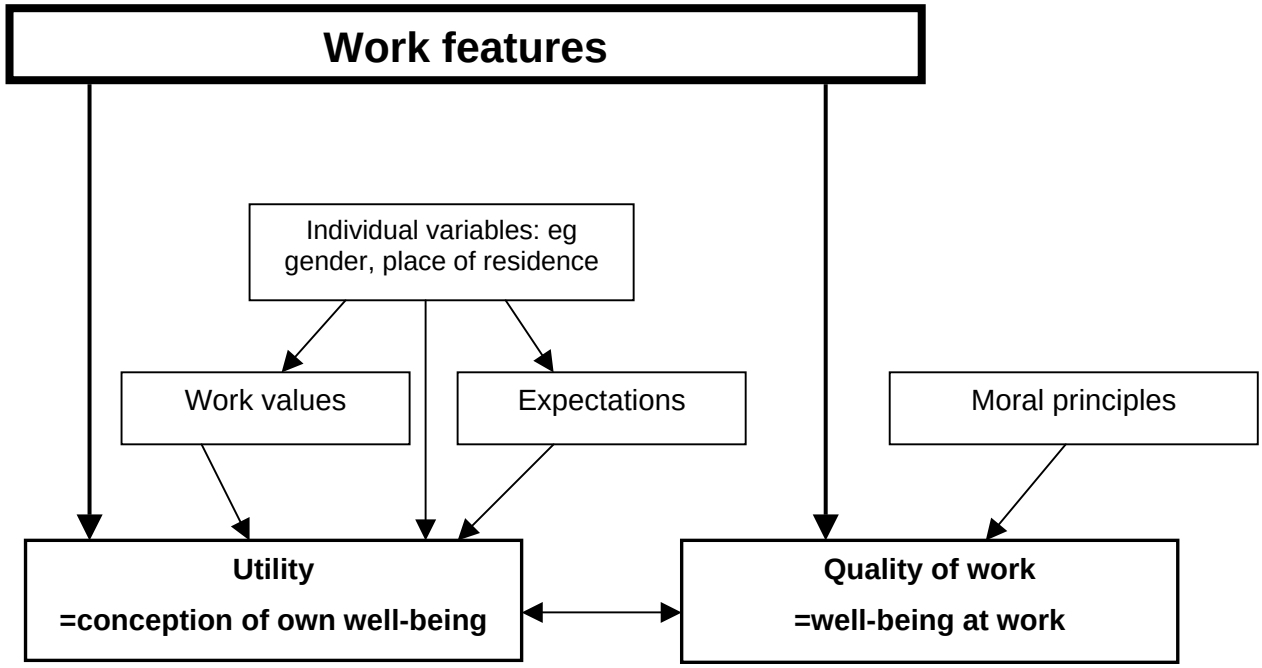
3. Concepts and key indicators

Different concepts are used when talking about quality of work; job satisfaction, well-being and utility. Economists, sociologists and psychologists focus on various aspects relating to these concepts. In figure 1 we offer an interdisciplinary overview of the different concepts and determinants.

Well-being was defined by Bentham as "the excess of pleasure over pain" (Collard, 2006). "The person's conception of his well-being" is called utility (Sen, 1979). We consider job satisfaction as a proxy to measure utility. As discussed earlier, some measurement error is possible when using the subjective report (ie. job satisfaction) as a measure for utility. Against this, there are circumstances that reduce the measurement errors when using self-reported data - individuals know much better what happens in their job than observers. As Green (2006) puts it, "The countless people who were selected by chance…telling their own story. Whose story is more accurate than theirs?".

We use the terms "utility" and "job satisfaction" for the workers' view, whereas we use the term "quality" to offer a judgment from the perspective of society and policy. This is in line with Barbier and Sylla (2004) who say that, "Quality of work is an internal normative category from a political discussion, which is – as a principle – flexible, and can change meaning and significance depending on circumstances".

Figure 1: Concepts concerning job quality and main determinants



Central in figure 1 and in our contributions are the work features as determinants for utility and quality of work. Figure 1 shows that, next to work features, the utility of an individual worker is also influenced by some other factors. When looking for the determinants of utility, and thus job satisfaction as a proxy for utility, economists, psychologists and sociologists stress different factors. Economists will mainly focus on the wage as crucial element, although Blau (1991) argues for the inclusion of non-pecuniary characteristics into the economic modelling. Hedonic theory pushes the approach of a job as a collection of non-pecuniary characteristics to its extreme (Elliott, 1990). Sociologists place emphasis on work values, which Kalleberg (1977) defines as "meanings that individuals attach to their perceived job characteristics". Psychologists stress expectations as an important determinant for job satisfaction. The difference between values and expectations is explained by Kalleberg (1977): "Expectations denote one's beliefs about what will occur in the future, but what is expected may not correspond to what is wanted and, conversely, what is valued may or may not correspond to what is expected".

Next to the work values and expectations there is also a consensus that individual factors might have their influence on the perceptions of well-being. In figure 1 we indicate that this impact on utility might be direct or indirect through differences in expectations or work values. When we consider the special case of our sample of young workers, we will return to the concepts of work values and expectations and discuss why they might be different for young workers. Various individual variables are added as control variables through our work.

The quality of work is determined by the work features as figure 1 shows. Next to these work features, society's norm of what a good quality job is depends on what we call moral principles. The European definition in the first part offers some examples of considerations which may be taken into account to judge the quality of the work (eg. gender equality, non-discrimination).

Figure 1 also shows an influence in both directions of the individual and society's perception of well-being at work. There is agreement that environmental variables such as policy influence the worker's reported job satisfaction. On the other hand, society's view is influenced by the view of the individual workers on what is important, which seems obvious in a democracy. This is in line with the consistent distinction in labour psychological literature between two types of variables; the stressors (objective characteristics of the work), and stress reactions (eg, job satisfaction) (De Witte, 2001):. According to De Witte (2001), a useful analysis of the extent to which work is "good" or "bad" involves the objective characteristics as well as the subjective consequences being taken into account. In a welfarist tradition, quality of work should only be judged on the individual utilities. This principle is however the subject of several critiques.[2] The most common critique is that welfarism can defend outcomes which are contrary to our moral intuitions. Therefore we do not follow this welfarist idea, and consider job quality as being different from individual utilities and allow that non-utility information is taken into account. We do not however take up the discussion on which grounds exactly policy makers should judge the quality of work.

In the continuation of this doctoral thesis, we will only consider the work features that foster the well-being of workers. We focus on work features for which there is an agreement that they influence worker's well-being and we try to provide some more insight into these concepts and their influence. In line with Green (2006) we distinguish five key work features: skill utilisation, work effort/pressure, personal discretion, wages and risk. Green distinguished these key aspects based on an interdisciplinary conceptual and theoretical approach.

Skills utilisation is seen as an intrinsic value. Changes in skill requirements take a prominent role in recent debates. The belief exists that the new economy requires more highly skilled jobs - the so-called "knowledge economy". Krugman (1994) argues that the increase in the ratio of skilled to unskilled employment is due to technological change. However Wood (1994) provides evidence for a rising inequality between skilled and unskilled workers. On the other hand lots of authors also pay attention to the under-utilization of skills (Borghans & De Grip, 2000).

Work effort is the second key element. It is a crucial element in efficiency wage theories, which are studied in different disciplines. Workers who believe they are treated fairly are likely to put in more effort, those who think their treatment is unfair withhold effort - psychologists call it 'equity theory' (Ehrenberg & Smith, 2003). Efficiency wages are the economic answer to the principal-agent problem of motivating employees to help advance the employer's objectives and to prevent shirking.

[2] See Sen (1979) for an extensive discussion of welfarism

Akerlof (1982) argues that worker effort depends on the work norms of the relevant reference group. Akerlof and Yellen (1990) introduced the "fair wage-effort hypothesis": workers form a notion of the fair wage and if the actual wage is lower, they withdraw effort in proportion. In psychology most of the leading models on job stress (Karasek's Job-Demand-Control model, Warrs' Vitamin model, the Effort-Reward Imbalance model) consider high work effort as a stressor (Le Blanc *et al*., 2003).

By discussing in brief the efficiency wage theory we have already introduced the third key aspect, namely wages. From an economic point of view, wages are a main determinant of labour supply and thus a key aspect of job quality. Is the economic focus on the wage of the job justified, or are the other characteristics more important? Several studies seem to indicate that intrinsic aspects (i.e. the work itself) are more important than pay.[3] However Kalleberg (1977) argued that intrinsic work factors might have become more important in producing job satisfaction because of a reduced variance in pay.

Personal discretion is another key aspect of job quality according to Green. This idea of assigning value to personal discretion is not common in economic thought except in the capabilities approach of Sen. Sen's approach attributes high value to the process of determining and choosing activities (Green, 2006). In contrast to mainstream economics, sociology and psychology consider discretion and autonomy as essential to high quality work. Sociologists see the extent to which work becomes alienated as fundamental for the analysis of job quality and thus the personal discretion is a central element (Green, 2006). The central role for autonomy in psychological models is clearly illustrated in the Job-Demand-Control model of Karasek (1979).

The last key aspect of job quality is personal risk and security. Green (2006) identifies health and safety as the most important aspects of intrinsic security. Intrinsic security has improved considerably over recent decades. However insecurity of the job itself becomes more and more important given fundamental changes in our economic system: more temporary employment, mergers and reorganisations. In psychological literature, job insecurity has been the subject of several studies.[4]

Green (2006) concludes that job satisfaction in Britain declined between 1991 and 2000. He tried to find whether the key indicators he identified could explain this decline. His results show that "roughly half of the decline in job satisfaction is directly attributable to the decline in task discretion…Another third of the fall in job satisfaction resulted from the work intensification that took place during the decade".

3 For example Braus (1992), Lowe (2001), Jencks *et al*. (1988), Clark (1999b) and Sousa-Poza (2000).

4 For an overview, see De Witte (2005).

4. Setting of the contributions

As mentioned, our contributions mainly focus on the work features determining job quality and job satisfaction. We focus on the same key indicators as distinguished by Green (2006); skill utilisation, work effort, autonomy, pay and risk.

Education and job satisfaction (chapter 1).

The first question we raise concerns the relation between education and job satisfaction. Research concerning the determinants of job satisfaction is rather consistent; see, for example, Spector (1997). The exception is the literature regarding the relationship between the level of education and job satisfaction, which is rather ambiguous. Most empirical research suggests a positive relationship between both variables, but some studies have found no relationship or suggest a negative correlation. Therefore the aim of the first contribution is to clarify the relationship between job satisfaction and educational level. From an economic point of view, the relation between education and job satisfaction seems a very important one. Human capital analysis explains that schooling raises earnings and productivity (Becker, 1993). We want to find out whether schooling also raises well-being at work. Our hypothesis is that the positive relationship between educational level and job satisfaction, found in several studies, results from the impact of indicators of job quality on satisfaction. Our further hypothesis is that better educated workers are more satisfied because they have a better job, and we want to estimate the impact from the educational level on job satisfaction when the quality of the work is corrected for. At the same time we estimate the impact of different "objective" job characteristics (stressors) - which can be seen as indicators for the quality of the job - on the well-being at work.

Workload and autonomy: the Karasek Job-Demand-Control model (chapters 2,3 and 4).

The second important subject of our contributions builds on two key indicators of job quality: effort and autonomy. According to Green (2006), these are the main determinants to explain the decline in British job satisfaction (see above). We study the workload in entry jobs in relation to the autonomy using the Karasek Job-Demand-Control model. The Karasek model dominates in the field of work and organisational psychology. One of the reasons for this may be its parsimony, since it reduces a divergent series of stressors at work to only two dimensions, workload and autonomy, which make it easily testable. The Karasek model (1979), refines the qualification of "workload" as the burdensome aspect of work, by highlighting the importance of a balance between demands in the job (i.e. workload) and the control one can exercise in that job (i.e. the job autonomy one has). Only a job with high workload and low autonomy (a "high strain job") is supposed to be stressful, whereas a highly demanding job with a lot of autonomy (an "active job") results in learning opportunities. The Karasek model thus has two main hypotheses; an imbalance between demands (workload) and control (autonomy) increases strains, whereas a balance between both job characteristics increases learning and development in the job.

Table 2 gives an idea of the kind of jobs that are in the different Karasek job types by offering the distribution of some characteristics over these job types.

Table 2: Distribution of some characteristics over the Karasek job types.

(%)	Passive jobs (low workload, low autonomy)	Low strain jobs (low workload, high autonomy)	High strain jobs (high workload, low autonomy)	Active jobs (high workload, high autonomy)
Gender				
Men	22.3	27.3	31.7	18.8
Women	21.6	28.5	29.2	20.7
Educational level attained				
Primary education	25.0	18.8	48.8	7.5
Lower secondary education	31.2	19.9	39.7	9.2
Higher secondary education	26.6	22.9	37.2	13.4
Lower tertiary education	15.8	36.2	20.7	27.4
Higher tertiary education	8.0	39.6	10.8	41.6
Fulltime or part-time job				
full time	21.9	26.3	32.1	19.7
part time	26.9	29.7	30.4	13.05
Company size				
less than 10 employees	26.5	29.5	25.8	18.2
11 to 49 employees	19.4	25.2	34.6	20.8
more than 50 employees	20.1	27.2	31.5	21.1
NACE classification of economic activities				
Primary sector	34.6	26.9	26.9	11.5
Manufacturing	25.4	20.7	39.5	14.3
Construction	32.8	21.1	34.4	11.7
Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	27.4	25.8	30.3	16.5
Hotels and restaurants '	17.2	8.6	60.3	13.8
Transport, storage and communication	23.0	16.8	38.1	22.1
Financial intermediation	14.5	28.9	20.5	36.1
Real estate, renting and business activities	14.6	26.3	23.9	35.1
Public administration and defence, compulsory social security	23.3	41.7	13.3	21.7
Education	13.2	53.7	7.8	25.4
Health and social work	18.4	30.4	36.7	14.5
Other community, social and personal service activities or	27.0	28.4	35.1	9.5

activities of households				
Type of contract				
Permanent contract	19.0	25.7	33.1	22.3
Temporary contract	25.4	27.8	30.8	16.0

Source: SONAR C76(23)

All differences, except the difference between the job types of men and women, are significant. The more highly educated seem more represented in the high autonomy jobs (the low strain and active job types). Workers in part-time jobs experience less workload than their full-time counterparts. The number of high strain jobs is particularly high in the transport, storage and communication sectors, in manufacturing, and especially in the hotels and restaurant sector (60% of all jobs). Low-strain jobs seem to occur more in public administration and defence and in education. A lot of active jobs appear in the sector of financial intermediation and in the real estate, renting and business activities sector.

As noted above, the Karasek JDC model thus has as central hypotheses that an imbalance between demands (workload) and control (autonomy) increases strains, whereas a balance between both job characteristics increases learning and development in the job. Chapter 2 will test these hypotheses using the data from the SONAR surveys of school-leavers in Flanders (see below). Our focus is on the rarely tested but crucial hypothesis that work leads to active learning.

In chapter 3, we examine the relationship with pay as key indicator of job quality. We examine whether workers in a stressful job (defined according to the Karasek model) receive compensation for high workload.,. If we consider high workload in a job as a stressor, which constitutes a burden for the worker, the “compensating wage differentials” model predicts that workers accepting a job with high workload will receive a wage compensation. Combined with the predictions of the Karasek model, we might expect that the wage compensation for high workload will be lower in a job with high autonomy (active job). Because people starting in a stressful job seem to be worse off, we want to find out if this “pain” is only temporary. Do young people starting in a high strain job leave their job faster than those in an active job? What is the influence of the job type on the probability of being unemployed in the next spell? And are these young people really better off later on in their career or do they stay in stressful jobs? Chapter 4 answers these questions, offering a wider view on the transition period from school to work. Here we thus focus on the possible career perspective for young workers and we also highlight the importance of indicators of job quality for mobility behaviour.

Temporary employment (chapter 5)

The third main topic we raise considers the insecurity of the job itself. In chapter 5 we therefore focus on how youth are integrated in the labour market: do they enter through a temporary job or do they get a permanent job immediately? From a theoretical point of view two different approaches to temporary employment are possible. Temporary employment is sometimes seen as a bad

characteristic. Adam Smith (1776) suggested that the agreeableness of the job depends on "the constancy of employment". Segmentation theory sees a temporary contract as a characteristic of the secondary labour market. "The secondary market has jobs that, relative to those in the primary sector, are decidedly less attractive. They tend to involve low wages, poor working conditions, considerable variability in employment, harsh and often arbitrary discipline, and little opportunity to advance." (Piore, 1970).

Signalling and screening theory offers a positive view on temporary employment. Temporary contracts are seen as possible signals for employers as a solution for the asymmetric information through hiring, or they can be used as a screening device. The employer can, in the case of unobserved productivity, hire the employee on a temporary basis, during this period the employee can be screened.

If we look to the first job of employees only, the SONAR sample for Flanders shows that about 50% enter the labour market through a fixed-term contract or through a contract with a temporary work agency (table 3). The presented figures indicate clearly that temporary employment is very common among young people and it is especially used to hire school-leavers.

Table 3: Contract type of the first job of employees in Flanders

Contract type in the first job	(%)
Permanent contract	42.1
Fixed term contract	31.9
Temporary agency contract	18.4
Active labour market policy	7.6

Source: SONAR C76-78 (23-26)

Table 2 has shown that temporary jobs are underrepresented among the active jobs, matched by an overrepresentation among the passive jobs. Are temporary jobs therefore bad jobs or are they just a step towards permanent employment? In chapter 5, we focus on those starting their career in a temporary job. We investigate whether temporary employment increases the transition rate from school to a permanent job. We contribute to the literature by focusing on school-leavers, a group for whom the stepping stone hypothesis is almost never tested. In addition we join the group of studies which answer the question whether temporary contracts are a 'stepping stone' and thus compare a temporary contract with the alternative of staying unemployed. The aim is to determine whether the intermediate temporary job shortens the duration of the period it takes for school-leavers to find a permanent job.

5. The special case of young workers

All the data in this doctoral thesis is derived from the SONAR data. The aim of the SONAR[5] consortium is to study a representative sample of young Flemish adults in their transition from various educational institutions to the labour market. This aim is achieved in two phases. First, a survey of a large and heterogeneous sample of young adults of the same age is taken at regular intervals. Next, the same age group is surveyed again at a later stage (longitudinal follow-up design). The samples were randomly selected and trained interviewers at the interviewees' home address performed the oral interviews. The data is thus all self-reported information of the respondents. Since the database was constructed during the period in which the different researches were running, the different papers make use of different SONAR samples. The first chapter makes use only of one cohort questioned at 23. Only the last chapter includes the information at 26 (which was available by that time). The used data is always discussed in detail in the different chapters.

Does this sample of Flemish school-leavers differ from the Flemish population in general with respect to their job satisfaction? Table 4 presents the frequency distribution of questions on job satisfaction, both general (job satisfaction with the work as a whole), and with different aspects of the job, comparing two groups; the group central in this thesis, namely school-leavers (SONAR) and employees of all ages (APS).[6] This table shows that youth as well as workers from all ages are rather satisfied with their work. Both categories are especially satisfied with their employment relations (colleagues and direct boss) and with the content of their job and the working hours and holiday arrangements. A lower satisfaction is reported for the wages, the learning possibilities, the work pressure and especially the promotion opportunities.

When we compare the percentage of people who are satisfied with different aspects of their work between both samples, we conclude that the SONAR sample is less satisfied on most aspects compared to the employees of the APS-survey. For both wages and colleagues, the sum of those satisfied and those rather satisfied is similar for both groups, but for all other items the satisfaction differs between both groups. The young group seem somewhat more satisfied with their work pressure but they are considerably less satisfied with their promotion opportunities: only 36% are satisfied, compared with 43% in the APS sample. Also with regard to job security and the content of the job, the young people score lower. The differences between both samples are reflected in the satisfaction with the work as a whole: 73% of school-leavers are satisfied against 88% of the employees in general.

[5] 'SONAR' is an abbreviation for the Dutch title *Studiegroep van Onderwijs naar Arbeidsmarkt*, which can be translated as 'Research Consortium for the Study of the Transition between Education and Labour Market'.

[6] For more information on the comparison of job satisfaction in the SONAR and APS data, see De Witte & Verhofstadt (2006).

Table 4: APS and SONAR sample and their degree of job satisfaction (%)

To which extent are you satisfied with…?	Very satisfied		Rather satisfied		Not satisfied, not unsatisfied		Rather unsatisfied		Very unsatisfied	
	APS	SONAR	APS	SONAR	APS	SONAR	APS	SONAR	APS	SONAR
Content										
- Content of your job	38.3	33.6	48.4	38.2	9.4	13.3	3.2	9.2	0.7	5.6
- Learning possibilities	20.5	23.5	38.1	31.9	22.1	16.9	14.4	14.8	5.0	12.9
- Possibilities to take initiative	29.8	22.9	44.3	35.1	17.1	18.6	7.1	12.3	1.6	11.1
Circumstances										
- Physical circumstances	22.0	27.3	50.6	38.5	18.3	17.7	7.5	11.3	1.5	5.3
- Work pressure	11.6	16.8	40.8	41.2	27.9	22.8	16.4	14.0	3.3	5.3
Conditions										
- Wage	14.7	23.6	52.2	41.7	20.8	17.4	10.1	10.3	2.3	7.0
- Hours arrangements	31.9	34.8	48.7	40.2	12.6	11.4	5.3	8.7	1.7	4.7
- Holiday arrangements	34.5	36.3	42.4	35.2	11.4	12.1	9.3	10.0	2.5	6.4
- Job security	33.5	29.1	44.2	32.8	16.1	14.5	4.6	14.8	1.6	8.8
- Promotion opportunities	13.7	13.3	29.2	22.4	34.9	24.1	14.7	19.6	7.6	20.6
Relations										
- Colleagues	38.8	48.3	47.0	37.5	11.9	8.0	1.8	4.3	0.5	1.9
- Direct boss	34.8	38.7	44.0	34.2	14.1	11.2	4.9	7.7	2.4	8.3
Work as a whole	33.1	34.2	54.8	39.1	10.0	14.9	1.6	7.4	5.0	4.4

APS = survey titled '*Sociaal-culturele verschuivingen in Vlaanderen*' 1998 en 2000 (*Ministerie van de Vlaamse Gemeenschap, Administratie Planning en Statistiek*).

SONAR = SONAR C76(23).

Figure 1 offers some ideas as to why well-being reports of young people might differ from the population in general. There are several reasons why certain age groups might, on average, report higher or lower feelings of well-being at work:

1) Certain job characteristics occur more often within this group;
2) Different work values - factors which do not occur more often but have a different impact on the groups;
3) Differences in expectations about the job.

The first reason gives rise only to average higher or lower levels of reported well-being. This is also called the "job-change hypothesis" and is supported by Wright and Hamilton (1978). The other reason might explain why given the same objective characteristics, different groups report different well-being levels.

According to Lowe (2001), those over the age of 45 place greater emphasis than workers under the age of 30 on performing work that provides a sense of accomplishment and on feeling committed to their employer. In contrast, younger workers are more likely to emphasize job security and having opportunities for career advancement. Kalleberg and Loscocco (1983) argue that the observed age differences in job satisfaction partly reflect "more general processes of aging and development" and they highlight the importance of non-work roles.

As described above, our sample is even more specific than “young people” in general, since it contains young people in the transition period from school to work. It might be that these school-leavers see their first job in a long-term career perspective and thus accept temporary jobs of a lower quality in the hope of getting a better job later on.

6. Main results

In the first research question, we hypothesize that the positive relationship between educational level and job satisfaction, found in several studies, results from the impact of indicators of job quality on satisfaction. Our empirical analysis indeed confirmed the hypothesis that various indicators of job quality explain the relationship between the educational level and job satisfaction. more highly educated workers seem more satisfied than their less educated counterparts. This association, however, is caused by the fact that the more highly educated also obtain a job of better quality. When we control for the indicators of the quality of the first job, the association between the level of education and job satisfaction becomes negative: the more highly educated report that they are less satisfied with their (first) job. Two possible explanations for this finding could be offered. The first one is that the more highly and and the less educated have different values towards their work. If the more highly educated attach more value to characteristics that are less available in their job (eg. promotion opportunities) their reported well-being will be lower. An alternative explanation is that a higher standard of education induces higher expectations. These higher expectations could result in dissatisfaction when they are not met. This could be particularly true in the first job, because these young workers are still rather inexperienced.

The largest impact on job satisfaction was due to job characteristics. The results however indicated that the less educated will profit more from the psychological benefits of a ‘good job’ than the more highly educated. When a less educated worker obtains a job of good quality, his or her probability of being satisfied will be considerably higher than that of his more highly educated counterparts, working in exactly the same job.

In the second chapter, several aspects of Karasek’s Job-Demand-Control (JDC) model were tested. The results of the analyses confirmed all hypotheses derived from the JDC model, and also the learning hypothesis for which empirical evidence is scarce. Job dissatisfaction is higher amongst those with low autonomy (main effect of autonomy) and amongst those with high workload (main effect of workload). Low job autonomy combined with high workload leads to a level of job dissatisfaction which exceeds the combined effect of both taken separately. Autonomy thus seems to buffer the negative impact of workload on dissatisfaction, as expected in Karasek’s interaction hypothesis. The extent to which people acquired new skills was higher amongst those who score high on autonomy (main effect of autonomy) and amongst those working under high workload (main effect of workload). Furthermore, the combination of high autonomy and high workload leads to an

increase in the percentage of respondents who acquired new skills. Autonomy thus appeared to increase the positive impact of workload on learning, as expected in Karasek's interaction hypothesis.

The "compensating wage differentials" framework predicts that workers should receive compensation for unattractive features in the job. We thus hypothesised that workers receive a wage compensation for taking a job with high workload. However the main conclusion of our third chapter is that young workers are not compensated for high workload in their job. If we combine this with the conclusion of the previous contribution, that the combination of low autonomy and high workload does indeed result in stressful jobs, we can conclude that workers in high strain jobs are really worse off. First of all, they have a stressful job and (as a consequence) feel less satisfied. In addition to this, we have found that they are not compensated for this less favourable position. The other job type that Karasek distinguished is the active job (characterised by high workload but also high autonomy). According to Karasek, this combination leads to growth. In this research, we also observe that these young workers - and workers in the high control segment in general - are better paid than their counterparts. These results lead to the conclusion of a duality in the labour market for young people. On the one hand, the better-paid active jobs with on average higher job satisfaction, and on the other hand, the lower-paid, dissatisfying, stressful jobs.

Young workers with a high strain job (according to the Job-Demand-Control model of Karasek) are less satisfied with their job and do not receive a wage compensation for the strain that is associated with their job. In the fourth chapter we therefore raised the question whether they tend to leave their job sooner than their colleagues in active jobs. Our results confirm this hypothesis. Using different models for estimating duration data (non-parametric, semi-parametric and parametric), we consistently find that young workers leave their high strain jobs sooner compared with those in active jobs.

As well as the test of our main hypothesis (do starters in high strain jobs leave their jobs sooner?), we also examined whether they were better off later on in their career. The theoretical model predicts that young workers will leave their first job if they have a better alternative. Due to a lack of data, we could not test if this was true. Data only permitted comparison of the job type of the first job with the job type at the age of 26. The results of this comparison show that a considerable proportion of the young starters in high strain jobs remain in a high strain job later on. For those who had to leave their first job, we examined whether their job type also influenced the probability of being unemployed later on in their career. The estimation showed that this was not the case. So, although starters in high strain jobs are premature victims of forced mobility, their initial job type does not affect their probability of becoming unemployed afterwards. Only the educational level was a relevant determinant of that probability.

We can thus conclude that the strain of a high strain first job is only temporary. There is however a significant probability of remaining in a high strain job later on in the career.

In the last main contribution (chapter 5), we investigate whether temporary employment can act as a stepping stone for school-leavers. We compare the transition rate into permanent employment between school-leavers who stay unemployed and those taking up temporary employment. Our estimation results indicate that there is no selection in unobserved characteristics. Simulations are used to investigate the effect of temporary employment on the transition to permanent employment. The results differ for our two samples but for both we observe a time varying effect. Workers who accept a temporary job have a low transition rate into permanent employment at the start of the temporary employment spell, which results in a lower fraction of those obtaining a permanent contract in the short run (compared with the hypothetical situation where these individuals remained unemployed). In the long run (from 40 months in the sample of all school-leavers, 21 months in the sample of unemployed school-leavers) participants in temporary employment do better than school-leavers who remain unemployed during their search for a permanent job. So we can conclude that, on average, for all school-leavers, taking a temporary job delays the transition to a permanent job for the observed sample. We do find a strong stepping stone effect for our sample of unemployed school-leavers.

7. Further research reflection

Given our specific sample of Flemish school-leavers, an obvious suggestion for further research is to compare the results of our analysis with results of similar analysis for a more general population of working people. It would also be interesting to conduct a similar analysis for the same sample on a later age to see how job quality changes over the career. Further research should also include the potential role of social support as a moderator in the identified relationships.

Regarding our first main question, a topic for further research is trying to explain the relation between education and job satisfaction. Two possible explanations could be offered for the finding that, once controlled for the quality of their job, the more highly educated are less satisfied than less educated workers. The first one is that the more highly and the less educated have different values towards their work. Research into the work values of workers with higher and lower levels of education could help to test this possible explanation. An alternative explanation is that a higher level of education induces higher expectations. These stronger expectations could result in dissatisfaction when they are not met. This could be particularly true in the first job, because these young workers are still rather inexperienced. Further research is needed to check whether these results also hold for a sample of workers of all ages. This could indicate whether or not the obtained results are indeed due to the high expectations of highly-educated young workers at the start of their career. We would expect no relationship at all between education and job satisfaction for older workers, since their

expectations are based on their past labour market experience and their job satisfaction will only be influenced by the quality of their work. Testing our hypothesis for different samples is thus needed to check whether expectations do indeed explain why young, more highly educated workers are less satisfied than their less educated counterparts. The results of our study should also encourage empirical studies on job satisfaction to control for the quality of the job, in order to obtain the true impact of the educational level on job satisfaction. As a result, diverging empirical results concerning this relationship might gradually converge.

The results of our test of the Karasek JDC model are encouraging for theory as well as practice in occupational health psychology. As a consequence, future research should further focus on the test of Karasek's learning hypothesis, and on the analysis of the interaction between both job dimensions of workload and autonomy of the JDC-model in determining learning and growth. Future research is also needed in order to meet some of the weaknesses of our study. The measurement of the two core job dimensions needs to be strengthened in future research. Only a few items were used in this study to measure job control and workload. One should also measure how far the work-family relation influences the perception of demands at work.

The results of our study have shown that only jobs with an imbalance between the demands upon one and the control one has, cause stress. We also found that a proportion of those starting in a high strain job, obtain a "better" job later on in their career, a smaller proportion seem to stay in high strain jobs. Some of our findings suggested that the less educated who start in a high strain job are particularly vulnerable. Further research should therefore focus on the characteristics and antecedents of young workers who are unable to leave high strain jobs on their own.

With respect to temporary employment, our third main topic, many suggestions for further research can be given. The performed analysis was a basic analysis and can be refined by distinguishing different types of temporary employment and by running similar analyses for separate groups (eg. according to educational level). Institutional factors can be included, for example, by also modelling the sector of work. Given the absence of unobserved heterogeneity, it would be interesting to compare the results of our analysis with the same analysis using propensity score matching.

8. Policy reflection

The results of our contributions can help in a better understanding of the key work characteristics influencing well-being of workers and offer some suggestions on how to increase well-being at work. We first discuss how our results can add to actual public debates concerning the "knowledge economy", "stress" and "flexibility". Afterwards we will discuss briefly what can be done - how one can intervene to increase worker's well-being. We will end by summarising our three main suggestions for policy.

The knowledge economy

According to those who believe in the "knowledge economy", competition between firms occurs through superior knowledge. This concept is not wrong, as Green (2006) argues, but it is too simplistic. In reality there is a mix of skilled and unskilled jobs. The results of our first contribution indicated that skill utilisation is a very important determinant for job satisfaction. Providing adequate skills through education is a main task of government, but government should pay more attention to the demand side as well. Concern is needed for a balance between supply and demand for skills. However some warning has its place, since increasing skill utilisation of workers can only be achieved by increasing the possibilities to use skills in jobs, and not just increase the skill demands in job offers. Over-education negatively affects job satisfaction and should thus be avoided. Government could give the example by pursuing high skill strategies in its departments.

Stress

Stress is another concept much used in recent public debate, with reason given that the expenditures on it are huge. On average, in the European Union, 9.6% of GNP is spent on the consequences of job stress such as diminished productivity and medical costs (Le Blanc *et al*., 2000). The Karasek JDC model however refines the qualification of "workload" as the burdensome aspect of work, by highlighting the importance of a balance between demands in the job and the control one can exercise in that job. The statistical interaction in our results suggests that job autonomy moderates the relation between workload and job satisfaction, as supposed in the Job-Demand-Control model. Autonomy can thus buffer the negative consequences of workload on job satisfaction.

We also found that a considerable part of those starting in a high strain job, obtain a "better" job later on in their career. So, a high strain first job seems to be temporary for some young workers, and could be a stepping stone to a "better" job later on. We do not want to minimize the current problem of job stress among young starters with this statement. Stress is indeed a problem, but mostly for those who are not able to escape to another job and who must stay in high strain jobs or become unemployed. As a consequence, it is important to target these young workers. Some of our findings suggested that the less educated who start in a high strain job are particularly vulnerable.

Flexibility

Temporary employment has risen in most European countries over the last few years, making the flexibility debate more relevant than ever. Especially for the younger workforce, temporary employment is very important (Ryan, 2001). Opponents of flexibility argue that temporary employment is bad for employees. However our results point to a stepping stone effect of temporary employment for unemployed school-leavers. This means that temporary employment helps unemployed school-leavers in speeding up the gaining of permanent employment and that it increases their eventual probability of finding a permanent job. This stepping stone effect of temporary employment should encourage employment offices to help young unemployed people to find a job as soon as possible, even if it is a temporary job, since it enhances their chances

afterwards. The recent OECD report "Jobs for Youth" for Belgium also recommends "eventually abolish the waiting allowance and at the same time modify substantially the rules applying to new entrants to the unemployment offices" in order to reduce youth unemployment. For the unemployed school-leaver, this would increase his or her search effort and the likelihood of accepting a temporary job, which *ceteris paribus*, shortens the duration of the period before he or she gets a permanent job afterwards. However it is not certain that the same results would appear given a different school-to-work context. Therefore one should also take the macro effects of such a reform into account.

Given the potential positive effect of temporary employment one might also advocate the easing of employment protection legislation for temporary employees in order to give more opportunities to unemployed people to use the stepping stone effect of temporary employment. A recent study by Salvatori (2007) on the well-being effects of recent reforms easing restrictions on temporary employment in different European countries, generates positive results for both permanent and temporary employees.

Intervention

Intervention can have two targets; the individual or the work situation. One can also distinguish between two types of intervention; preventive interventions (interventions aimed at removing the causes) and interventions to soften the effects (Kompier, 2003). Arrangements like career interruption and time credit can be considered as preventive interventions for individuals. Counselling and coaching can help individual employees to soften the effects of dissatisfying work features. However our results offer some possibilities to ameliorate job quality. The core idea is the need to increase job control. The increase of job control enables to achievement of a double goal; the increase of job satisfaction and of the possibilities to acquire new skills in the job. The finding of an interaction between job control and workload strengthens this conclusion even more. The association between job demands and outcomes seems to be moderated by the possibility of exerting control in the job.

Of course there is no such thing as a free lunch and, as mentioned at the beginning of this chapter, policy takes considerations of both workers and employers into account. As Green (2006) argues, policies aimed at changing management culture need not be at the expense of productivity. Modern technology does not require firms to choose more regimented forms of work control, while changing workers' control has a considerable effect on their well-being. With respect to workload, things are different - changing work effort does influence workers' well-being, but for firms it might be beneficial to extract more effort from their workers where possible. This again supports our proposition that control becomes an important tool to realise growth and well-being in jobs.

Job enrichment or job redesign might be a good solution to intervene in the work situation to increase skill utilisation and autonomy and thus to increase the well-being of workers. Several ideas could be considered to redesign jobs in practice; removing unnecessary controls, combining tasks, allowing scheduling of own work, allowing workers to plan and control their own work (Kompier, 2003). The potential success of interventions depends not only on the steps taken but also on the way they are chosen and implemented. The employee can resist good measures when they are badly implemented. Therefore it is important to change the work situation together with employees (Kompier, 2003). Unions and collective representation bodies could play an important role in this, if they changed their primary emphasis away from pay.

Government could diffuse best practice by reducing central control in the state sector. Green (2006) gives the education sector as an example. He argues that the costs of extensive central controls on what school-teachers do are underestimated: "The hidden costs lie in the reductions in discretion and the freedom to do satisfying work".

Conclusion

The main suggestions from our research for policy can be summarised in the following three points:

1) Stop focusing on work pressure only as the indicator for stress at work, and instead consider the balance between demand and control in jobs.
2) Work on success stories of job enrichment and job redesign in order to increase skill utilisation and discretion in jobs, especially for less educated employees.
3) Take the potential stepping stone effect of temporary employment for unemployed school-leavers into account in the flexibility debate

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CHAPTER 1

Higher educated workers: better jobs but less satisfied?*

Abstract

The quality of the job of higher educated workers is better than that of their lower educated counterparts. This is certainly true regarding their wage and (non pecuniary) job characteristics. It is less clear, however, whether the level of education of workers is associated with their job satisfaction. We argue that the quality of a job plays an important role in the relationship between educational level and job satisfaction. The positive relationship between educational level and job satisfaction, reported in previous research, seems caused by the relationship between the level of education and job quality. We use survey data on Flemish 23 year old workers, to determine the effect of educational level on job satisfaction. The results show that higher educated workers are more satisfied than their lower educated counterparts, because they get a better job. When we control for all job characteristics, a negative relationship appears, with higher educated people reporting less job satisfaction.

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* This chapter is joined work with Hans De Witte and Eddy Omey

We would like to thank Gerdie Everaert, Freddy Heylen, Dirk Van de gaer and Dieter Verhaest for several valuable comments and critical suggestions.

The authors acknowledge support from the Flemish Ministries of Science and Technology and Education (PBO 1997 and 1998) and the Interuniversity Attraction Poles Program - Belgian Science Policy [Contract no. P5/21].

Forthcoming in International Journal of Manpower

1. Introduction

On the labour market, higher educated workers seem to be in a favourable position. They are better paid and work in jobs of better quality (e.g. less physical demanding job characteristics). It is unclear, however, whether they are also more satisfied with their jobs. Most research supports the hypothesis of a positive relationship between the level of education and job satisfaction, although sometimes, also a negative relationship is found. In this study, we want to clarify the relationship between the educational level and job satisfaction, using the Flemish SONAR-survey data. In this survey, 2212 23 year olds were surveyed regarding their labour market career and education.

In section 1 we give a brief review of the relevant job satisfaction literature. Section 2 introduces our hypotheses and explains how to test them. Section 3 presents the data and empirical results. Section 4 summarises our conclusions.

2. Determinants of job satisfaction: a brief review of the literature

Job satisfaction – "affective orientations on the part of individuals towards work roles, which they are presently occupying" (Vroom, 1967) - is a psychological concept, commonly used in (work and organisational) psychology (e.g. Spector, 1997). Freeman (1978) introduced it as an economic variable, assuming that it could explain economic behaviour too.

In this study (see section 3), we will include several possible determinants of job satisfaction in order to clarify the impact of the level of education. Three categories of possible determinants can be distinguished. First of all, the *level of education* itself will be considered, since this variable is the focus of our research. According to Hall, the evidence regarding the relationship between education and job satisfaction is mixed (Hall, 1994). Most studies find support for a positive relationship (for example Hamilton & Wright, 1981; Glenn & Weaver, 1982; Burris, 1983; in: Hall, 1994). Clark & Oswald (1996), Clark (1999), Grund & Sliwka (2005) however find a negative relationship between the level of education and job satisfaction. These authors obtained the negative results after controlling for various income effects. Grund & Sliwka (2005) interpret this negative relation as a confirmation of the hypothesis that job satisfaction is strongly influenced by aspirations. The extensive overview of the literature on e.g. education and (job) satisfaction of Veenhoven (1984), also points to diverging results. Again, most studies suggest both variables to be positively related. Some others, however, suggest a negative correlation, or no relationship at all. In this study, we examine whether these inconsistent results are due to variables related to the job of the respondents. The second category therefore considers *job characteristics*, as indicators of the *quality of work* of our respondents. It is not easy to define the characteristics of a 'good job', however, and scientists of various disciplines tend to use different criteria. Based on the literature (and because of some data restrictions), we first of all opt to analyse the wage (or income) as an economic indicator for a good job. The literature on job satisfaction indeed suggests that wage has a positive impact on job

satisfaction (e.g. Furnham, 1997). Note, however, that some authors do not find a (strong) empirical relationship between the absolute income level and job satisfaction. Lévy-Garboua & Montmarquette (1999) state that youth have a long term view and invest in their job, so that their actual wage has only a small impact on their level of satisfaction. Groot & Maassen Van den Brink (1999) argue that employees adapt to their higher wage, which diminishes the wage effect on satisfaction. Hamermesh (2001) indicates that changes in wage have an impact on job satisfaction. Clark & Oswald (1996) support the idea of a comparison income, which is significantly correlated with reported levels of job satisfaction.

Next to the income, several job characteristics will be considered. In work and organizational psychology, several theories have been developed, suggesting a specific set of job characteristics to indicate job quality, which subsequently leads to job satisfaction. Herzberg, Mausner and Snyderman (1959) were among the first to identify work intrinsic aspects like recognition, achievement and responsibility as factors, which increase job satisfaction. Later on, Hackman and Oldham (1976) developed their 'Job Characteristics Model' in which satisfaction depends upon the presence of five core job dimensions: variety, task identity, task significance, autonomy and feedback. O'Brien added skill utilization to this list (O'Brien, 1986). Karasek and Theorell (1990) discuss the importance of autonomy (an aspect of job control) and of workload (an aspect of job demands). Warr's 'Vitamin Model' (1987) encompasses the largest list of job characteristics indicating job quality (and subsequent job satisfaction). This list adds to the already mentioned job characteristics (such as income and variety) aspects such as the opportunity for control and for skill use, externally generated goals and physical security, among others.

In accordance with dual labour market theory (Piore, 1970), contract type is added as a possible indicator of job quality. An overview of research on the consequences of temporary work indeed suggests that temporary work can be considered as an indicator of reduced job quality (De Witte & Näswall, 2003), which is sometimes also associated with lower job satisfaction (for an overview, see e.g. De Cuyper, Isaksson & De Witte, 2005). Pénard et al. (1998) for instance, report that young workers in France are less satisfied with their job when they work on a temporary contract, compared to those with a permanent contract.

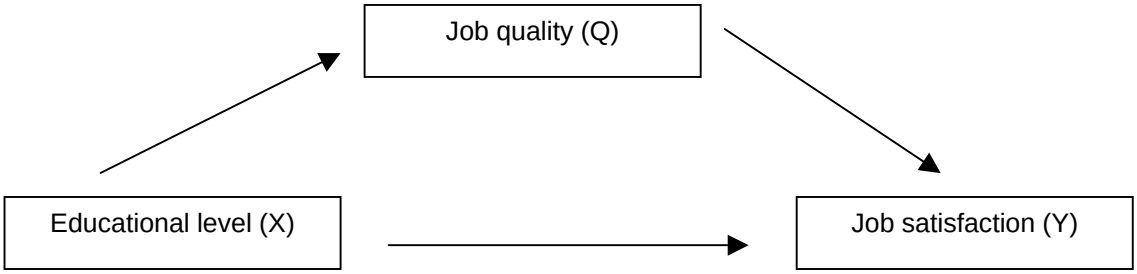
The third category of determinants of job satisfaction relates to *background characteristics*. These variables are included as control variables. A review of the job satisfaction literature shows that aspects such as gender (Clark, 1997), occupational level of the parents (Godechot & Gurgand, 2000) and company size (Dunn, 1986; Idson, 1990) are all associated with job satisfaction.

3. The role of indicators of a "good job" in the relationship between educational level and job satisfaction

We will test the hypothesis that job quality acts as a crucial ('contaminating') variable in the relationship between the educational level and job satisfaction. We hypothesize that the positive relationship between educational level and job satisfaction, which is found in several studies, results

from the impact of job quality on satisfaction. We assume that the higher educated have jobs of 'better quality' (e.g. with better job characteristics), which in turn results in an increase in satisfaction. Figure 1 summarises our hypotheses.

Figure 1: Hypothetical relationships between educational level, job quality and job satisfaction



To test the 'true' impact of the educational level on job satisfaction, we estimate three models.
In the first model, we examine the impact of the educational level (X) on job satisfaction (Y):

$Y = \beta X + \varepsilon_1$.

We assume a positive relation between the educational level and job satisfaction: $\beta > 0$ (hypothesis 1).

In a second model, we estimate the impact of the educational level on job quality (Q):

$Q = \alpha X + \varepsilon_2$.

We assume a positive relation between educational level and the various job quality indicators: $\alpha > 0$ (hypothesis 2).

The third model will reveal the 'true' impact of educational level on job satisfaction, when the job quality indicators are added as independent variables:

$Y = \beta' X + \delta Q + \varepsilon_3$.

We assume a positive impact of the job quality indicators on job satisfaction: $\delta > 0$ (Hypothesis 3a). For the resulting relationship between educational level and job satisfaction, three alternatives are possible (assuming that hypothesis 2 $\alpha > 0$ is valid):

1. A less significant (positive) association between job satisfaction and educational level, indicating that the higher educated have jobs of better quality and at the same time are (intrinsically) more satisfied with their work: $\beta' < \beta$ (hypothesis 3b.1).
2. No remaining significant association between job satisfaction and educational level, after controlling for the job quality indicators. This suggests that the higher satisfaction levels of the higher educated are only due to the (better) quality of their jobs. When the lower

and higher educated have a job with similar characteristics, their satisfaction levels would be similar: $\beta' = 0$ (hypothesis 3b.2).

3. A negative association between the educational level and job satisfaction, indicating that the higher educated are less satisfied with a job of similar quality than the lower educated: $\beta' < 0$ (hypothesis 3b.3).

The first two assumptions are supported by literature. Research suggests that the level of education is positively associated with job satisfaction in most studies: the higher educated are generally more satisfied with their jobs (e.g. Hall, 1994; Veenhoven, 1984; Spector, 1997). The level of education is also strongly associated with the occupational position of workers, partly because the educational level is used as an access criterion in order to achieve a higher occupational position (see e.g. Marshall, Newby, Rose & Vogler, 1988). A higher occupational position is related to most indicators of job quality, such as income, and job characteristics, such as autonomy and skill use (Spector, 1997; Warr, 1987). The third hypothesis relates to the controversy in literature, which will be tested in this study. We assume that the job quality indicators will be associated with job satisfaction (hypothesis 3a), as suggested in many theoretical models in work and organizational psychology (e.g. Herzberg et al., 1959; Hackman & Oldham, 1976; O'Brien, 1986; Karasek & Theorell, 1990; Warr, 1987). The 'true' relationship between the educational level and job satisfaction will be explored, after controlling for all job quality indicators (see the three alternatives mentioned above; hypotheses 3b.1 until 3b.3). Job satisfaction literature offers two main reasons why certain groups (in our case higher and lower educated people) might on average report higher or lower feelings of well-being at work, besides the obvious reason that certain job characteristics occur more often within a certain group. A first reason is different work values: factors that do not occur more often but have a different impact on the groups. The second reason might be differences in expectations about the job. (Spector, 1997)

4. Education and satisfaction with the first job: results of an empirical study on Flemish youngsters

4.1 Design and sample

Sample

The data used in this study was collected by the research consortium 'SONAR' (SONAR, 2001) in Flanders (Belgium). Belgium is known as a country with a low participation rate (below the EU average) due to a later entrance of youth on the labour market and the early retirement of many older workers (Vrind, 2000). The primary locus of wage negotiations in Belgium is the joint industrial committee organised at the national level for each economic sector, resulting in central agreements covering a variety of issues (wage an non-wage aspects). Subsequent bargaining takes place at

regional, enterprise and plant level. Union density (the fraction of the wage and salary earners (augmented by the unemployed) who belong to a union) is relatively stable around 55%; union coverage is about 90% (Wallerstein et al., 1997).

In Belgium there are large differences in economic performance between the regions Flanders, Wallonia and Brussels. Flanders performs better in investing, export and economic growth, resulting in better labour market indicators compared to the other Belgian regions. The Flemish unemployment rate (5.4% of the labour force in 1999) is below the European level (Vrind, 2000). The female unemployment rate (about 7%) is higher than the male unemployment rate, but much lower than the European average of about 11% in 2000. Women in Flanders more often work part time than the European average (41% versus 34%). There is however a huge difference in Flanders between men and women with regard to part time work, with almost no men working part time in Flanders. (Steunpunt WAV, 2000)

'SONAR' is a Dutch abbreviation ('Studiegroep van Onderwijs naar Arbeidsmarkt'), which can be translated as 'Research Consortium for the Study of the Transition between Education and Labour Market'. The aim of the consortium is to study a representative sample of young Flemish adults' transition from various educational institutions to the labour market. This aim is achieved in two phases. First, a cross-sectional survey of a large and heterogeneous sample of young adults of the same age is taken at regular intervals. Next, the same age group is surveyed again at a later stage (longitudinal follow-up design).

This study will use the data of the first survey (young adults born in 1976) consisting of 3 010 young Flemish adults, interviewed between October 1999 and March 2000 (see Sonar, 2001). At that point in time, all the respondents were 23 years old. The sample was randomly selected and trained interviewers at the interviewees' home address performed the oral interviews. About 51% of the respondents were male and 49% were female, a ratio which is also found in the Population Statistics. At the time of the interview, about 15% of the respondents were still in training (e.g. higher education). The others were either unemployed (11.4%) or working (73.4%). In this contribution, we restrict the analysis to working respondents (n= 2212). Respondents who were unemployed at the time of the interview (n=347) are thus deleted from the sample. We confine the analysis to data of the first job even though, at the time of the interview, some of the respondents were already working in a second (or third) job (n=1125) or were unemployed (n=93). The gender division of this reduced sample did not differ much from that of the larger sample (52% men as opposed to 48% women). About 11.1% of the respondents had obtained a university degree, and 28.1% had obtained a non-university higher education diploma (amounting to 37% of highly educated respondents). More or less 52.2% had obtained the higher secondary education certificate, 5.5% had obtained a lower secondary education certificate and 2.7% the primary education certificate. Respondents with the lowest degree of schooling were to a certain extent under-represented in this sample. For an explanation of the various levels of education, see Appendix 1. About 81.8% were employed by the private sector (41.2% as blue-collar workers and 40.6% as white-collar workers), and 12.4% by the public sector. The remaining 5.6% were self-employed. About 17% were working part-time and no

less than 57% had a fixed term contract (temporary work). Only 15.6% of the respondents were married, and a small number (1.8%) were not of Belgian nationality.

Job satisfaction in the SONAR-data

In the SONAR-questionnaire the workers were surveyed regarding their satisfaction with 12 aspects of their job, and with the job as a whole. The response-scale varies from 'very satisfied' to 'very unsatisfied'. Respondents were fairly satisfied with their first labour market experience: almost three-quarter of the respondents were rather or very satisfied with their work as a whole.

Respondents were surveyed about their satisfaction with their first job. All individuals who have once started working thus had to give a retrospective evaluation of their job satisfaction at the beginning of their first job. We will limit the analysis to satisfaction with the job as a whole (one item measurement of 'global satisfaction', see: Spector, 1997). The results of a meta-analysis of job satisfaction research suggest that one can adequately measure this concept with only one item (Wanous et al., 1997).

Job characteristics

The job characteristics were measured with self-reports by the respondents. All individuals who once started working were asked to give a retrospective evaluation of these aspects at the beginning of their first job. We use ratings of 30 aspects of their job. This battery of items was previously used in Belgian research (see e.g. Hooge & De Witte, 1998). The respondents had to score whether they completely agree, rather agree, rather disagree, or completely disagree with each item. Principal components analysis was used, and items loading on the same factor were added in order to obtain a reliable scale. We distinguish seven characteristics of the job. In appendix 2 we present these characteristics with their factor loadings (i.e. the correlation between the original variables and the factor). In the subsequent analysis, we only use the newly created variables (scales) as substitutes for the original variables (items). In doing so, the job characteristics are reduced to 7 aspects (instead of 30), because many of them were highly correlated. The following aspects were measured: dangerous working conditions ('physical demanding job'), the extent to which one can use one's skills ('skill utilisation'), job related learning, autonomy, workload, complexity (a composite of responsibility and complexity) and variety. These aspects cover most job characteristics as discussed in recent models of work stress (e.g. Warr, 1987; O'Brien, 1986; Karasek & Theorell, 1990).

Regarding wage, the respondents had to indicate the category in which their net monthly wage falls. Consequently, this variable is a categorical variable in the analysis. We also include an indicator of a 'comparison income' in the analysis. This variable was constructed in two steps. First, we estimated the wage category in which we could expect the respondent to be, when we take his/her background and job characteristics into account. Next, we compared this position with his/her actual wage, to determine whether this respondent obtained a higher or lower wage in reality. This variable is included in the analysis by use of two dummies: one for obtaining a higher wage than predicted and one for obtaining a lower wage than predicted.

The contract type is a dummy variable, distinguishing a permanent from a temporary contract.

Control variables

Gender, occupational level of the parents and company size are included in the model as control variables. Next to these, two additional variables are included in the analysis. The first indicates the duration of 'recall bias', expressing the amount of months that passed since the start of the first job (date of the interview minus start date of the first job). By including this variable, we control for the time span since the respondent started to work, because the first job is longer ago for some respondents than for others. This difference could affect their recollection of the data.

Because the sample consists of workers in their first job as well as of workers who already had more than one job, we also include a dummy variable which contrasts those working in their first job to those who found a second (or third) job. This variable also covers the influence of job change. As a consequence, also this variable could be used as an indicator of the quality of the first job. We therefore only include this variable in the final model.

4.2 Empirical analysis

In model 1 and 3 we regress job satisfaction on the educational level. Because the dependent variable (satisfaction with the job as a whole) is an ordered variable (from low to high satisfaction), we opt for an ordinal regression analysis. Such a model is based on an underlying latent variable $y_i^* = \beta x_i + \varepsilon_i$, which follows a standard logistic distribution[1]. The latent variable y_i^* is related to the observed job satisfaction variable: $y_i = j$ if $\gamma_{j-1} < y_i^* \leq \gamma_j$, with j the job satisfaction category (going from 1 to 5) and γ_l (l=0,…,5) the threshold parameters ($\gamma_0 = -\infty, \gamma_5 = +\infty$). The probabilities have the following form, given the parameters γ_j and β and explanatory variables x_i:

$$P(y_i \leq j) = P(y_i^* \leq \gamma_j) = \frac{\exp(\gamma_j - \beta x_i)}{1 + \exp(\gamma_j - \beta x_i)}.$$

In the third model also the indicators of job quality (Q_i) are included as independent variables, so $y_i^* = \beta' X_i + \delta Q_i + \varepsilon_i$.

1 We estimated the model with a different distributional assumption. The logit model fits the data better than alternative models (probit, complemantary log-log).

The interpretation of the β coefficients is in terms of the latent variable or in terms of the probabilities. A positive coefficient β_k means that the latent variable y_i^* increases if x_{ik} increases. Correspondingly the probability of being very satisfied will increase, whereas the probability of being very unsatisfied will decrease (Verbeek, 2000)[2].

The second model consists of regressing the job quality indicators on the educational level. Since wage was measured in categories, we also use an ordinal regression model. The various job characteristics are measured as continuous factors. For these variables, OLS regressions were used. In the modelling of the contract type as indicator for job quality, the dependent variable is a binary variable. As a consequence, we opt for a binary logit model when analysing this variable (Greene, 2003). The choice of the logistic distribution for the error term of the underlying latent variable (cf. ordered logit model) results in the following probability of obtaining a temporary contract in the first job:

$$P(\text{permanent contract} \mid X_i) = \frac{\exp(X_i\beta)}{1+\exp(X_i\beta)}.$$

We restrict the sample to full-time workers. All determinants except the characteristics of the job are entered as dummy variables. The reference category is always indicated.

The results of the regressions regarding the second model are presented in appendix 3. The results show that the educational level has a significant positive impact on the majority of the job quality indicators (hypothesis 2). In general, respondents with a higher (e.g. tertiary) level of education report more job related learning, skill utilisation, variety, autonomy, a higher income and a more complex job. These respondents also report less dangerous working conditions than their lower educated counterparts. No significant effect is found for the variable “work load”. The impact of the educational level on the probability of getting a temporary contract is opposite to our assumption. Having a degree of lower tertiary education increases the probability of obtaining a temporary contract, compared with those having a degree of higher secondary education. For the other educational levels, no significant effect was found.

In table 1, we present the results of the first and third model, in which job satisfaction was regressed on the educational level. Since the Heckman selection model was not supported, we report the model without the correction terms. In the first step, only background characteristics were introduced as control variables. In the third step of the model, also the job quality indicators were introduced as independent variables.

2The results of the job satisfaction regression analysis could be biased: respondents with a low score on job satisfaction are omitted from the estimation, leading to a censored sample. Following standard procedures we tested whether sample selection occurred using the Heckman procedure (1979). We concluded that selection issues did not disturb our results. The results of this test can be obtained from the authors on request.

Table 1

The results of the first model show that the educational level has a significant (positive) impact on job satisfaction, which confirms hypothesis 1. The results of the third model show that the job quality indicators have a significant impact on job satisfaction, as hypothesized (hypothesis 3a). Wage and job related learning however show no significant association with job satisfaction. For 'job related learning', this could be due to the high correlation with the level of educational (Pearson correlation equals 0.425). The additional variable "duration of the recall bias" has only a very limited impact in the first model. Respondents who are still in their first job are significantly more satisfied with that job. We can assume that those who were dissatisfied about their first job changed to a new job, because their first job did not correspond well with their wishes or aspirations. Important in this context is that we controlled for this recall bias when analysing our results: the relation between educational level and job satisfaction cannot be attributed to the effect of switching from the first to a new job.

The effect of the educational level has significantly changed in the third step, from a significant positive relationship (step 1) to a significant negative relationship. This finding is in line with the third alternative relationship, mentioned earlier (Hypothesis 3b.3). The first model thus seemed to confirm a positive relationship between education and job satisfaction, with higher educated workers showing a higher probability of being very satisfied. After controlling for background variables and job characteristics, however, we found a significant negative relationship in the third step of the model. This suggests that higher educated youngsters are more satisfied with their first job compared to their lower educated counterparts, because they have a 'better' job, with characteristics of higher quality. Once these differences in the quality of the first job are taken into account, the higher educated workers are less satisfied, however. These results thus indicate that the relationship between the educational level and job satisfaction as such is a negative one. Due to the impact of job quality indicators, this relationship becomes positive. According to literature (cfr supra) these differences among higher and lower educated might be due to two main reasons. The first reason might be that higher and lower educated have different values towards their work. Higher educated might attach more value to certain characteristics which are possibly less available in their job. A potential candidate to explain the differences between higher and lower educated might be the value they attach to promotion opportunities. Workers in general and young worker in particular are rather unsatisfied with their promotion opportunities (De Witte & Verhofstadt, 2006). Thurman (1977) in his international overview on job satisfaction also points to promotion prospects as the job aspect concerning which there is least satisfaction. It is plausible that higher educated value promotion opportunities higher then lower educated do and are therefore on average less satisfied with their work in general. A second possible explanation for the negative association of educational level and job satisfaction could be that a higher education induces higher expectations. When these

expectations are not met, dissatisfaction results (Hall, 1994). This could be particularly true in the first job, because these youngsters did not yet gain experience with jobs and with the labour market.[3]

Table 1, however, does not show the size of the impact of the various variables. Therefore, we calculated the probability of being 'unsatisfied' and 'satisfied' for persons with different educational levels, for both models in table 1 (results displayed in table 2). In the first model, the reference person is a man with a higher secondary degree, whose father and mother had an intermediary job. In the third model, several additional variables are included. The reference man works still in his first job in a large company with a permanent contract and earns between 1,000 and 1,250 EUR a month, which is also his predicted wage. The values for the 7 job characteristics and the duration of the 'recall bias' are the mean values of the sample (because we used factor scores for the job characteristics, the mean values are zero). For these reference persons, the probabilities of being unsatisfied and satisfied are calculated.

The results in table 2 show that in the restricted model, the probability of being satisfied increases with an increase in the educational level. The probability that the reference man will be satisfied is 73% when he has a degree of primary education. This probability increases to 82% when this person obtained a degree of higher tertiary education. The extended model, which also includes the job quality indicators, reveals quite different results, however. The probability to be satisfied is lower for those with a tertiary degree than for those with a secondary degree. The results in table 1 suggested that this difference is due to the inclusion of the various variables used to indicate job quality. To illustrate this point, satisfaction probabilities for the reference person with extreme job characteristics values are included in table 2. These scores are based on scale values. There are no outliers: all values (or cases) are realistic ones[4]. The reference man (with a degree of higher secondary education and with mean job characteristics) has a probability of 82.04% to be satisfied. When this person gets a job with the highest (e.g. maximum) score on skill utilisation, his probability of being satisfied increases to 94.54%. His probability of being unsatisfied decreases to less than half of this percentage. When he works in a job with maximum variety, his probability of being satisfied will be 87.77% (also compared to 82.04%). Assuming that he has both advantages in his job (maximum skill utilisation and maximum variety) his probability of being satisfied increases further to 96.45% (figure not reported in table 2). This underpins the importance of the job characteristics 'skill utilisation' and 'variety' for job satisfaction.

We can thus conclude that the higher educated have a higher probability of being satisfied because of their favourable job characteristics and not because of their educational level as such. The better quality of their job is due to their higher level of education. It is remarkable, however, that they are less satisfied with 'good' job characteristics compared to the lower educated. This can be illustrated

3 The results for gender show that women are more satisfied than men. A separate analysis for men and women did not result in different effects regarding the relation between educational level and job satisfaction. We however found that the negative effect of education on job satisfaction (after controlling for job quality) is somewhat stronger for men than for women.

[4] For example the maximum value of skill utilisation appears 387 times in the sample, the minimum value of workload 242 times.

with the percentages regarding a job with dangerous working conditions in table 2. The reference man with a degree of lower secondary education degree would have a probability of 88.28% to be satisfied, if he was working in a job with the lowest score concerning dangerous working conditions. Working in the same job would lead to a much lower probability to be satisfied (e.g. 73.32%), if this person has a degree of higher tertiary education.

Table 2

5. Conclusion

The existing literature regarding the relationship between the level of education and job satisfaction is rather ambiguous. Most empirical research suggests a positive relationship between both variables, whereas others found no relationship or suggest a negative correlation. In this paper, we hypothesize that the positive relationship between educational level and job satisfaction, found in several studies, results from the impact of indicators of job quality on satisfaction. Our empirical analysis indeed confirmed the hypothesis that various indicators of job quality explain the relationship between the educational level and job satisfaction. Higher educated workers seem more satisfied than their lower educated counterparts. This association, however, is caused by the fact that the higher educated also obtain a job of better quality. When we control for the indicators of the quality of the first job, the association between the level of education and job satisfaction becomes negative: the higher educated report that they are less satisfied with their (first) job.

Two possible explanations for this finding could be offered. The first one is that higher and lower educated have different values towards their work. If higher educated attach more value to characteristics which are less available in their job (e.g. promotion opportunities) their reported well-being will be lower. Research into the work values of higher and lower educated workers could help to test this possible explanation. An alternative explanation is that a higher education induces higher expectations. These stronger expectations could result in dissatisfaction, when they are not met. This could be particularly true in the first job, because these young workers are still rather inexperienced. Further research is needed to check whether these results also hold for a sample of workers of all ages. This could indicate whether or not the obtained results are indeed due to the high expectations of high-educated young workers at the start of their career. We would expect no relationship at all between education and job satisfaction for older workers, since their expectations are based on their past labour market experience and their job satisfaction will only be influenced by the quality of their work. Testing our hypothesis for different samples is thus needed to check whether expectations do indeed explain why young higher educated workers are less satisfied than their lower educated counterparts.

The results of our study should encourage empirical studies on job satisfaction to control for the quality of the job, in order to obtain the true impact of the educational level on job satisfaction. As a result, diverging empirical results concerning this relationship might gradually converge.

The largest impact on job satisfaction was due to job characteristics. Especially the possibility to use one's skills, and variety in the job contributed to job satisfaction. The results however indicated that the less educated will be more satisfied in a 'good job' than the higher educated. Companies and policy makers should keep this in mind. Investing in the job quality of lower educated young workers might boost their job satisfaction and as a consequence also their productivity.

Appendix 1: Educational variables

Primary	less than a degree in secondary education or BUSO education
Lower secondary	the highest level attained is a second degree in secondary education
Higher secondary	the highest level attained is a third degree in secondary education, a seventh year of secondary education or a fourth degree of vocational secondary education
Lower tertiary	up to a higher degree of the short (non-university) type
Higher tertiary	education at the university level

Appendix 2: Characteristics of the job

▪ Dangerous working conditions	
Dirty work	0.793
Smelly surroundings	0.724
Noisy surroundings	0.705
Dangerous or insecure conditions	0.703
Requiring much physical effort	0.660
▪ Skill utilisation	
I can show my abilities	0.863
I can see the results of my work	0.792
I can indulge myself in my work	0.788
▪ Job related learning	
Study regularly to keep up-to date	0.926
Follow courses regularly	0.926
▪ Autonomy	
Being able to decide what to do on a particular day	0.892
Being able to decide how much to work on a day	0.891
Being able to decide in which way to do the job	0.798
▪ Workload	
Work at a great pace	0.908
Work under time pressure	0.908
▪ Complex job	
Many responsibilities	0.792
Many creative ideas	0.777
Much mental effort	0.724
Direct others	0.635
▪ Variety	
I can learn new things	0.908
Varied work	0.908

Appendix 3: Results of the regression analysis in the different models

Model 2		Coeff (st. error)
Dependent variable	wage	
Independent variables	primary education	-0.327 (0.244)
	lower secondary	-0.253 (0.194)
	higher secondary (ref)	
	lower tertiary	1.639*** (0.112)
	higher tertiary	2.287*** (0.161)
Dependent variable	Temporary contract	
Independent variables	primary education	0.166 (0.256)
	lower secondary	0.159 (0.192)
	higher secondary (ref)	
	lower tertiary	0.495*** (0.115)
	higher tertiary	-0.171 (0.163)
Dependent variable	dangerous working conditions	
Independent variables	primary education	0.219** (0.101)
	lower secondary	0.150* (0.079)
	higher secondary (ref)	
	lower tertiary	-0.560*** (0.045)
	higher tertiary	-0.947*** (0.065)
Dependent variable	autonomy	
Independent variables	primary education	-0.107 (0.108)
	lower secondary	-0.120 (0.083)
	higher secondary (ref)	
	lower tertiary	0.536*** (0.048)
	higher tertiary	0.969*** (0.069)
Dependent variable	pressure of time	
Independent variables	primary education	0.003 (0.979)
	lower secondary	-0.044 (0.089)
	higher secondary (ref)	
	lower tertiary	-0.077 (0.051)
	higher tertiary	-0.043 (0.073)
Dependent variable	complex job	
Independent variables	primary education	-0.130 (0.108)
	lower secondary	-0.353*** (0.082)
	higher secondary (ref)	
	lower tertiary	0.669*** (0.047)

	higher tertiary	0.749*** (0.068)
Dependent variable	variation in the work	
Independent variables	primary education	-0.222 (0.136)
	lower secondary	-0.283** (0.100)
	higher secondary (ref)	
	lower tertiary	0.488*** (0.056)
	higher tertiary	0.646*** (0.081)
Dependent variable	skill utilisation	
Independent variables	primary education	-0.204* (0.114)
	lower secondary	-0.162* (0.088)
	higher secondary (ref)	
	lower tertiary	0.339*** (0.050)
	higher tertiary	0.391*** (0.072)
Dependent variable	learning	
Independent variables	primary education	-0.135 (0.102)
	lower secondary	-0.275*** (0.079)
	higher secondary (ref)	
	lower tertiary	0.777*** (0.045)
	higher tertiary	1.007*** (0.065)

Other control variables included in all the models: gender, occupational level of the father, and occupational level of the mother

Standard error in parentheses

* significant 10% level ** significant 5% level *** significant 1% level

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Table 1: Determinants of job satisfaction with the job as a whole (first job)

	Model 1	Model 3
Gender	0.174** (0.083)	0.207* (0.116)
Education		
Primary education	-0.208 (0.216)	0.329 (0.301)
Lower secondary education	-0.126 (0.147)	0.132 (0.190)
Higher secondary degree (reference)		
Lower tertiary education	0.287 ** (0.118)	-0.597 *** (0.173)
Higher tertiary education	0.332 ** (0.167)	-0.876 *** (0.235)
Wage		
Less than 750 € a month		0.005 (0.263)
Between 750 and 1,000 € a month		-0.199 (0.167)
Between 1,000 and 1,250 € a month (reference)		
More than 1,250 € a month		0.115 (0.230)
Higher wage scale than predicted		-0.172 (0.171)
Lower wage scale than predicted		0.064 (0.178)
Job characteristics		
Dangerous working conditions		-0.282 *** (0.060)
Skill utilisation		1.028 *** (0.072)
Job related learning		-0.045 (0.066)
Autonomy		0.222 *** (0.065)
Workload		-0.262 *** (0.057)
Complex job		0.230 ** (0.071)
Variety		0.417 *** (0.067)
Contract		
Temporary contract		0.198* (0.106)
Permanent contract (reference)		
Duration of 'recall bias'	-0.006** (0.003)	0.003 (0.004)
At 23 still in first job		0.702*** (0.123)
N	2106	1612
Nagelkerke R^2	0.010	0.214

Other control variables included in the model: occupational level of the father, occupational level of the mother and company size.

Standard error in parentheses.

* significant 10% level

** significant 5% level

*** significant 1% level

The reported results are for the 'very satisfied' category. The threshold values for the other categories in theses models are:

Treshold	Model 1	Model 3
Very unsatisfied	-3.324	-4.398
Rather unsatisfied	-2.246	-3.003
Satisfied, nor unsatisfied	-1.209	-1.519
Rather satisfied	0.534	1.155

We do not report the log-likelihood statistic since these are biased due to the large number of empty cells (especially in the third model, in which also continuous variables are included). McCullagh & Nelder (1989) however showed that the difference of log likelihoods between the full model and the 'intercept only' model can still be interpreted as chi square distributed statistics. It thus is a valid instrument to evaluate the model. Like the R^2 measure, this statistic shows that the more extensive model is better than the first model (SPSS, 1999).

Table 2: Probability of being satisfied

	Unsatisfied	Satisfied nor unsatisfied	Satisfied
Model 1: reference person with			
Primary education	11.52%	15.34%	73.14%
Lower secondary education	10.71%	14.57%	74.72%
Higher secondary degree (reference)	9.57%	13.41%	77.02%
Lower tertiary education	7.36%	10.94%	81.70%
Higher tertiary education	7.05%	10.58%	82.37%
Model 3: reference person with			
Primary education	3.45%	10.16%	86.39%
Lower secondary education	4.17%	11.93%	83.90%
Higher secondary degree (reference)	4.73%	13.23%	82.04%
Lower tertiary education	8.27%	20.18%	71.54%
Higher tertiary education	10.65%	23.81%	65.54%
Minimum of dangerous working conditions	3.32%	9.84%	86.84%
Maximum skill utilisation	1.29%	4.17%	94.54%
Maximum job related learning	5.16%	14.19%	80.65%
Maximum autonomy	3.12%	9.32%	87.56%
Minimum workload	2.99%	8.98%	88.03%
Maximum complex job	3.16%	9.42%	87.42%
Maximum variety	3.06%	9.17%	87.77%

CHAPTER 2

Testing Karasek's learning- and strain hypothesis on young workers in their first job*

Abstract

Both hypotheses of Karasek's 'Job Demand-Control'-model are tested: an imbalance between demands (workload) and control (autonomy) increases strains (job dissatisfaction; strain hypothesis), whereas a balance between both job characteristics increases learning and development in the job (here: learning new skills in the first job; learning hypothesis). Both hypotheses are tested in two ways: (a) the mere combination of both job characteristics is associated with the expected outcomes, and (b) a statistical interaction between both job characteristics occurs. A large- dataset (n = 2.439) of young workers in their first job is used to test all hypotheses. The results confirm both the strain and the learning hypothesis. We found a combined effect of both job characteristics, as well as a statistical interaction between both variables. The lowest level of job satisfaction is found in the 'high strain' job, whereas the highest increase in skills is found in the 'active' job. All predictions of Karasek's JDC-model are thus corroborated. The consequences of these findings for theory and practice are discussed.

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* This chapter is joined work with Hans De Witte and Eddy Omey

We would like to thank Gerdie Everaert, Dirk Van de gaer and Dieter Verhaest for several valuable comments and critical suggestions.

The authors acknowledge support from the Flemish Ministries of Science and Technology and Education (PBO 1997 and 1998) and the Interuniversity Attraction Poles Program - Belgian Science Policy [Contract no. P5/21].

Forthcoming in Work&Stress

1. Introduction

Karasek's 'Job Demand-Control'-model (1979; also see Karasek & Theorell, 1990) has rapidly moved into a dominant position in the field of work and organisational psychology. One of the reasons for this may be its simplicity: the model integrates various older research traditions (e.g. Hackman & Oldham (1980) and the 'Michigan model' (Kahn, Wolfe, Quinn, Snoek & Rosenthal, 1964)), and reduces a divergent series of stressors at work to only two dimensions. This leads to an economical model, which can be tested easily, and can be used to deduce unequivocal suggestions for redesigning job functions or -tasks.

Not surprisingly, the model inspired extensive research. However, not all assumptions have reliably been confirmed thus far, and one crucial assumption is rarely tested: the hypothesis that work leads to active learning. Testing this hypothesis will be the main focus of this article. To complete the test of the Karasek model, its strain hypothesis will also be tested. The dataset used enables an adequate test of these hypotheses, because it relates to young people working in their first job.

2. Karasek's 'Job Demand-Control' model

2.1 The model's basis dimensions: psychological job demands versus decision latitude

The original 'Job Demand-Control' model's (further on: JDC-model) point of departure is that two basis dimensions can be distinguished when discussing the consequences of a specific work environment (Karasek, 1979; Karasek & Theorell, 1990). On the one hand there are the 'psychological job demands' placed on the worker. The 'job demands' refer to a series of psychological stressors that are present in the work environment, such as time pressure and role conflicts. Generally, the combination of high working pace and high time pressure (high 'workload') is considered as the most important aspect of this dimension. Psychological job demands thus refer to the amount of work to be carried out and the time frame provided. A demanding job implies that one has to perform a lot of work within a limited time span.

The second dimension refers to possible 'control' within the job environment: the possibilities at one's disposal in deciding how to meet the job demands. This control dimension comprises two sub-dimensions: 'decision authority' (the extent to which employees are able to take autonomous decisions on the job), and 'skill discretion' (the extent to which people can utilize their skills at work). These two sub-dimensions are usually grouped under a single denominator, i.e. 'control' or 'decision latitude'.

The model's simplicity has been criticised (e.g. Johnson & Hall, 1988), because it disregards some crucial job dimensions. In a subsequent elaboration of the model, a third dimension was added to the two previous ones: the amount of *social support* within the job environment (Karasek & Theorell, 1990). This third dimension will not be taken into consideration in this article, however. In this contribution, the focus is on the original core model.

Karasek argues that a combination of both dimensions is essential for the development of 'strain' and 'activity'. An imbalance between psychological job demands and decision latitude causes strain. This is evident in the 'strain' diagonal, which contrasts 'low strain' and 'high strain' jobs. The 'strain hypothesis' states that the most adverse reactions of psychological strain are to be expected in the high strain job, which combines high job demands with low job control. A balance between the challenges of the situation (e.g. job demands) and the individual's skill or control in dealing with these challenges, results in opportunities to learn and develop. This is evident in the 'activity or learning' diagonal, which contrasts 'passive' and 'active' jobs. This results in the 'learning hypothesis' or 'activation hypothesis' (e.g. de Lange, Taris, Kompier, Houtman & Bongers, 2003), stating that most learning will be found in the active job (e.g. high job demands combined with high job control).

2.2 The strain hypothesis: work can be stressful

Karasek first of all defines a 'strain-diagonal': strains are caused by a combination of high job demands and low decision latitude ('*strain hypothesis'*). High job demands combined with low decision latitude constitute the most unfavourable situation within the model, leading to impaired well-being and ill health. This combination typifies a '*high strain job'.* A '*low strain job'* combines low job demands with high decision latitude. The model assumes that workers in this job will report fewer health or well-being complaints. The core idea behind the strain hypothesis is thus that strains will increase when the model's two dimensions are 'out of balance': an increase in job demands is problematic when it involves a reduction in decision latitude. The logic behind this assumption is that high demands initiate a state of arousal. This arousal will lead to damaging, residual strain when it cannot be converted into an effective coping response, due to a lack of discretion, needed to meet the demands effectively (Karasek & Theorell, 1990).

The strain hypothesis can be divided into three sub-hypotheses. Firstly, it is assumed that an increase in job demands increases strains. Secondly, reducing the decision latitude or the possibilities of control likewise involves greater strain. As such, two main effects of the Karasek JDC-model dimensions are specified. A third assumption specific to the Karasek model is the assumption that strains result from the 'joint effects' of both job dimensions (job demands and decision latitude; see Karasek, 1979). Karasek however remains unclear regarding the precise meaning of this 'joint effect' (e.g. de Jonge & Kompier, 1997; de Lange et al., 2003). One interpretation is that the mere *combination* of high job demands and low decision latitude leads to the highest strain level (additive effect). Another interpretation is that the combination of high job demands and low decision latitude

leads to more strain than the mere addition of the two dimensions' effects taken separately. The latter involves an *interaction* in the statistical sense of the word, which exceeds the additive effect discussed above. Both interpretations of the 'joint effect' postulated by Karasek are accepted within the literature (cf. de Lange et al., 2003).

Karasek's strain hypothesis has been extensively tested in empirical research (for reviews: de Jonge & Kompier, 1997; van der Doef & Maes, 1998 & 1999; de Lange et al., 2003). Also in Belgium and the Netherlands, the Karasek model is frequently used to examine the job environment's negative implications for health and well-being (e.g. de Lange, Taris, Kompier, Houtman & Bongers, 2004; Proost, De Witte, De Witte & Evers, 2004). The two postulated main effects are generally supported: both an increase in job demands and a decrease in the job's decision latitude are associated with an increase in strains, be it in the work context (e.g. job dissatisfaction) or beyond the job context (e.g. lower psychological well-being; for reviews, see: de Jonge & Kompier, 1997; van der Doef & Maes, 1999). A similar conclusion is reached based on large-scale epidemiological studies, focussing on various indicators of ill health, such as heart- and vascular diseases (e.g. de Jonge & Kompier, 1997; van der Doef & Maes, 1998).

A recent review of longitudinal studies, however, reveals limited empirical evidence for the supposed combination effect of job demands and decision latitude on strains at a later date (de Lange et al., 2003). This review reveals more evidence of separate main effects of both job dimensions. Even more problematic is the evidence regarding a possible interaction effect between job demands and decision latitude. Such an effect has been found by some researchers (e.g. Karasek, 1979; Parkes & Von Rabenau, 1993, both with regard to job satisfaction). In most studies, however, a similar interaction effect was not found (de Jonge & Kompier, 1997; van der Doef & Maes, 1998 & 1999; de Lange et al., 2003).

2.3 The learning hypothesis: work can activate workers

Karasek (1979) also defines a second diagonal alongside the strain diagonal: the '*learning'*- or '*activating'* diagonal. This diagonal defines a (more or less) equal balance between the two job dimensions. The core idea is that activation and learning will occur when the challenges of the situation (e.g. job demands) are matched by the individual's skill and control in dealing with these challenges. Karasek describes the outcomes 'activation' and 'learning' as 'an increase in overall activity and in general problem-solving activity' (Karasek, 1979: 288). Taris and Kompier (2004) reviewed several studies on this issue, and concluded that the 'learning hypothesis' refers to learning new skills and behaviour patterns, effective problem solving (or adaptation to the environment) and to work involvement and motivation.

The learning diagonal equally contrasts two job types. The combination of low job demands and low decision latitude typifies a '*passive job'*. This job type is unfavourable for learning, since it is

characterised by simple tasks and activities, which do not stimulate (problem solving) behaviour. An '*active job'*, on the contrary, is characterised by high job demands combined with a high level of decision latitude. Although this job is very demanding and involves handling a lot of work, it also offers a large amount of control, since the workers in this job can work autonomously and are able to use all available skills. As a consequence, this job increases the possibility to learn and grow in the job. These workers can learn new skills while further developing already existing skills.

The learning hypothesis can also be divided into three separate sub-hypotheses. First, an increase in job demands involves an increase in learning possibilities within the job. Second, an increase in decision latitude will have a similar effect. Apart from these two main effects, an additional 'joint effect' is also expected: the highest learning possibilities will occur in the situation characterised by high job demands and high decision latitude (the 'active job'). However, once again Karasek is not very clear about the exact meaning of this 'joint effect' (e.g. de Jonge & Kompier, 1997; de Lange et al., 2003). Two interpretations are possible: the mere combination of both job dimensions leads to learning (high job demands combined with a high level of decision latitude; additive effect), or an interaction effect in a statistical sense between both dimensions will lead to most job related learning.

It is striking that the learning hypothesis of the JDC-model inspired much less research than the strain hypothesis (de Jonge & Kompier, 1997; de Lange et al., 2003). This is particularly notable because research into positive job consequences (such as learning and growth) fits in well with the call to re-orientate the present research in the field of work and organisational psychology to 'positive' instead of negative outcome variables (e.g. Schaufeli & Bakker, 2004; Schaufeli, 2004). Karasek reports a longitudinal study indicating that workers with a passive job become gradually more passive as regards recreational and political activities, while the opposite is true for employees with an active job (Karasek, 1978).

Little research has analysed the learning hypothesis in a job context, however. In a recent overview, Taris and Kompier (2004) report that only 18 such studies could be found. A number of these studies do not focus on typical indications of learning or development. Five studies analyse job satisfaction, and three others focus on organisational commitment. The results in the remaining studies involve relevant outcome variables such as 'work challenge' and the motivation to learn. Taris and Kompier (2004) conclude their overview with the statement that most studies confirm the learning hypothesis, although it is too early for a definite conclusion. Some studies even contradict the learning hypothesis. Taris, Kompier, de Lange, Schaufeli and Schreurs (2003) found that teachers in a 'low strain job' displayed a higher degree of learning behaviour, while their colleagues with a 'high strain job' reported a lower degree of learning behaviour. It is striking that these effects are found on Karasek's 'strain diagonal' instead of on the 'learning diagonal', as expected.

Some conclusions can be drawn from Taris and Kompier's overview (2004) regarding the combination of job demands and decision latitude. First of all, the assumed interaction between both

job dimensions has rarely been tested. Secondly, it is striking that decision latitude is more strongly associated with indicators of learning and activation than job demands. Finally, the (additive) combination of both job dimensions had the predicted effect on indicators of learning in almost two thirds of the reviewed studies.

2.4 Topics for further research

Two research lacunae are evident from the review of the literature. First, there is a need to test the learning hypothesis. Subsequently, the assumed interaction-effect within the strain- and learning hypothesis needs to be explored: Does it relate to the 'mere combination' of both job dimensions, or to an interaction in a statistical sense? The literature discussed above suggests that the evidence thus far of both interpretations is weak and ambiguous.

Three other relevant suggestions can be derived from the literature, when testing the learning hypothesis. First, it seems essential to make a clear distinction between the dependent and independent variables. This is especially important when testing the learning hypothesis. De Jonge and Kompier (1997) warn against the danger of contamination, when one tries to predict learning (and skill development) on the basis of decision latitude, because the concept of skill utilisation is part of the latter. As a consequence, researchers are impelled to limit the decision latitude dimension to the concept of 'autonomy' only. Next, when testing the learning hypothesis, one should select an outcome variable that is clearly related to 'active learning behaviour' (Taris & Kompier, 2004). In line with their definition, Karasek and Theorell (1990) suggested three possible groups of such variables: learning new skills, problem solving behaviour and motivation. Finally, Taris and Kompier (2004) found that the majority of studies testing the learning hypothesis were limited to employees in 'contactual' professions, who have to focus on others in performing their job (e.g. nurses and teachers). This concentration of research in homogeneous professional groups may have distorted the results (see also Houtman & Smulders, 2003), hampering the possibility to draw general conclusions. Future studies using more heterogeneous samples are needed, in order to test the learning hypothesis more fully. These three suggestions will be taken into account in this study.

3 Method

3.1 Design and sample

The data used in this study was collected by the research consortium 'SONAR' (SONAR, 2001) in Flanders (Belgium). 'SONAR' is a Dutch abbreviation ('Studiegroep van Onderwijs naar Arbeidsmarkt'), which can be translated as 'Research Consortium for the Study of the Transition between Education and Labour Market'. The aim of the consortium is to study a representative sample of young Flemish adults' transition from various educational institutions to the labour market.

This aim is achieved in two phases. First, a cross-sectional survey of a large and heterogeneous sample of young adults of the same age is taken at regular intervals. Next, the same age group is surveyed again at a later stage (longitudinal follow-up design).

This study will use the data of the first survey (young adults born in 1976) consisting of 3 010 young Flemish adults, interviewed between October 1999 and March 2000 (see Sonar, 2001). At that point in time, all the respondents were 23 years old. The sample was randomly selected and trained interviewers at the interviewees' home address performed the oral interviews. About 51% of the respondents were male and 49% were female, a ratio which is also found in the Population Statistics. At the time of the interview, about 15% of the respondents were still in training (e.g. higher education). The others were either unemployed (11,1%) or working (73,4%). In this contribution, the data on the first job are used (n=2439)[1] even though, at the time of the interview, some of the respondents were already working their second (or third) job (n=1115) or were unemployed (n=93). The gender division of this sample did not differ from that of the sample survey (51% men as opposed to 49% women). About 10,5% of the respondents had obtained a university degree, and 26,6% had obtained a non-university higher education diploma (amounting to 37% of highly educated respondents). More or less 53,5% had obtained the higher secondary education certificate, 6% had obtained a lower secondary education certificate and 3,4% the primary education certificate. Respondents with the lowest degree of schooling were to a certain extent under-represented in this sample. About 82% were employed by the private sector (43% as blue-collar workers and 39% as white-collar workers), and 12,4% by the public sector. The remaining 5,6% were self-employed. About 18% were working part-time and no less than 58% had a fixed term contract (temporary work). Only 16% of the respondents were married, and a small number (2%) were not of Belgian nationality.

This particular sample has a number of advantages for the purposes of this study. First, this sample is heterogeneous and – apart from the educational level – is also representative for the 23-year old population of working young adults. This meets the need for analyses based on non-homogeneous samples. The (quasi) representative nature of the data also permits generalisation of the conclusions. The use of a large scale data file has enables controlling for a large amount of background characteristics, which may confound the association with the dependent variables. Focussing on young people working their first job is interesting, because it allows analysing learning as well as strain on a category group not yet influenced by other job experiences. This is exactly the type of category that still has a lot to learn about job practice, thus constituting an excellent category of employees for testing the learning hypothesis. Finally, limiting the category to 23-year olds has the advantage of controlling possible confounding variables on a macro level. These young people enter the labour market at more or less the same time (standardisation of the economic conjuncture), are

[1] In the 'SONAR' survey, the first job is defined as paid employment supported by a job contract (or as self-employed) for a minimum of *one* month, and for at least one hour a day and one day per week.

present in more or less the same stage of life, and grew up during the same time-period (standardisation regarding culture and values).

3.2 Measures

The SONAR questionnaire consists of a large number of questions. Only relevant variables are discussed in this section. Several background characteristics (such as gender, age and educational level) are recorded, next to questions related to the first job experience.

First of all, a number of aspects of the first job were charted (such as contract duration and the amount of hours worked). The respondents were also asked to evaluate about thirty items concerning job characteristics on a 5-point scale (ranging from 'totally agree' to 'totally disagree'). These items were used and tested in previous research in Flanders (e.g. De Witte, 1990; Hooge & De Witte, 1998). To operationalise job demands and decision latitude, two concepts were selected from the list of items: workload and autonomy. Scholars traditionally select both concepts as indicators for the two Karasek dimensions (compare e.g. Houtman & Smulders, 2003), and the selection of autonomy as indicator for decision latitude meets the need for a clear distinction between the dependent and independent variables (de Jonge & Kompier, 1997). A principal component analysis (with varimax rotation) was performed on the selected items, and resulted in the two expected dimensions. Job autonomy was measured with three items (example: "I can determine the way in which I work" and "I can determine the amount of work I do in one day"). Workload was measured with two items ("I work at a high pace" and "I work under time constraints"). Note that the selection of items also meets the recommendation that both dimensions of the Karasek model must refer to one another (van der Doef & Maes, 1999). When operationalising autonomy, reference was made to the control of workload. Factor scores, which will be used in all further analyses, were calculated for both dimensions.

Job (dis)satisfaction is chosen as indicator for 'strain'. This concept was measured with one item (e.g. "How satisfied are you with your work in general?"), and could be scored on a 5-point scale (from 'very satisfied' to 'very dissatisfied'). Most respondents were 'satisfied' (39,4%) or 'very satisfied' (35,5%) with their first job. Only 14,1% scored 'neither satisfied, nor dissatisfied' and 7,0% were 'dissatisfied' or 'very dissatisfied'. This distribution corresponds with the findings of other research in Flanders (e.g. De Witte, Hooge, Vandoorne & Glorieux, 2001). A meta-analysis regarding job satisfaction suggests that this concept can be measured with only one item (Wanous, Reichers & Hudy, 1997). When analysing the JDC-model, Karasek also suggested using job dissatisfaction as indicator of strain (Karasek, 1979).

As suggested above, it is crucial to select a relevant outcome variable in order to test the learning hypothesis (Taris & Kompier, 2004). Learning new skills is such a variable, and the data used enable to measure this concept. As a criterion for 'learning in the job' the following question could be used:

"Did you learn a number of new skills in your first job, which you did not possess before?" The respondents could only answer 'yes' or 'no'. About 76.3% of the respondents declared having learnt new skills in their first job, and 23.7% did not.

3.3 Hypotheses

The three sub- hypotheses of the strain hypothesis will be tested first. Hypothesis 1a states that an increase in workload is associated with reduced job satisfaction (main effect of workload on job satisfaction). Hypothesis 1b states that (job) autonomy is positively associated with job satisfaction (main effect of autonomy on job satisfaction). Karasek's assumption regarding the 'joint effects' of both job dimensions (hypothesis 1c: interaction effect of workload and autonomy on job satisfaction) can be tested in two ways (e.g. de Lange et al., 2003). One can test whether both main effects are found simultaneously ('combination'). The explicit interaction hypothesis sates that the combination of high workload with low autonomy leads to a decrease in job satisfaction that exceeds the sum of the effects of both dimensions taken separately ('interaction').

The learning hypothesis can also be tested by testing three separate sub-hypotheses. Hypothesis 2a assumes that an increase in workload is associated with learning new skills. Hypothesis 2b states that an increase in autonomy is associated with learning new skills. Next to these two main effects, a 'combination effect' is expected as part of hypothesis 2c (*both* dimensions *together* influence the learning of new skills). To conclude hypothesis 2c, an explicit *interaction* between workload and autonomy is expected: the combination of both job dimensions will have a more positive impact on the learning of new skills in the first job than the mere sum of the effects of the two separate dimensions.

3.4 Statistical analysis

To test both hypotheses we opt for a suitable logistic regression analysis. Since the dependent variable to test the strain hypothesis (job satisfaction) is an ordered variable, we use an ordinal logit analysis (McCullagh, 1980). The dependent variable for testing the learning hypothesis (whether or not new skills were learned in the course of the first job) is a binary variable, so we perform a binary logit model (Greene, 2003).

Job satisfaction and the extent, to which one learned new skills, are of course also influenced by other variables. For this reason, various confounding variables are kept under control in the analysis. In order to compare the results of both analyses, the same control variables are introduced when testing the strain and the learning hypothesis. These are traditional demographic characteristics, such as gender and educational level, supplemented with specific occupational characteristics such as job level, full-time versus part-time work, job contract shift work, day- or night shifts, net salary, and company size. Two variables were especially added because they could play a confounding role

when testing the learning hypothesis: the extent to which the workers' level of education is too high or too low for their present occupation (subjective assessment of over- versus underemployment; 3 categories, with 'just enough training' as the middle category), and the extent to which people were given 'on the job training' (yes versus no).

Next to these, two additional variables are included in the analysis. The first indicates the duration of 'recall bias', expressing the amount of months that passed since the start of the first job (date of the interview minus start date of the first job). By including this variable, we control for the time span since the respondent started to work, because the first job is longer ago for some respondents than for others. This difference could affect their recollection of the data.

Because the sample consists of workers in their first job as well as of workers who already had more than one job, we also include a dummy variable which contrasts those working in their first job to those who found a second (or third) job. This variable also covers the influence of job change. To test the interaction effect between autonomy and workload, both factor scores were multiplied and subsequently added to the analyses. Because factor scores are used, the suggestions by Aiken and West (1991) regarding testing interaction terms are met (e.g. the need to centre both variables beforehand). All coefficients reported below are unstandardised coefficients.

4 Results

4.1 Test of the strain hypothesis

The results of the test of the strain hypothesis are reported in Table 1. Because we run a regression to estimate the probability of being 'very satisfied'-, we expect a negative coefficient for workload (hypothesis 1a) and a positive coefficient for autonomy (hypothesis 1b).

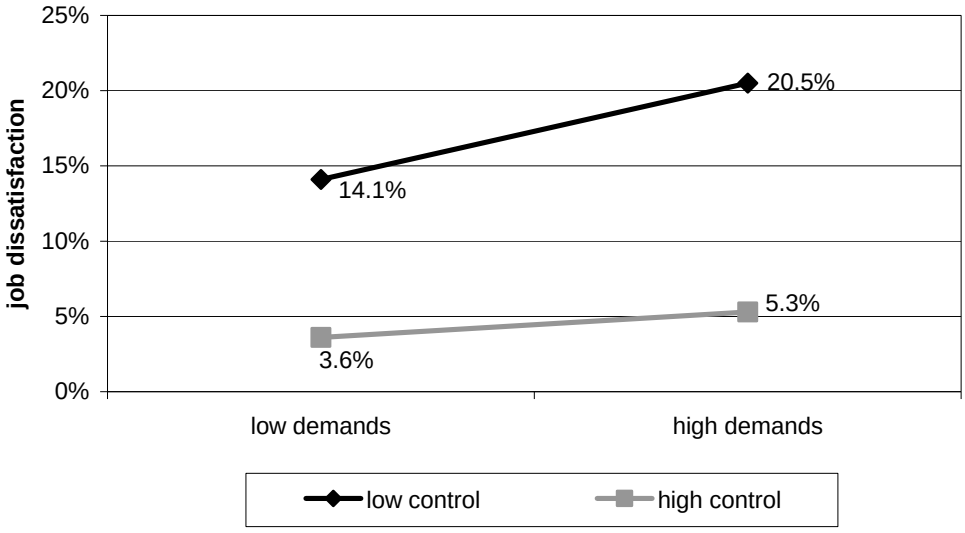
Table 1

The results in Table 1 indeed show a significant positive sign for autonomy and a significant negative one for workload. Hypotheses 1a and 1b are corroborated[2]. Note that autonomy is more strongly associated with job satisfaction than workload. The corroboration of hypothesis 1a and 1b also supports the assumption of an additive effect of both job dimensions ('combination' interpretation of the postulated joint effect of autonomy and workload). The results in Table 1 however also show a significant interaction effect. The exact nature of this interaction was examined by splitting both

[2] In another analysis (Verhofstadt & Omey, 2003) a few additional variables, such as the parents' occupational position and various job characteristics (e.g. skills utilisation and task variation), were kept under control when predicting job satisfaction. These variables did not, however, modify the correlation with the dimensions autonomy and job demands.

scales (autonomy and workload) into two, and by cross tabulating both dichotomous scales[3]. This results in Karasek's four job types: A passive job, an active job, a low strain job and a high strain job. Figure 1 reports the percentage of respondents within these four categories who were dissatisfied with their job (combination of the 'dissatisfied' and the 'very dissatisfied' response categories).

Figure 1. Test of strain hypothesis



The results in figure 1 confirm hypothesis 1c: The interaction displayed in this figure is in line with Karasek's strain hypothesis. Job dissatisfaction is higher amongst those with low autonomy (main effect of autonomy) *and* amongst those with high workload (main effect of workload). Low job autonomy combined with high workload leads to a level of job dissatisfaction which exceeds the additive effect of both separate job dimensions, resulting in no less than 20,5% of dissatisfied respondents in the 'high strain' job. Autonomy thus seems to buffer the negative impact of workload on dissatisfaction, as expected in Karasek's interaction hypothesis.

4.2 Test of the learning hypothesis

Table 2 reports the results of the test of the learning hypothesis. According to hypotheses 2a and 2B, a positive coefficient for workload (hypothesis 2a) *and* a positive coefficient for autonomy (hypothesis 2b) were expected.

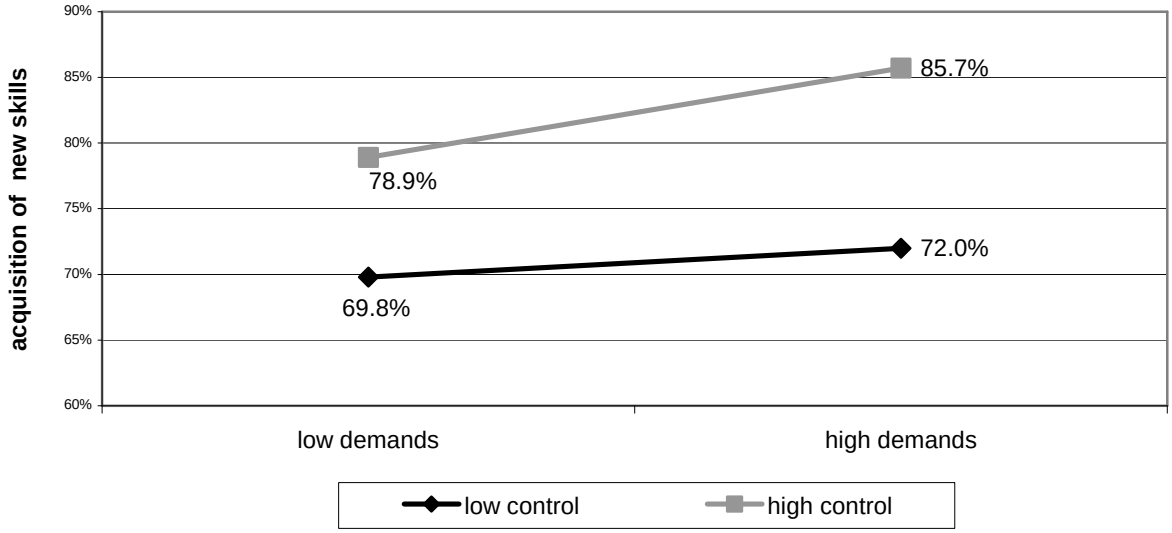
Table 2

The results in table 2 confirm both hypotheses: a high score on job autonomy and a high workload are significantly associated with the acquisition of more new skills in the first job. The association between both job dimensions and the acquisition of new skills is roughly of the same magnitude. The

[3] Because factor scores are used, a score above or equal to zero is considered as 'high', and a score below zero is considered as 'low'.

fact that we find evidence for both main effects (hypothesis 1a and 1b) also corroborates the interpretation of a 'combination effect' regarding Karasek's 'joint effect' of both job dimensions. Hypothesis 2c however also states that an interaction effect will occur between workload and autonomy in predicting the acquisition of new skills. This interaction effect is indeed significant. The nature of this interaction was examined by splitting both scales in two equal parts, and by cross tabulating both dichotomous scales[4]. Figure 2 reports the percentage of respondents indicating that they acquired new skills in their first job within each of the four Karasek job types.

Figure 2. Test of growth hypothesis



The results in Figure 2 confirm hypothesis 2c. The extent to which people acquired new skills was higher amongst those who score high on autonomy (main effect of autonomy) and amongst those working under high workload (main effect of workload). Furthermore, the combination of high autonomy *and* high workload leads to an increase in the percentage of respondents who acquired new skills. This effect transcends the mere additive effect of both separate job dimensions. In the 'active' job category, almost 86% indicated having learnt new skills in their new job. Autonomy thus appeared to increase the positive impact of workload on learning, as expected in Karasek's interaction hypothesis.

5. Discussion

Several aspects of Karasek's Job-Demand-Control model were tested in this contribution (Karasek, 1979; Karasek & Theorell, 1990). In contrast to most studies, *both* hypotheses of the JDC-model

[4] Because factor scores are used, a score above or equal to zero is considered 'high', and a score below zero as 'low'.

were tested, and not just the strain hypothesis. The strain hypothesis states that an imbalance between job demands and job control leads to strain. Consistent with the call to orientate research in occupational health psychology to 'positive' instead of negative outcomes and processes (e.g. Schaufeli, 2004), the learning hypothesis of the JDC-model was tested too. This hypothesis states that high demands and high control in the job increase growth, development and learning. Remarkably fewer studies are devoted to the test of this 'positive' hypothesis (Taris & Kompier, 2004). As a consequence, testing this hypothesis was the main focus of this article. Many studies are limited to the test of the main effects of both job dimensions of the JDC-model. In this contribution, however, the focus was on the assumption that the 'joint effects' of both job dimensions are of particular importance. Karasek remained rather vague regarding the exact nature of this joint effect (e.g. de Jonge & Kompier, 1997; de Lange et al., 2003). In line with the literature (de Lange et al., 2003), two interpretations of this joint effect are tested. The first states that the mere combination of both main effects will result in strain or learning. The second implies a statistical interaction: The combination of job demands and job control will lead to more strain or learning than the mere addition of the effects of both dimensions taken separately.

The hypotheses were tested using a large-scale dataset of 23-year-old young workers in Flanders (Belgium) (n = 2439). The data all referred to their first job. This sample had several advantages. First of all, the sample was heterogeneous (except for the age of the respondents). This meets the call of Taris and Kompier (2004) to test the learning hypothesis with non-homogeneous samples. The focus on young workers in their first job offers the opportunity to test both strain and learning among a category at the early stages of their career. This category is not yet influenced by other job experiences, and still has a lot to learn. As such, this category thus constitutes an excellent category to test whether learning (or strains) is determined by job characteristics, such as autonomy or workload. The analysis of the same cohort of young workers also enables to control for several confounding contextual variables, like the economic conjuncture at the time of their entry in the labour market, or the impact of a specific stage of life.

In testing the hypotheses of the JDC-model, some additional refinements, suggested in previous research are taken into account. The dimension of job control was limited to the aspect of job autonomy. This avoids contamination between the measurement of the independent variable (control) and that of the dependent variable 'learning in the job' (de Jonge & Kompier, 1997). Karasek considers the dimension of skill utilisation as an aspect of control, whereas this dimension shows a conceptual overlap with the dependent variable 'learning new skills on the job'. This overlap is avoided by limiting the analyses to job autonomy. Next, an attempt is made to conceptually attune both dimensions of the JDC-model to one another, as recommended by van der Doef en Maes (1999). Finally, in testing the learning hypothesis, the dependent variable needs to be closely related to active learning behaviour, as recommended by Taris en Kompier (2004). To meet this requirement, the acquisition of new skills while performing the first job was selected.

The results of the analyses corroborated all hypotheses derived from the JDC-model. First of all, all aspects of the strain hypothesis were corroborated. A higher degree of autonomy in the job was

associated with a higher score on job satisfaction, and a higher level of workload was associated with more dissatisfaction about the job. Both main effects were found simultaneously, thus confirming the first variant of Karasek's 'joint effects' hypothesis: the mere *combination* of high workload and low autonomy (resulting in a 'high strain job') is associated with the highest level of job dissatisfaction. Next to this, evidence was also found for a statistical interaction. The combination of both job dimensions resulted in a lower score on job satisfaction than the mere addition of the negative effects of both dimensions taken separately. Such a statistical interaction is rather scarce (van der Doef & Maes, 1999), and suggests that job autonomy moderates the relation between workload and job satisfaction, as supposed in the JDC-model (Karasek, 1979; Karasek & Theorell, 1990). Autonomy can thus buffer the negative consequences of workload on job satisfaction. It is conspicuous that such an interaction effect is found in this analysis, whereas it remains absent in many other studies (see e.g. van der Doef & Maes, 1998 & 1999). This could be due to the specific characteristics of the sample: Young workers in their first job. One could assume that this specific category constitutes a suitable category for the determination of such an interaction effect. These young workers have no other job experience. They are confronted with the consequences of (specific) characteristics of their job for the first time, which could lead to the detection of clear effects.

The various assumptions that can be derived from the learning hypothesis were also confirmed. High job autonomy was associated with the acquisition of new skills in the (first) job. A higher workload was equally associated with the acquisition of new skills. Striking, and in contrast to previous studies in this field (see e.g. Taris & Kompier, 2004), was the observation that both job dimensions were equally important in determining the learning of new skills. In their review article, Taris & Kompier (2004) conclude that job control is more strongly associated with indicators of growth than job demands. This differential effect was not found in this study. The finding that the acquisition of new skills was associated with both autonomy and workload confirms the 'combination' interpretation of Karasek's 'joint effects' hypothesis. This interpretation states that jobs that combine high job autonomy and high workload (the 'active jobs') are characterised by the highest level of growth. In this part of the research, the more strict statistical interaction hypothesis is corroborated too. The combination of high workload with high autonomy is associated with the highest percentage of respondents who acquired new skills. This effect exceeds the mere addition of the positive effect of both job dimensions taken separately. This finding suggests that job autonomy moderates the relationship between workload and the acquisition of new skills (as an indicator of growth). In this study, job autonomy increases the positive impact of workload on learning. This statistical interaction corroborates Karasek's original hypothesis regarding the 'joint effects' of demands and control. The fact that this interaction is found in this study could be related to the specific characteristics of the sample used. Young workers, who recently entered the labour market, are perhaps more sensitive to the effects of labour market conditions and job characteristics.

The corroboration of the hypotheses of this study offers some possibilities to ameliorate jobs, in line with some suggestions of e.g. Karasek (1979) and Karasek en Theorell (1990). The core idea of

these suggestions is the need to increase job control. The confirmation of *both* hypotheses of the JDC-model in the same study underlines the strength of this recommendation. The increase of job control enables to achieve a double goal: The increase of job satisfaction and of the possibilities to acquire new skills in the job. The finding of an interaction between job control and workload strengthens this conclusion even more. The association between job demands and outcomes seems to be moderated by the possibility to exert control in the job. Control therefore becomes an important tool to realise growth and well-being in jobs. Off course there is no such thing as a free lunch, but as Green (2006) argues policies aimed at changing management culture need not be at the expense of productivity. Modern technology doesn't require firms to choose more regimented forms of work control while changing worker's control has a considerable effect on their well-being. With respect to workload things are different: changing work effort does influence worker's well-being but for firms it might be beneficial to extract more effort from their workers where possible.

The results of this study are encouraging for theory as well as practice in occupational health psychology. As a consequence, future research should further focus on the test of Karasek's learning hypothesis, and on the analysis of the interaction between both job dimensions of the JDC-model in determining learning and growth. Future research is also needed in order to meet some of the weaknesses of this study. The two crucial dependent variables (job satisfaction and the acquisition of new skills) were measured in a rather crude way, using only one item. It is preferable to measure these variables with a larger amount of items in future research, because the reliability of a one-item measure is difficult to assess. This was impossible in this study, because an already existing database was used (secondary analysis). Future research should not solely rely on self-reports. Learning and growth in the first job could be assessed by an external observer (such as the supervisor). Also the measurement of the two-core job dimensions needs to be strengthened is future research. Only a few items were used in this study to measure job control and workload. The actual study is limited too, because it is cross-sectional in nature. A longitudinal follow-up of the respondents of this study would allow making causal interferences regarding the impact of job control and workload in the first job on strains and learning in the future.

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Table 1. Results of the test of the strain hypothesis (ordinal logit analysis)

Autonomy and workload	
Autonomy	0.588***(0.056)
Workload	-0.182***(0.047)
Autonomy * Workload	0.109*(0.046)
Control variables	
Women (1)	0.290**(0.097)
Lower education (2)	-0.247 (0.286)
Lower secundary education (2)	0.056 (0.195)
Higher non-university education (2)	-0.283(0.156)
Higher education: university (2)	-0.660**(0.239)
Qualification: to high (3)	-0.976***(0.116)
Qualification: to low (3)	-0.146 (0.197)
Training 'on the job' (4)	0.077(0.105)
At 23 not any more in first job (5)	-0.917***(0.108)
Duration of 'recall bias'	0.005 (0.003)
N	1871
Nagelkerke R^2	0. 264

The standard deviation is mentioned between brackets after each coefficient. *: $p < .05$; **: $p < .01$; ***: $p < .001$

The reference categories are respectively: (1) men, (2) respondents with a certificate of higher secondary education, (3) respondents with the 'appropriate level' of qualification to prefer their job (4) respondents that did not receive 'on the job training' and (5) respondents still working in their first job. Other included control variables: full time or part-time work, type of contract, company size, job level, shift work and net salary. The complete tables can be obtained with the authors on request.

Table 2. Results of the test of the learning hypothesis (binary logit analysis).

Autonomy and workload	
Autonomy	0.165*(0.075)
Workload	0.201***(0.062)
Autonomy * workload	0.141*(0.060)
Control variables	
Women (1)	-0.197 (0.128)
Lower education (2)	-0.365 (0.341)
Lower secundary education (2)	-0.281 (0.232)
Higher non-university education (2)	0.050 (0.210)
Higher education: university (2)	0.211 (0.335)
Qualification: to high (3)	-0.524***(0.141)
Qualification: to low (3)	0.268 (0.296)
Training 'on the job' (8)	0.776***(0.158)
At 23 not any more in first job (5)	-0.472***(0.142)
Duration of 'recall bias'	0.006 (0.004)
N	1879
Nagelkerke R^2	0.154

The standard deviation is mentioned between brackets after each coefficient. *: $p < .05$; **: $p < .01$; ***: $p < .001$

The reference categories are respectively: (1) men, (2) respondents with a certificate of higher secondary education, (3) respondents with the 'appropriate level' of qualification to prefer their job, (4) respondents that did not receive 'on the job training' and (5) respondents still working in their first job.

Other included control variables: full time or part-time work, type of contract, company size, job level, shift work and net salary. The complete tables can be obtained with the authors on request.

Note: One might question the validity of including the variable 'training in the job to explain 'learning' for reasons of endogeneity. Since the correlation between these two variables is only 0.186, we keep this variable as independent variable in order to control for a similar set of variables in both tests. Leaving this variable out of the model does not change our main results.

CHAPTER 3

Are young workers compensated for a high strain job?*

Abstract

In this paper we examine whether starters in a stressful job receive a compensation for the burden they face. The compensating wage differentials model predicts a wage compensation for accepting a job with high workload. The Karasek model (1979) highlights the importance of a balance between demands and control in the job. The combination of both models leads to the hypothesis that the wage compensation for high workload will be lower in a job with high autonomy. The selectivity corrected estimations do not confirm this hypothesis. So, entrants on the labour market who start in a stressful job are in a problematic position as they are not compensated for this burden.

* This chapter is joined work with Hans De Witte and Eddy Omey

We would like to thank Gerdie Everaert and Dirk Van de gaer for several valuable comments and critical suggestions. We are also grateful to participants of the Belgian Day Of Labour Economists (2004, ULG) and TIY 2004 (Nurenberg) for useful comments.

The authors acknowledge support from the Flemish Ministries of Science and Technology and Education (PBO 1997 and 1998) and the Interuniversity Attraction Poles Program - Belgian Science Policy [Contract no. P5/21].

1. Introduction

In this paper we test whether starters in a stressful job receive a compensation for the burden they face. If we consider high workload in a job as a stressor, which constitutes a burden for the worker, the compensating wage differentials model predicts that workers accepting a job with high workload will receive a wage compensation (Rosen, 1986). This model has very strict assumptions (e.g. perfect information and perfect mobility among workers). Job search models (Mortensen, 1986; Burdett, 1978) offer a possible explanation for the lack of a compensation for high workload. The Karasek model (1979) refines the qualification of 'workload' as burdensome aspect of work, by highlighting the importance of a balance between demands in the job (i.e. workload) and the control one can exercise in that job (i.e. the job autonomy one has). Especially a job with high workload and low autonomy (a 'high strain job') is supposed to be stressful, whereas a high demanding job with a lot of autonomy (an 'active job') results in learning opportunities. So we might expect that the wage compensation for high workload, if any, will be lower in a job with high autonomy (active job). Testing this hypothesis is the aim of this paper.

Previous research showed that entrants in a job with high workload and low autonomy ('high strain job') are less satisfied (De Witte et al., forthcoming). Therefore, it is important to analyse whether they receive a compensation for this additional burden in their job. Without compensation, these young workers are really worse off. If they are compensated, there might be no reason for concern.

2. Theoretical framework

2.1 Wage compensation

The origins of the compensating wage differentials theory can be found in the work of Adam Smith: "The whole of the advantages and disadvantages of the different employments of labour and stock must, in the same neighbourhood, be either perfectly equal or continually tending to equality. If in the same neighbourhood, there was any employment evidently either more or less advantageous than the rest, so many people would crowd into it in the one case, and so many would desert it in the other, that its advantages would soon return to the level of other employments. This at least would be the case in a society were things were left to follow their natural cause, where there was perfect liberty, and where every man was perfectly free both to choose what occupation he thought proper and to change as often as he thought proper" (Smith, 1776).
Rees (1973) argues that Smith's approach is incomplete in one important respect, namely that he writes as all workers have identical tastes.

The impact of tastes of workers is integrated by applying the hedonic hypothesis. This hypothesis states that goods are valued for their utility–bearing attributes or characteristics. Hedonic prices are

defined as implicit prices of attributes and are revealed to economic agents from observed prices of differentiated products and the specific amounts of characteristics associated with them (Rosen, 1974).

Rosen (1986) formulated this application of hedonic prices to labour market transactions. A labour market transaction is viewed as a tied sale in which workers simultaneously sell (rent) the services of their labour and buy the attributes of their job. These attributes are fixed for any one job, but may vary from job to job. On the other hand employers simultaneously buy the services and characteristics of workers and sell the attributes of jobs offered to the market. The characteristics of a particular worker are fixed, but may differ among workers. An acceptable match occurs when the preferred choices of an employer and an employee are mutually consistent. The actual wage paid is therefore the sum of two conceptually distinct transactions, one for labour services and worker characteristics, and another for job attributes. In this sense the labour market may be viewed as an implicit market in job and worker attributes (Rosen, 1986).

According to the basic compensating wage differential model, workers in a job with high workload should receive wage compensation.
Three assumptions at the supply side are needed to arrive at the prediction of the compensating wage differential theory (Ehrenberg and Smith, 2003):

1 Utility maximisation (workers maximise their utility, not their income)
2 Worker information (workers are aware of the job characteristics of importance for them)
3 Worker mobility (workers have a range of job offers from which to choose)

On the demand side also three assumptions are needed (Ehrenberg and Smith, 2003):

1 It is costly to reduce the “bad” characteristic (in our context this is high workload)
2 Firms operate at zero profit (due to competitive pressure)
3 All other job characteristics are already determined

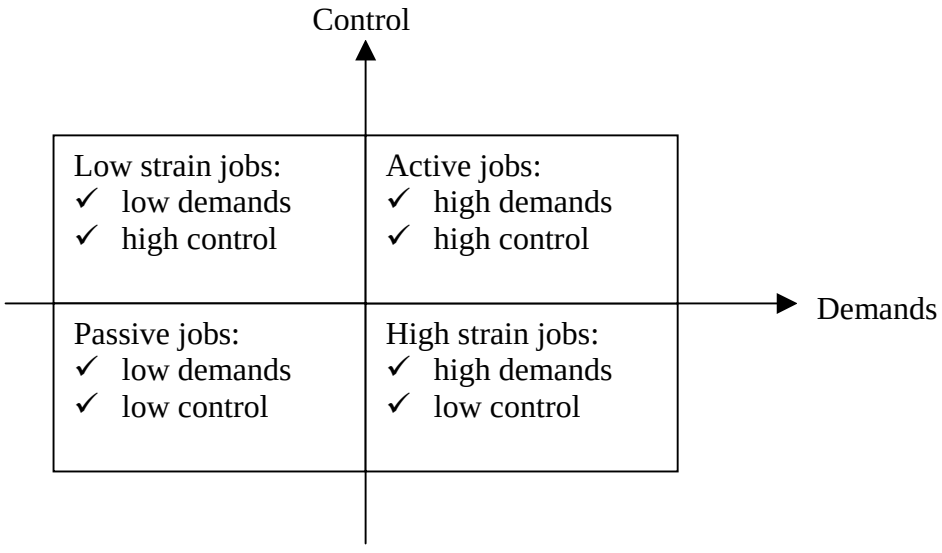
For school-leavers, the assumptions at the supply side are very restrictive. According to the wage search model of Mortensen (1986) and Burdett (1978) the search process for a job stops when the wage offered exceeds the reservation wage. Blau (1991) includes non-pecuniary work characteristics as indicators of the search process. As a consequence, the utility of the job becomes the unique determining element in the search process, instead of the wage. The reservation utility is a predetermined minimum acceptable utility level, determined by the level where the benefits of an additional search are equal to the benefits of accepting the job with its minimal acceptable utility level. When allowing for on-the-job-search, there are two reservation utilities: A and B (with A<B). When the respondent receives an offer with a utility that exceeds reservation utility A, the respondent accepts the job and continues searching for another job while working. He continues to search with an intensity that equals the marginal cost and return to search effort. The respondent quits the job, when he receives an offer with a utility equal or larger than the utility of his/her actual job. When the respondent receives a job offer of which the utility equals or exceeds reservation utility B, the

respondent accepts that job and stops searching for another job (the marginal cost exceeds the marginal return of search effort). In this framework, it is sufficient that the utility of the accepted job exceeds the reservation utility level A. Given the cost of searching, it is not evident that people have 'a range of offers' to choose from, which violates the third assumption at supply side. In this search theoretical framework, we are only sure that people will accept a job with a higher utility than the reservation utility level. This could be a high workload job. It is uncertain that the school leaver receives an alterative low workload job offer at the same moment. Because of this uncertainty, it is not necessary to pay a compensation for high workload.

2.2 'Job Demand-Control'-Model of Karasek (1979)

The job-demand-control model of Karasek (1979) achieved a dominant position within work and organizational psychology. One of the reasons is it simplicity, since it distinguishes only two basic dimensions when analysing jobs. The combination of psychological job demands and control or decision latitude gives rise to four job types, as described in figure 1. On the basis of the combination of both dimensions, Karasek formulated two hypotheses. The stress-hypothesis states that high demands combined with low decision latitude (a 'high strain' job) give cause for stress. The activity hypothesis states that the combination of high demands with a high level of control (an 'active' job) gives opportunities for growth and for the increase of one's competencies (Karasek, 1979).

Fig. 1: Jobtypes in the Karasek model (Karasek, 1979)



We can conclude that, according to the Karasek model, high workload is not per definition negative, as it can be a source of motivation when combined with a high level of control. Expressed in terms of preferences, we can summarise the Karasek model as follows: utility is decreasing with an increase in demands, and increasing with an increase in control.

3. Previous empirical research

The Karasek model has been the focus of a large amount of empirical research (e.g. De Jonge & Kompier, 1997; Karasek & Theorell, 1990; van der Doef & Maes, 1999). The main focus is on the stress hypothesis. Research concerning the activity hypothesis is rather scarce. In general, research clearly confirms the stress hypothesis. In their review of 20 years of empirical research on the Job Demand Control model, van der Doef and Maes (1999) conclude that most studies support the hypothesis that employees in high strain jobs are worse off: they experience a lower level of psychological well-being, less job satisfaction, more burnout and more job-related psychological distress. Epidemiological studies equally show that workers in a high strain job exhibit lower levels of various aspects of physical health, such as cardiovascular diseases (De Jonge & Kompier, 1997). Most studies show that both job characteristics distinguished by Karasek exhibit main effects on these (psychological and physical) outcome variables: an increase in job demands is associated with a decrease in health and well-being, whereas an increase in job control is associated with an increase in these outcome variables. As a conclusion, research demonstrates that more job demands are stressful, whereas more control in the job leads to a decrease in stress among workers. A previous test of the Karasek model with the SONAR dataset (i.e. the dataset used in this paper) confirms both the stress and the activity hypothesis. The combination of high demands and low control did result in lower overall job satisfaction (De Witte et al., forthcoming). This combination is typical for a high strain job, and can be considered as a particularly stressful situation.

A lot of empirical work has been done concerning the compensating wage differentials model. Most work has been done with respect to the risk of injury or death on the job. Viscusi (1993) gives an overview of labour market studies concerning the value of life and job injuries. Although the estimations vary considerably, the hypothesis that wages will be higher when the risks are higher is mostly supported. A variety of other job characteristics have been the focus of research on compensating wage differentials. Wage premiums have been found for night work, inflexible work schedules, having to stand a lot and working in a noisy environment (Ehrenberg, 2003). Smith (1979) however summarises that the theory of compensating differentials is only conclusive in case the job contains a risk of dying, but inconclusive with respect to other job characteristics.

Recent work estimating a wage differential for high workload work is non-existent. Two recent papers do estimate a price for stress. Both papers measure stress using respondent answers on the question whether their work is ‘mentally stressful’ (French& Dunlap, 1998) or ‘mentally demanding’ (Groot and Maassen van den Brink, 1999). French and Dunlap (1998) estimate compensating wage differentials for job stress, using OLS. Their findings suggest that a compensating wage differential does exist in occupations with above-average levels of mental stress. Groot and Maassen van den Brink (1999) include sample selection correction terms and found a compensation of 6-9% for workers in stressful jobs. This means that these workers earn 6-9% more than they would have earned in jobs without stress.

The main contribution of our work is testing the impact of 'job control' on the wage differential for high workload. We define stress in an accurate way by using one of the leading models in job stress research and we combine the Karasek model with the predictions of economic models about the pricing of job characteristics.

4 Data

We will test the hypothesis whether there is a wage compensation for high workload and if so, whether it is larger in jobs where high workload is combined with low autonomy. We test this for the Flemish youth labour market using the SONAR data. The SONAR dataset contains information about the transition from school to labour market for 23 years old, resulting from face-to-face interviews. Month to month registrations of the educational and labour market career as well as opinions about work in general and background information are available. For a detailed overview of the SONAR dataset we refer to SONAR (2000) and SONAR (2004).
For this research we will use the second wave of 3.000 23-years-old (born in 1978). We will estimate the compensating differential for high demands in the first job, as the dataset contains extended information about that job.
Not all 3.000 individuals are included, as not all of them found work (or had worked) yet when they were questioned (i.e. at the age of 23). We also excluded self-employed people. As a result the sample we use consists of 2093 respondents.

The measurement of job characteristics (such as job demands and control) can be done in two ways: observers can rate the job of a specific worker (a so called 'objective' measurement), or workers can rate their own jobs ('subjective' measurement; see e.g. Frese & Zapf, 1988). Both methods are in fact 'subjective', however, as both ratings have to be performed by an individual. The observer ratings have the advantage that the rating is performed separately from the respondent, thus excluding subjective evaluations and actual mood states of the observed worker. The disadvantage, however, is that the observer can only sample a specific (visible) part of the job performed, within a given time span. The self-description of the worker has the advantage that he or she can take all possible aspects of the job into account, whether or not they are visible or scarce. The correlation between both methods, however, is rather high (Fried & Ferris, 1987; O'Brien, 1986). Fried & Ferris (1987) in their analysis of 15 studies handling this problem found a median correlation of 0.63 between the so-called 'objective' and 'subjective' rating, suggesting that both methods measure the same reality. As a consequence, it is warranted to use self-descriptions of workers, collected during interviews.
We constructed a demand and control variable based on a list of items about different characteristics of their job, tested in previous research (e.g. De Witte, 1990; Hooge & De Witte, 1998). The respondents had to rate these items on a 4-point scale, ranging from completely agree, rather agree, rather disagree, to completely disagree.

We used the items related to job demands and job control. For job demands we could only use one item, asking whether one had to work at a great pace or under time pressure. To measure job control we used an average of three items: were the workers able to decide (a) what to do on a particular day, (b) how much work they had to perform that day and (c) how to perform the job. Joining these 3 items together is allowed since their internal consistency (measured by Cronbach's alpha) is 0.809.

For both job characteristics completely and rather agree were considered as 'high' and completely and rather disagree were considered as 'low'. The table shows the distribution of jobs in the sample.

Table 1: Number of the different job types in the sample

	low control	high control
low demands	Passive jobs: 509	Low strain jobs: 412
high demands	High strain jobs: 832	Active jobs: 338

The wage variable is the (self reported) official monthly net wage, without extralegal advantages or advantages in kind.

5 Estimation procedure

5.1 Estimation of the wage equation

The standard human capital earnings function as developed by Mincer is of the form (Mincer, 1974):

$$\ln W_i = \alpha_0 + \alpha_1 X_i + \upsilon_i$$

where the vector X contains schooling, experience and experience squared. The constant term α_0 represents the log of the earnings of someone without any additional investment in human capital. As we are considering the first job, no experience terms can be added. In addition to the human capital variable schooling we add personal, firm and job characteristics to the vector X. Using the semi-logarithmic specification, the coefficients α_1 can be interpreted as percentage changes in the starting wage for the variable considered.

As we are interested in comparing the wage between the different job types, we will estimate the following equation:

$$\ln W_i = d1 + d2 + d3 + d4 + \alpha_1(X_i * d1) + \alpha_2(X_i * d2) + \alpha_3(X_i * d3) + \alpha_4(X_i * d4) + d1 * \upsilon_1 + d2 * \upsilon_2 + d3 * \upsilon_3 + d4 * \upsilon_4$$

With d1, d2, d3 and d4 dummy variables for the different job types (passive jobs, high strain jobs, low strain jobs and active jobs). A joint test whether the coefficients for the different job types were equal or not will be performed.

5.2 Sample selection

It is possible that selection over the different job types is not completely random. Workers selecting themselves in a certain job type might be better off in this job type than in alternative ones. Therefore, the results from the wage predictions for the different job types might be biased (respondents who are not better off in a certain job type are omitted in the estimation; the sample is thus censored). Following standard procedures to correct for sample selection, we check if sample selection for the job types is significant.

The general idea of correcting sample selection is that the variables causing the specification error are estimated. These estimates are then used as regressors to estimate the wage functions.

A widely used method to correct for sample selection is the Heckman procedure (1979). Different from Groot & Maassen Van den Brink (1999) where the selection equation is binary, we need the generalisation of Lee (1983) to polychotomous choice selectivity models.
However Bourguignon, Fournier and Gurgand (2001) show that the method of Lee relies on a very unlikely particular case and they provide an alternative to get consistent estimates.

5.2.1 Estimation procedure based on Lee

In a first step the job type K (i.e. the four Karasek job types) is estimated for the whole sample using the following multinomial logit model:

$$K_{ij} = \delta_{0j} + \delta_{j1} Y_i + \varepsilon_{ij} \qquad \text{for } j = 1,...4$$

Y: vector of personal and job characteristics

The parameters are estimated by maximum likelihood and the probabilities P_{ij} (that an individual i chooses job type j) are computed. Out of these estimates the sample selection correction terms are calculated as suggested by Lee (1983). The log of the hourly wage on a set of personal and job characteristics is than regressed, whereby the sample selection correction terms (λ_{ij}) are included as an additional regressor.

$$\ln W_{ij} = \alpha_{0j} + \alpha_{1j} X_i + \kappa_j \lambda_{ij} + \mu_{ij} \qquad \text{for } j = 1,...4$$

The correct asymptotic covariance matrix for the different wage equations is computed as in Heckman (1979).

5.2.2 Estimation procedure based on B-F-G

Bourguignon et al (2001) show that the Heckman based correction term only incorporates the correlation between υ_j and ε_j for the choice j but neglects the possible correlation of υ_j with ε_j for the other possible choices. They correct this as follows[1]:

$$\ln W_{ij} = \alpha_{0j} + \alpha_{1j} X_i + \sigma_j \left[\rho_1 m(\hat{P}_1) + \rho_2 m(\hat{P}_2) + \rho_3 m(\hat{P}_3) + \rho_4 m(\hat{P}_4) \right] + \mu_{ij} \qquad \text{for } j = 1,...4$$

with ρ_1 : the correlation between υ_j and ε_1^*

$m(\hat{P}_1)$: the conditional expected value of ε_1^*

$\varepsilon_1^* = \Phi^{-1}(G(\varepsilon_1))$ G(.) is the cumulative of the Gumbel distribution function

Bourguignon et al (2001) suggest the use of weighted least squares in the second step model to gain efficiency. To obtain consistent standard errors they recommend a bootstrap method.

6 Estimation results

6.1 Sample selection

To estimate the job type in the Bourguignon-Fournier-Gurgand model we use a multinomial logit model with the parameters of a passive job normalised to zero. We used educational level of the mother, the number of siblings, financial independence of parents, living together, driving license and a typology of the place of residence as identifying variables. Since the selection terms in the estimated wage equations are not significant, we do not discuss them.[2]

6.2 Wage differentials

The estimated wage equation (without sample selection correction) can be found in appendix 1. We test whether the coefficients for the different job types were equal or not. The joint hypothesis that the differences in coefficients equals zero was rejected (p=0.0001).

Since we only observe the actual wage, we have to calculate the counterfactual wage. To eliminate the effects of the random term, we use the estimates to calculate all the wages (the wage when workload is high and the wage when workload is low). Table 2 offers the mean and median value of the predicted wages in all 4 job types. The wages of passive jobs and high strain jobs (the two job types in the low control segment) are close to each other. The same holds for the wages of the job types in the high control segment (low strain jobs and active jobs). It is also clear that the wages in the high control segment are higher than those in the lower control segment. The second part of

[1] For details about the bias in the Heckman type correction and the alternative for it, we refer to Bourguignon, Fournier & Gurgand (2001).

[2] The results of these estimations can be obtained from the authors on request

table 2 offers the counterfactual wage for each jobtype: the wage one would have earned if one works in a job with high respectively low workload. So the counterfactual wage for the passive jobs is the wage these people would earn in a high strain job. The counterfactual wage for high strain jobs is the wage workers in a high strain job would earn in a passive job.

Table 2: The distribution of the observed and predicted wages for the different job types.

	predicted wage				predicted counterfactual wage			
	passive	high strain	low strain	active	passive	high strain	low strain	active
Mean	1.777	1.772	1.864	1.862	1.772	1.781	1.852	1.871
Median value	1.770	1.767	1.851	1.871	1.765	1.770	1.861	1.873

Since we are interested whether or not there is a wage differential for high workload, we compute the wage differential between working in a high workload job and working in a low workload job. So we calculate the wage difference (d) as the wage that would be earned when one works in a job with high workload (H) minus the wage one would get in a low workload job (L):

$$d = E(\ln(W_i^H) - E(\ln(W_i^L)$$

We calculate this wage difference for the low ad high control segment.

The average and median values of the wage differential in both segments are presented in table 3. On average, workers in a high workload job earn less than if they would work in a low workload job. In the high control segment this average wage loss is higher than in the low control segment (0.56% versus 0.41%). The median values are also negative, which means that more than half of the population has a wage loss because of working in a high workload job.

Table 3: Mean and median value of the wage differential (in%)

	Low control segment	High control segment
Mean value	-0.41	-0.56
Median value	-0.49	-0.67

In general we can conclude that no evidence is found in favour of a wage differential for high workload jobs. On average there is a wage loss of having a high workload job, in both segments. The average penalty of working in a high workload job is higher in the high control segment than in the low control segment. This is in line with the prediction that the wage compensation should be lower in the higher control segment. However we do not find a wage compensation for high workload, but a wage penalty.

7 Conclusion

The main conclusion of our empirical work is that young workers are not compensated for high workload in their job. The compensating wage differentials framework predicts that workers should receive a compensation for unattractive features in the job. We thus hypothesised that workers receive a wage compensation for taking a job with high workload. The combination with the Karasek model leads to the hypothesis that the wage compensation for workload should be lower in the high control segment (i.e. for the active jobs) than in the low control segment. Our empirical results do not support this hypothesis. A possible explanation why this theory is not valid for workload in entry jobs can be found in the search theoretical framework (Mortensen, 1986; Burdett, 1978 and Blau, 1991). This theory predicts that school-leavers accept the first job, which offers a utility higher than a predetermined reservation utility level. Since searching for a job is not 'a free lunch', it is plausible that people do not have 'a range of offers' to choose from. So they will accept a job with a higher utility than the reservation utility level even if this is a high workload job. It is uncertain that the school leaver receives an alterative low workload job offer at the same moment. The worker will continue his search for a better job when working in his first job.

If we combine this with the conclusion that the combination of low autonomy and high workload does indeed result in stressful jobs (as witnessed by lower overall job satisfaction, see De Witte et al., forthcoming), we can conclude that workers in high strain jobs are really worse off. First of all, they have a stressful job and (as a consequence) feel less satisfied. In addition to this, we have found that they are not compensated for this less favourable position. The other job type that Karasek distinguished is the active job (characterised by high workload but also high autonomy). According to Karasek, this combination leads to growth. In this research, we also observe that these young workers - and workers in the high control segment in general - are better paid than their counterparts. These results lead to the conclusion that our supposed segments according to the control provided in the job are a true duality in the labour market for young people. On the one hand the better paid active jobs with on average higher job satisfaction and on the other hand the lower paid dissatisfying stressful jobs.

Two important questions for further research arise. First of all, we can ask the question if young workers try to avoid such an unfavourable position by leaving their stressful job more rapidly than their counterparts in other types of jobs (turnover). Secondly, we have to find out whether stressful jobs are only a start position or if they are the start of a career in this type of job? The latter would have important policy implications, as in current discussions "stress" is often considered as high workload only, without linking this aspect to the control dimension. Our results seem to suggest that first of all high workload combined with autonomy is not per se negative and secondly that jobs with a high level of control are better-paid jobs.

Appendix 1: Results of the wage equations

	passive jobs	high strain jobs	low strain jobs	active jobs
Constant	1.75***(0.04)	1.78***(0.03)	1.79***(0.04)	1.81***(0.04)
Man (ref)				
Woman	-0.06***(0.02)	-0.10***(0.02)	-0.04**(0.02)	0.01 (0.02)
lower education	-0.01 (0.05)	-0.01 (0.04)	-0.03 (0.07)	0.33***(0.09)
lower secondary education	0.00 (0.03)	-0.03 (0.02)	-0.07*(0.04)	0.00 (0.04)
higher secondary education				
higher education (3 years)	0.11***(0.02)	0.06**(0.02)	0.12***(0.02)	0.06**(0.03)
higher education (more than 3 years)	0.09*(0.05)	0.11**(0.05)	0.20***(0.03)	0.21***(0.04)
Permanent contract (ref)				
Temporary contract	-0.02 (0.02)	-0.04**(0.02)	0.00 (0.02)	0.01 (0.02)
Full-time (ref)				
Part time	0.10***(0.02)	0.16***(0.02)	0.16***(0.03)	0.12***(0.04)
Clerk (ref)				
Worker	0.00 (0.03)	-0.03 (0.02)	-0.03 (0.03)	-0.10***(0.04)
Small company (<10 employees)	-0.03 (0.02)	-0.04**(0.02)	0.02 (0.03)	-0.08***(0.03)
Medium company (ref)				
Large company (>50 employees)	0.05**(0.02)	0.07***(0.02)	0.03*(0.02)	0.02 (0.02)
Working during the day (ref)				
Working during the night	0.09***(0.03)	0.06***(0.02)	0.05 (0.04)	0.05 (0.04)
Not working in shifts (ref)				
Working in shifts	0.03 (0.02)	0.03 (0.02)	0.07**(0.03)	0.06 (0.04)
Elementary job level				
Lower job level	-0.04 (0.03)	-0.03 (0.02)	0.01 (0.04)	0.04 (0.04)
Intermediate job level (reference)	-0.01 (0.02)	-0.01 (0.02)	-0.03 (0.03)	-0.02 (0.03)
Higher job level				
Scientific job level	0.07**(0.03)	0.08***(0.03)	0.08***(0.03)	0.10***(0.03)
	0.13**(0.06)	0.10*(0.05)	0.12***(0.04)	0.12***(0.04)
Not giving direction (ref)				
Giving direction				
	-0.02 (0.04)	0.04 (0.03)	-0.01 (0.04)	-0.01 (0.03)
Service sector	-0.03 (0.02)	-0.01 (0.02)	-0.07**(0.03)	-0.06**(0.03)
Public sector	-0.02 (0.03)	-0.01 (0.03)	-0.09***(0.03)	-0.11***(0.03)

N: 1954

Log Likelihood: 587.46

Standard errors between brackets

* significant at 10% level, ** significant at 5% level, *** significant at 1% level

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CHAPTER 4

Starting in a high strain job… short pain ?*

Abstract

Karasek (1979) defined a stressful job as a job with an imbalance between the demands of the job and the control one can exercise in that job (a 'high strain job'). Previous research showed that starters in a high strain job are indeed less satisfied. They are also not compensated for the high workload they face. In this paper, we raise the question whether this strain ('high strain job') is only temporary. The results of our duration analysis show that those starting in a high strain job leave their job significantly sooner than those in an active job. However, this is no guarantee that the strain is only temporarily, since there is a significant probability of still having a high strain job at the age of 26. This finding determines our policy implication: the discussion on work stress should focus on those trapped in high strain jobs.

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* This chapter is joined work with Hans De Witte and Eddy Omey

We would like to thank Gerdie Everaert and Dirk Van de Gaer for several valuable comments and critical suggestions. We are also grateful to participants of the Belgian Day Of Labour Economists (2005, UGent). A special word of thanks to Jurgen Vanoverberghe for the many discussions and his assistance with the ideas developed in this paper.

The authors acknowledge support from the Flemish Ministries of Science and Technology and Education (PBO 1997 and 1998) and the Interuniversity Attraction Poles Program - Belgian Science Policy [Contract no. P5/21].

1. Introduction

Karasek (1979) emphasised the importance of a balance between the demands in the job (i.e. workload) and the control one can exercise in that job (i.e. the autonomy one has). A job with high workload and low autonomy (a 'high strain job') is supposed to be a stressful job, whereas a high demanding job with a lot of autonomy (an 'active job') results in learning opportunities.
Previous research shows that young workers who start in a high strain job are less satisfied than their counterparts (De Witte et al., forthcoming) and that they are not compensated for this aggravating work situation in terms of a higher wage (Verhofstadt et al., 2004).

Because workers starting in a high strain job seem to be worse off, we want to find out whether this strain is temporary. Do young workers who start in a high strain job leave their job faster than those in an active job? What is the influence of the job type on the probability of being unemployed in the near future? And are these young workers better off later on in their career, or are they 'locked up' in high strain jobs?

We first of all model job search on the basis of the wage-search model of Mortensen (1986). We incorporated various aspects of the job in this model (by not only considering the wage but also the utility of the job).

We will use duration analysis to answer our first research questions. We compare the job duration of high strain and active jobs by using non-parametric, semi-parametric and parametric estimations. Multinomial logit models will be used to analyse the impact of the first job type on the probability of unemployment in the near future and on the probability of still having a high strain job at the age of 26.

2. Theoretical framework

In this theoretical part, we introduce the Karasek Job-Demand-Control model, and the framework used to analyse the job duration of the different job types of the first (significant) job.

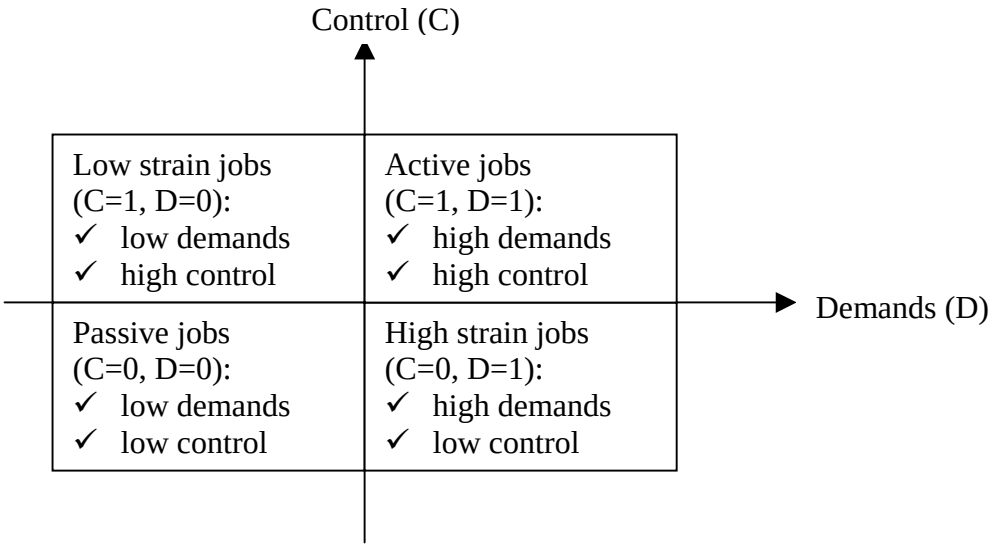
2.1 The Karasek Job-Demand-Control model (1979)

The job-demand-control model of Karasek (1979) achieved a dominant position within work and organizational psychology. One of the reasons is it simplicity, since it distinguishes only two basic dimensions when analysing jobs. The combination of psychological job demands and control or decision latitude gives rise to four job types, as described in figure 1. We define both control (C) and demand (D) as binary variables. On the basis of the combination of both dimensions, Karasek formulated two hypotheses. The stress-hypothesis states that high demands combined with low

decision latitude (a 'high strain' job) causes stress. The learning hypothesis states that the combination of high demands with a high level of control (an 'active' job) gives opportunities for growth and for the increase of one's competencies (Karasek, 1979).

According to the Karasek model, high workload is not per definition problematic, as it can be a source of motivation when combined with a high level of control. Expressed in terms of preferences, we can summarise the Karasek model as follows: the utility is decreasing with an increase in demands, and increasing with an increase in control.

Figure 1: Jobtypes in the Karasek model (Karasek, 1979)



The Karasek model has been the focus of a large amount of empirical research (e.g. De Jonge & Kompier, 1997; Karasek & Theorell, 1990; van der Doef & Maes, 1999). The main focus is on the stress hypothesis. Research concerning the learning hypothesis is rather scarce. In general, research confirms the stress hypothesis. In their review of 20 years of empirical research on the Job Demand Control model, van der Doef and Maes (1999) conclude that most studies support the hypothesis that employees in high strain jobs are worse off: they experience a lower level of psychological well-being, less job satisfaction, more burnout and more job-related psychological distress. Epidemiological studies equally show that workers in a high strain job exhibit lower levels of various aspects of physical health, such as cardiovascular diseases (De Jonge & Kompier, 1997). Most studies show that both job characteristics distinguished by Karasek exhibit main effects on these (psychological and physical) outcome variables: an increase in job demands is associated with a decrease in health and well-being, whereas an increase in job control is associated with an increase in these outcome variables. As a conclusion, research demonstrates that more job demands are stressful, whereas more control in the job leads to a decrease in stress among workers. A previous test of the Karasek model with the SONAR dataset (i.e. the dataset used in this paper) confirms both the stress and the learning hypothesis. The combination of high demands and low

control did result in lower overall job satisfaction (De Witte et al., forthcoming). This combination is typical for a high strain job, and can be considered as a particularly stressful situation. The combination of high demands and high job control (an 'active job') resulted in an increase in skills, as hypothesised in the learning hypothesis. The Karasek model has rarely been used to predict turnover. However, some of the outcome variables of the model, such as strain and dissatisfaction are often mentioned as antecedents of job mobility (e.g. Maertz & Campion, 2001).

2.2. Modelling job duration

As a starting point for our analysis, we use the wage search model of Mortensen (1986), extended by the possibility of workers looking for a job while they are employed (Burdett, 1978). We elaborate this model by not only considering the wage of the offered job, but by also including non-pecuniary characteristics of the work as indicators for the search process (Blau, 1991). As a consequence, we do not define the wage as the unique determining element in the search process. We instead highlight the utility of the job. We define $U = f(C, D; X)$: the utility is determined by the level of control (C) and demand (D) in the job and by X, which is a vector of other job and personal characteristics (including the wage).

Economic agents spent resources (time, telephone costs, transportation costs, stamps, …) while searching for jobs. For simplicity, we assume that the cost of this search is identical for both employed and unemployed. An important implication of this assumption is that the reservation utility of an unemployed worker is the utility of leisure. Assuming that the cost of job search is the same whether one is employed or not, implies that the economic agent accepts the first job which compensates for the value of abandoned leisure and continues to search for a better job (i.e. a job with a higher utility) while exercising his job. We also assume that the returns to more intensive job search diminish. We incorporate these assumptions in the model by assuming that the offer arrival rate is proportional to the worker's job search effort (λs) and by assuming that the cost of job search is an increasing convex function of search effort ($c(s)$).

We restrict our attention to modelling the probability of leaving the first job. $rU(\bar{u})$ denotes the discounted future utility when the economic agent is employed in a job with utility $\bar{u}$, given that the optimal job search strategy is followed in the future:

$$rU(\bar{u}) = \max_{s \geq 0} \left[\bar{u} - c(s) + \lambda s \int_0^{\infty} \left\{ \max\left[U(u), U(\bar{u})\right] - U(\bar{u}) \right\} dF(u) \right]. \quad (1.1)$$

The job search effort in the current period only affects the cost of job search in the current period and the probability of generating an offer in the next period. So, the optimal value of the job search effort maximizes the sum of the utility of the current period (i.e. utility net of search costs in the current

period, $\bar{u} - c(s)$ when employed at $\bar{u}$) and the expected utility gain, which is attributable to job search. The expected utility gain attributable to job search, consists of the product of the offer arrival rate (λs) (which is proportional to the search effort) and the expected difference between the utility when accepting and working in a job with utility u and the utility when staying in the job which provided the utility $\bar{u}$.

The economic agent determines the search intensity so that the optimal job search effort equals the marginal returns and costs of continuing the search effort in the next period. The optimal search effort can be derived from equation (1.1). Let $s^*(u)$ be the optimal search intensity choice of the economic agent when he is employed in a job with utility u. The optimal search intensity declines with the utility obtained while employed. So, the higher the utility while employed the lower the optimal search intensity ($s^*(u)$). At a certain high level of u, the marginal return of continuing the search effort will not be sufficient to compensate for the marginal costs of that search effort (> 0). This utility level (u^*) is the reservation utility.

Formally:

$$(\lambda / r)\int_{u^*}^{\infty}\left[u - u^*\right]dF(u) = c'(0). \qquad (1.2)$$

Equation (1.2) suggests that the marginal return of continuing the search effort equates the marginal cost of zero search effort ($s^*(u) = 0$). Because C'(s)>0, this equation (1.2) implies that the economic agent will not exercise any search effort anymore when he accepts a job offer with a utility of u^* (the reservation utility).

The probability that an individual working at utility $\bar{u}$ will exit the initial state (in our case the first significant job) within a short interval, conditional on having survived up to t, the starting time of the interval, is expressed by the hazard rate $\phi(U(C,D;X),t)$. This probability is the product of the rate at which the economic agent receives job offers, the optimal search intensity and the probability that the offered job is acceptable.

Formally:

$$\phi(U(C,D;X),t) = \lambda s^*\left(U(C,D;X),t\right)\left[1 - F\left(U(C,D;X),t\right)\right],$$

with λ: the rate of job offers,

$F(u,t)$: the cumulative job offer distribution

and $s^*(u,t)$: optimal search effort when employed at utility u. (1.3)

Since in equation (1.3) we implicitly assume that all job mobility is voluntary, we will also include ψ expressing involuntary mobility. Gronberg and Reed (1994) introduce involuntary mobility into the Mortensen job search model by including the exogenous separation rate of workers from firms into the expression for the hazard rate. We adapt this to our utility framework, but endogenize this term because it is reasonable to assume that certain personal and job characteristics will influence the probability that one will be forced to leave the company. So our expression becomes:

$$\phi(U(C,D;X),t) = (\psi(C,D;X),t) + \lambda s^{*}\left(U(C,D;X),t\right)\left[1 - F\left(U(C,D;X),t\right)\right] \quad . (1.4)$$

This distinction between voluntary and involuntary mobility is frequently introduced in research, but addressed in different ways. Reed and Dahlquist (1994), van Ommeren et al. (2000), Trevor (2001), Ruiz & Gomez (2002), Manning (2003), and Bradley et al. (2004), all distinguish quits and separations in their sample. In their estimations, however, they do not take the hypothesis into account that voluntary mobility can be influenced by the probability of forced mobility. Perticara (2004) addresses this issue by including the assumption "that workers are not aware that a layoff is coming until they are definitely laid off".

3. Hypotheses and motivation

Young workers starting their career in a high strain job are worse off than their counterparts in active jobs. Therefore, we want to analyse the impact of the job type on the job mobility of young workers. Based on the developed framework, we advance the following hypotheses

- *Young workers in high strain jobs will leave their job sooner*

Since we assume that according to the Karasek model the utility of a high strain job is lower than that of an active job, individuals will want to leave that job sooner in order to obtain an active job. The model discussed above suggests that the utility level of the actual job will be lower for those working in a high strain job. Those in active jobs have already a higher utility level compared to those in a high strain job. As a consequence, the job search intensity of respondents in active jobs is lower compared to the intensity of respondents in high strain jobs.

We can thus advance that: $U(1,1,X) > U(0,1,X) \Rightarrow s^{*}\left(U\left(1,1,X\right)\right) < s^{*}\left(U\left(0,1,X\right)\right)$.

- *Young workers in active jobs will be the last to be forced to leave their job*

We expect that those in active jobs are not the first victims of forced mobility. Active jobs are by definition jobs with high demands and high autonomy, which results in learning opportunities and the development of new skills. An explanation for this reduction in turnover among active jobs can be found in human capital theory (Becker, 1964). Firms will only offer learning opportunities if the benefits of these jobs are larger than the costs. Since the benefits are to be found in future

productivity, it is less likely that workers in active jobs are the first to be laid off during business downturns. Parsons (1972) found strong support for the hypothesis that in industries where worker- and firm financed specific investments are sizeable, average quit and lay-offs rates will be lower.
Therefore we put forward: $\psi(1,1,X)_t < \psi(0,1,X)_t$.

These hypotheses suggest that those starting their career in a high strain job will have a shorter job duration than those starting in an active job. Next to the test of this main hypothesis, we also want to examine whether young workers who quit their jobs are better off further on in their career.

For those who were forced to leave their job, we test the probability to end up in an unemployment spell. Previous research (e.g. Mc Donald and Felmingham, 1999) suggests that the incidence of unemployment is high for workers who involuntary left their jobs. Combined with our hypothesis that involuntary mobility occurs sooner for those in high strain jobs, we wonder whether young workers starting in a high strain job have a higher probability of becoming unemployed after their first job.
For those who choose to leave their job, our theoretical model suggests that they get a better job. Therefore we test the hypothesis of job mobility from high strain jobs to active jobs.

4. Econometric specifications

4.1 Survival analysis

The hazard function $\phi(t)$ [1]is the probability of exit from a state in the short interval of length dt after t, conditional on the state still being occupied at t (Lancaster, 1990).

In terms of the distribution function this probability equals:

$$\phi(t) = \frac{f(t)}{1-F(t)} = \frac{f(t)}{S(t)} \quad \text{with } f(t): \text{ density function of T}$$

$$\text{and } F(t) = P(T \le t) \text{ the cumulative distribution function of T.}$$

T is a nonnegative random variable that represents the failure time, in our case job duration. S(t) is the survivor function of T. This function gives the probability of survival beyond t or the probability that there is no failure event prior to t.

The analysis of survival data can be done in three ways: nonparametric, semi-parametric and parametric. Nonparametric analysis allows the dataset 'to speak for itself' without making assumptions about the functional form of the survivor function. Effects of covariates are not included in this kind of analysis.

[1] For notational simplicity we write $\phi(t)$ instead of $\phi(U(C,D;X),t)$ in the remaining of the paper.

Non-parametric estimation of the survivor function is done by using the Kaplan-Meier estimator, which is given by (Cleves et al., 2002):

$$\hat{S}(t) = \prod_{t_j \le t} \left(\frac{n_{t_j} - d_{t_j}}{n_{t_j}}\right) \text{ with } t_j = \text{observed failure time},$$

n_{t_j} = the number of individuals at risk at time t_j,

and d_{t_j} = the number of failures at time t_j.

Since we are interested in the different survival function for high strain and active jobs, we will estimate a survival function for each job type. We test the equality of the survivor functions across the job types by running a log-rank and a Wilcoxon test. Both are global tests, which means that they compare the overall survival functions and not at a specific time point. The tests compare the expected versus the observed number of failures for each group and combine these comparisons over all observed failure times. The difference between both tests is the weight they give to the contingency tables obtained at every failure time. The Wilcoxon test places additional weight to tables at earlier failure times (Cleves et al., 2002).

When we want to incorporate explanatory variables in the model, we have to conduct a parametric or semi-parametric analysis. Parametric analysis assumes a specific parametric family for the distribution of the failure times. Two specifications are possible.

A proportional hazard model has the following specification (Kiefer, 1988): $\phi(t) = \phi_0(t)e^{\beta X}$ with $\phi_0(t)$: the baseline hazard function, *X* the vector of explanatory variables and β the corresponding vector of coefficients.

In this model it is assumed that the hazard function is influenced proportionally by a change in the value of an independent variable. A proportional hazards parametric model gives a functional form to $\phi_0(t)$. When no particular parameterisation is given to the baseline hazard, we have the popular Cox model, which is called semi-parametric.

The alternative specification is the accelerated failure time (AFT) specification. Here we assume that rescaling time can capture the effect of explanatory variables on the failure time: $T = e^{\beta X} T_0$,

with T_0: the baseline failure time, *X* the vector of explanatory variables and β the corresponding vector of coefficients.

The $\exp(-\beta X)$ is also called the acceleration parameter and is assumed to be constant. If this acceleration parameter is larger than 1, failure would be expected to occur sooner (time is accelerated). The time scale for someone with characteristics X is $e^{\beta X} T_0$, whereas the time scale for

someone with characteristics X=0 is T_0. If the acceleration parameter is smaller than 1, time is decelerated (failure would be expected to occur later).

For the distribution of the failure time, we opt for the Generalized Gamma specification. The generalised gamma distribution is a three-parameter distribution $(\beta_0, \kappa, \sigma)$ permitting a variable hazard shape. The exponential (constant hazard), Weibull (monotonically increasing or decreasing hazard) and log-normal (non-monotonic hazard) are all special cases of this distribution. Since it is not straightforward to predict duration dependence for job duration, we opt for this flexible Generalized Gamma specification.

To check whether this generalised gamma model is indeed the most adequate model (among all possible parametric models), we will run two tests. For testing whether the gamma model is preferred over the exponential, Weibull and log-normal model (which are nested in the gamma model) we will run a Wald and likelihood ratio test. We test the following hypotheses:

(1) $H_0 : \kappa = 0$ if this is true, then the model is log-normal,

(2) $H_0 : \kappa = 1$ if this is true, then the model is Weibull,

(3) $H_0 : \kappa = 1,\ \sigma = 1$ if this is true, then the model is exponential.

To make a choice between non nested models, the use of the Akaike Information Criteria is suggested (Cleves et all., 2002): $AIC = -2\ln L + 2(k + c)$, with L the likelihood of the model, k the number of covariates in the model and c the number of model-specific distributional parameters.
The first term of the AIC measures the goodness-of-fit of the model to the data, the second term is a penalty for an increasing number of parameters. The preferred model is the one with the lowest value of the AIC (Sawa, 1978).

We will provide the non-parametric Kaplan Meier estimation, the semi-parametric COX proportional hazard estimations and the (parametric) generalised gamma model.

4.2 Binary and multinomial logit models

To test our additional research question, whether young workers are better off further on in their career, we make use of a number of limited dependent variables models. When testing the probability of working or not, the dependent variable is a binary variable, by means of which we are opting for a binary logit model (Greene, 2003):

$$P(\text{working}) = \frac{\exp(\beta x)}{1 + \exp(\beta x)}.$$

We use a multinomial logit model to model the reason for leaving the first job and to estimate the impact of the first job on the situation at the age of 26 (in order to check whether the job type

ameliorated over time). This kind of model is used since there are more than two alternatives without natural ordering. A convenient approach is to assume that all error terms (of the underlying relations between the latent variables and the observed characteristics) are mutually independent with a log Weibull distribution. This generates the multinomial logit model (Greene,2003).
The assumption of independent error terms is an important drawback of this method. In the literature this is known as the 'independence of irrelevant alternatives' (IIA). This property means that the ratio of the probabilities of choosing any two alternatives is independent of the attributes of any other alternative in the choice set (Hausman, 1984). Therefore, we will also run the Hausman test to check whether the multinomial logit specification is correct. This test examines whether the parameter estimates of the unrestricted and the restricted choice set (the choice set in which one or more alternatives are eliminated) are approximately the same. If this is the case, then the multinomial logit specification is not rejected (Hausman, 1984).

5. Data

The empirical analysis is based on the SONAR-data. We use the birth cohort of 1976. A sample of 3000 Flemish youth was surveyed at the age of 23 and a follow-up was realised when they were 26 years old. 2060 of them also participated in the follow-up survey. For a detailed overview of the SONAR dataset we refer to SONAR (2000) and SONAR (2004).
We calculated the duration of the first job by using the month-to-month registration of their labour market activities. In the SONAR-data, the first job is defined as the first job of at least one hour a week and with tenure of at least one month. The observations of the job duration are right censored, since not all respondents already left their first job at the moment of the follow-up survey.

In general, one can measure job characteristics (such as job demands and job control) in two ways: observers can rate the job of a specific worker (a so called 'objective' measurement), or workers can rate their own jobs ('subjective' measurement; see e.g. Frese & Zapf, 1988). Both methods are in fact 'subjective', however, as both ratings have to be performed by an individual. The observer ratings have the advantage that the rating is performed separately from the respondent, thus excluding subjective evaluations and actual mood states. The disadvantage, however, is that the observer can only sample a specific (visible) part of the job performed, within a given time span. The self-assessment of the worker has the advantage that he or she can take all possible aspects of the job into account, whether or not they are visible or scarce. The correlation between both methods, however, is rather high (Fried & Ferris, 1987; O'Brien, 1986). Fried & Ferris (1987) in their analysis of 15 studies analysing this issue found a median correlation of 0.63 between the so called 'objective' and 'subjective' rating, suggesting that both methods measure the same reality. As a consequence, it is warranted to use self descriptions of workers, collected during interviews.
We constructed a demand and control variable based on a list of items about different job characteristics, tested in previous research (e.g. De Witte, 1990; Hooge & De Witte, 1998). The

respondents had to rate these items on a 4-point scale, ranging from completely agree, rather agree, rather disagree, to completely disagree.
We used the items related to job demands and job control. For job demands we could use only one item, asking whether they had to work at a great pace or under time pressure[2]. To measure job control, we used an average of three items: were the interviewees able to decide (a) what to do on a particular day, (b) how much work they had to perform that day and (c) how to perform the job. For both job characteristics the answers "completely agree" and "rather agree" were considered as "high" and the answers "completely disagree" and "rather disagree" were considered as "low".

The vector X (i.e. the control variables) consists mainly of dummy variables, which were straightforward to construct and interpret. For the wage variable, we had different types of registrations. For some respondents the exact wage (point data) was available, while for others only the interval in which the wage was situated (in which the first and last wage interval were open-ended) was known. We constructed a wage variable, which is the log of the hourly wage, based on the different registrations using maximum likelihood[3].

The SONAR dataset contains detailed information about the first and the actual job, including the reason why people left their job. For the whole period up to the moment they were surveyed, information is available about their position (employed or not). Since no detailed data about the second job is available, we cannot apply the Karasek typology to this second job. Therefore, we have to restrict the analysis to a comparison of the first and the actual job in order to test whether people succeed in getting a better job in terms of the Karasek typology.

6. Results

6.1 Descriptive results

In table 1, the mean duration for the different job types is presented. This mean duration is not corrected for censoring (i.e. some people are still in their job). One can see that the mean duration is significantly higher for active jobs than for high strain jobs. Since the highest proportion of censored cases can be found within the active jobs category, this result is already a reliable indication that high strain jobs have a shorter duration than active jobs.

[2] In the first survey two items were used. In the follow-up survey, these were collapsed into one item. The two items in the first survey were reduced to one by strictly interpreting the 'or'.

[3] See Stewart (1983) for details.

Table 1: Mean duration of the first job for the different Karasek job types

Karasek Job type	Mean Job duration	Number of observations
Passive jobs	16.3	451
High strain jobs	19.3	1237
Low strain jobs	22.9	390
Active jobs	25.9	678

6.2 Results of the survival analysis

Non-parametric estimations

Figure 2: Estimated cumulative survival for active and high strain jobs

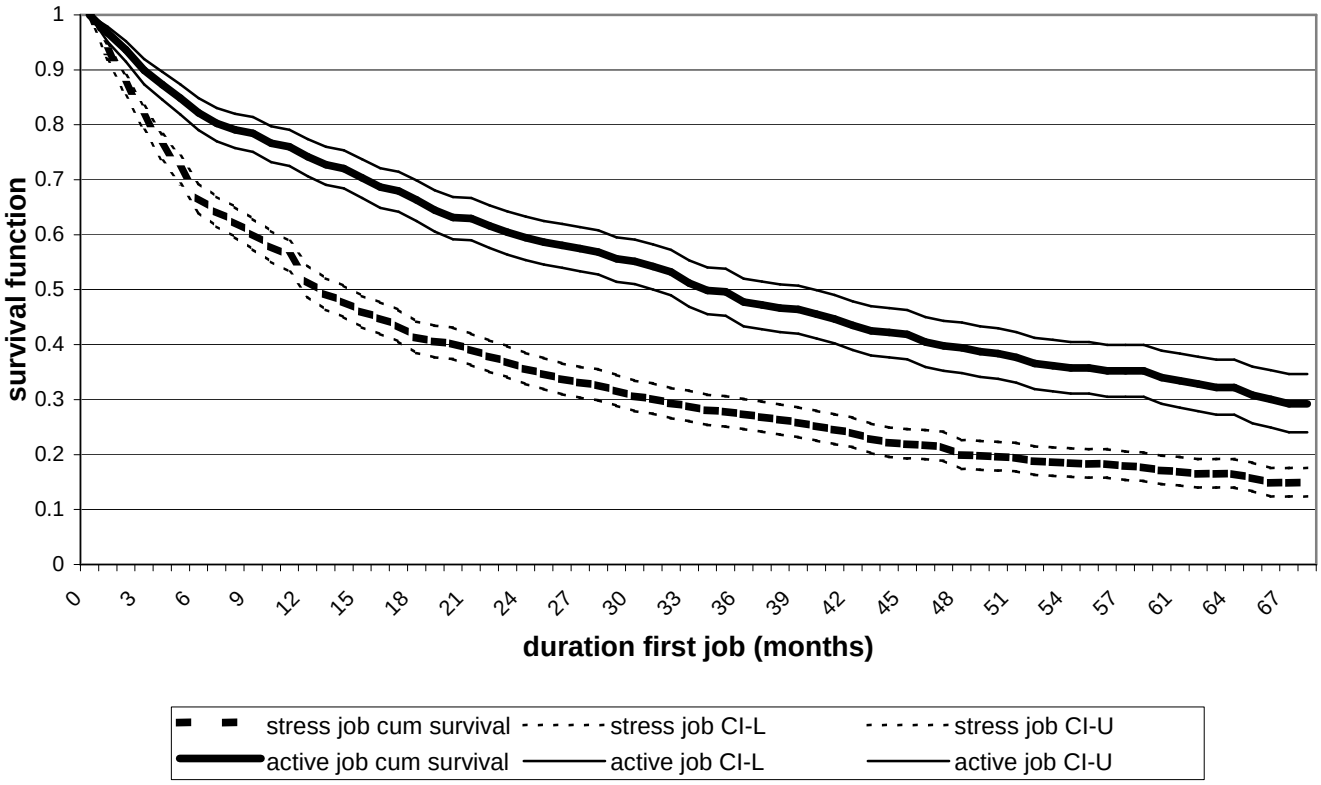


Figure 2 presents the cumulative survival function for the active and the high strain jobs with their 95% confidence interval. In the calculation of the survivor functions, censoring is taken into account. The cumulative survival function is the probability of leaving the job after t. The figure shows that the survival for active jobs is always higher than the survival for high strain jobs. This confirms our main hypothesis.

The probability of having an active job for more than t months is always higher than the probability of having a high strain job for more than t months. The results from both tests (log-rank and the Wilcoxon test) are identical: the probability that the observed differences occur by chance is less than 1%. So, the reported result is statistically significant.

Semi-parametric estimations

In table 2, the results of the semi-parametric Cox regression are reported. The interpretation is the easiest in terms of the hazard. For example, having a high strain job instead of an active job increases the hazard by 55%, because exp(0.44)=1.55. So the results confirm our hypothesis that those in high strain jobs will leave their job faster than those in an active job. Since the impact of other covariates is not the focus of our study, we do not report and discuss these results.

Table 2: Results of the Cox regression

	Coefficient	**St. error**	Hazard ratio	**St. error**
passive job	0.56***	0.09	1.75	0.16
high strain job	0.44***	0.08	1.55	0.12
low strain job	0.19*	0.1	1.21	0.12
active job (reference)				
Number of observations	1933			
Log Likelihood	-9266.36			

* Significant at 10% level, ** significant at 5% level, *** significant at 1% level

Included control variables: gender, number of children, living together with partner, ethnicity, educational level, subjective evaluation of educational level, working in the same region as one lives, contract type, hourly wage, percentage of a full time job one works, night work, shift work, company size, sector of employment.

Parametric estimations

Table 3 presents the results of the Generalized Gamma regression. The active job is considered as reference group, to enable a comparison with the high strain jobs. We report the coefficients as well as the time ratios. A positive coefficient means a longer survival time, whereas a negative coefficient implies a shorter survival time than the reference group. The time ratios express the delay of the failure compared to the reference group. For example, if someone in an active job quits his job at t=1, than someone in a high strain job will do so at t=0.58 (=exp(-0.55)).

Again, our hypothesis that those in high strain jobs will leave their job sooner than those in an active job, is confirmed. As the non-parametric and semi-parametric estimations suggested, passive jobs have the shortest duration and active job the longest. The time ratios in table 3 show that if an interviewee in an active job leaves his job at t=1, an interviewee in a passive job will do so at t=0.52, an interviewee in a high strain job at t=0.58 and an interviewee in a low strain job at t=0.77.

As discussed in the econometric part, we test whether this generalised gamma specification is indeed the most adequate parametric model. The test results (reported in appendix 1) support our model selection.

Table 3: Results of the generalized gamma regression

	Coefficient	St. error	Time ratio	St. error
passive job	-0.66***	0.11	0.52	0.06
high strain job	-0.55***	0.09	0.58	0.05
low strain job	-0.26**	0.12	0.77	0.09
active job (ref)				
constant	2.91***	0.52		
Number of observations	1933			
Log Likelihood	-2770.54			

* Significant at 10% level, ** significant at 5% level, *** significant at 1% level

Included control variables: gender, number of children, living together with partner, ethnicity, educational level, subjective evaluation of educational level, working in the same region as one lives, contract type, hourly wage, percentage of a full time job one works, night work, shift work, company size, sector of employment.

Conclusion

The non-parametric, semi parametric and parametric estimations all support our hypotheses. Young workers starting in a high strain job will leave this job sooner than their counterparts starting in an active job. Thus far, however, we did not distinguish between leaving voluntary or involuntary. Therefore, we will examine the reasons for leaving the first job in the next section.

6.3 Reasons for leaving the first job

To examine the impact of the job type on the reasons for leaving the first job, we estimate a multinomial logit model. The Hausman test provides evidence for the hypothesis that the odds of two outcomes are independent of other alternatives. The results of the multinomial logit model are presented in appendix 2. There is no significant impact of being in a high strain job compared with being in an active one. Based on the estimated coefficients, we calculated the probability for starters in the different job types that they will leave that job for a certain reason. So, the probabilities in table 4 are the probabilities of a man, without children, who does not live with a partner and who completed higher secondary education, to end his job for a certain reason. This probability is calculated for four cases, depending on his first job. The differences between the high strain and active job type are rather small.[4] This suggests that young workers in high strain jobs do not leave their first job more often because of a specific reason. The already discussed hazard estimates have

[4] The reported probabilities depend strongly on the considered reference person. The estimates (appendix 3) suggest a large impact of the educational level and so the probabilities differ remarkably for persons with different educational levels. Lower educated have a higher probability of lay off and higher educated get more job offers. Despite these differences, according to reference person, the comparison over the different job types is very similar.

shown that those in high strain jobs leave their job sooner. So, if we consider a short time spell, those in high strain jobs will experience more voluntary as well as involuntary job mobility compared to their colleagues in other job types in that time spell. In the next section, we will examine whether they are better off later in their career.

Table 4: Estimated probabilities to end the first job for the different reasons

	Reason of leaving the first job					
	End of temporary contract	Individual lay off	Collective lay off	Resign	Another job offer	Personal or other reason
Passive	24.19%	13.34%	11.03%	27.21%	15.24%	8.99%
High strain	14.58%	15.56%	9.50%	33.06%	14.76%	12.56%
Low strain	18.84%	16.28%	16.98%	22.76%	14.46%	10.67%
Active	11.52%	12.37%	17.08%	30.30%	15.01%	13.73%

6.4 What after the first job?

According to our theoretical model, young workers will leave their first job if they have a better alternative (voluntary mobility) or if they have to leave their job (forced mobility). For those who voluntary left their job, we thus assume that they have a better job immediately after leaving their first job. For those who were victims of forced mobility, this is not necessarily the case. For this sub sample, we estimate the probability of working one month after they had to leave their first job. The results (appendix 3) show no significant impact of the job type of the first job.[5] The educational level appears to be the most important determinant of the probability of working after one had to leave the job. Lower educated interviewees have a significant lower probability of working and higher educated interviewees a significant higher probability, compared to the reference group of middle educated interviewees. So, although young workers in high strain jobs are premature victims of involuntary mobility, they are not more often confronted with unemployment after their lay off.

For those who voluntary left their job, we cannot compare the Karasek job types of the first and the second job, since we only have data about the first and the actual situation (see data description). Therefore, we estimate the impact of the type of the first job on the situation at the age of 26, using a multinomial logit model. Our theoretical model predicts that voluntary job changes occur in order to obtain a better job. As a consequence, we use no unemployment spells between the different jobs as a proxy for voluntary job changes. For those who had one or more months of unemployment after leaving a job, the reservation utility equals the utility of not working and not the utility of the previous job. So, only for those who had no unemployment spells, we expect a better job at the age of 26.

[5] Individual lay off, collective lay off and end of temporary contract are considered as forced mobility. Leaving out the respondents who left because of end of temporary contract did not influence the result that there is no significant impact from the job type on the probability of having a job.

The probabilities to be in a certain situation at the age of 26 can be found in appendix 4. We distinguish between the different job types, unemployment and studying. The reported results are for a reference man without children who does not live with a partner.
The probability for the reference man starting in a high strain job to obtain an active job, strongly depends on his educational level. For lower educated interviewees, this probability is considerable lower than for higher educated interviewees. The probability of obtaining an active job at the age of 26 is always higher when the first job was also an active job. So, although we can assume that people leave their job to obtain a better one, the results indicate only limited job mobility from high strain jobs to active jobs. At the same time, a considerable group are 'locked up' in a high strain job later in their career.

7. Conclusion

Previous research suggested that young workers with a high strain job (according to the Job-Demand Control model of Karasek) are less satisfied with their job and do not get a wage compensation for the strain that is associated with their job. We therefore raised the question whether they leave their job sooner than their colleagues in active jobs. Our results confirm this hypothesis. Using different models for estimating duration data (non-parametric, semi-parametric and parametric), we consistently find that young workers leave their high strain jobs sooner compared with those in active jobs.
Next to the test of our main hypothesis (do starters in high strain jobs leave their jobs sooner?), we also examined whether they were better off later on in their career. The theoretical model predicts that young workers will leave their first job if they have a better alternative. Due to a lack of data, we could not test if this was true. Data only permitted comparison of the job type of the first job with the job type at the age of 26. The results of this comparison show that a considerable proportion of the young starters in high strain jobs remain in a high strain job later on.
For those who had to leave their first job, we examined whether their job type also influenced the probability of being unemployed later on in their career. The estimation showed that this was not the case. So, although starters in high strain jobs are premature victims of forced mobility, their initial job type does not affect their probability of becoming unemployed afterwards. Only the educational level was a relevant determinant of that probability.
We can thus conclude that the strain of a high strain first job is only temporary. There is however a significant probability to remain in a high strain job later on in the career.

The results of our study add to the current discussion on stress at work. First of all, not all jobs with a high workload seem to be stressful. Only jobs with an imbalance between the demands and the control one has, cause stress. Secondly, we found that a considerable part of those starting in a high strain job, obtain a "better" job later on in their career. So, a high strain first job seems to be temporary for some young workers, and could be a stepping stone to a 'better' job later on. We do

not want to minimize the current problem of job stress among young starters with this statement. Stress is indeed a problem, but mostly for those who are not able to escape to another job and stay in high strain jobs or become unemployed. As a consequence, it is important to target these young workers, in order to get some understanding of the antecedents of those who are more prone to stay in high strain jobs. Some of our findings suggested that the lower educated who start in a high strain job are particularly vulnerable. Further research should therefore focus on the characteristics and antecedents of young workers who are unable to leave high strain jobs on their own.

Appendix 1: Testing the parametric model choice

Wald test and Likelihood-ratio test for the nested models

	p-value of Wald test	p-value of likelihood-ratio test
$H_0 : \kappa = 0$ (log-normal)	0.050	0.048
$H_0 : \kappa = 1$ (Weibull)	0.000	0.000
$H_0 : \kappa = 1,\ \sigma = 1$ (exponential)	0.000	0.000

AIC for the different parametric estimations

Distribution	Log Likelihood	k	c	AIC
Exponential	-2865.499	23	1	5779.00
Weibull	-2848.8725	23	2	5747.75
Gompertz	-2821.3567	23	2	5692.71
Generalised gamma	-2770.5405	23	3	5593.08
Log-normal	-2772.4949	23	2	5594.99
Log-logistic	-2791.8799	23	2	5633.76

Appendix 2: Results of the multinomial logit model on the reason of leaving the job

	Coefficient	Std. Error	Sig.
Individual lay off			
Intercept	-0.194	0.455	0.670
less than higher secondary education	0.582	0.316	0.065
higher secondary education (ref)			
higher education	-1.876	0.343	0.000
passive job	0.061	0.401	0.879
high strain job	0.246	0.340	0.469
low strain job	0.312	0.454	0.491
active job (ref)			
Collective lay off			
Intercept	0.129	0.541	0.812
less than higher secondary education	0.518	0.378	0.171
higher secondary education (ref)			
higher education	-2.893	0.626	0.000
passive job	-0.452	0.465	0.331
high strain job	-0.570	0.389	0.143
low strain job	0.032	0.528	0.952
active job (ref)			
Resign			
Intercept	0.702	0.329	0.033
less than higher secondary education	0.396	0.285	0.165
higher secondary education (ref)			
higher education	-0.214	0.195	0.274
passive job	-0.123	0.279	0.660
high strain job	0.104	0.228	0.649
low strain job	-0.249	0.316	0.431
active job (ref)			
End of temporary contract			
Intercept	-0.265	0.327	0.417
less than higher secondary education	0.807	0.270	0.003
higher secondary education (ref)			
higher education	-0.394	0.186	0.034
passive job	0.727	0.262	0.006
high strain job	0.253	0.228	0.267
low strain job	0.530	0.290	0.067
active job (ref)			
Personal or other reason			
Intercept	-0.089	0.363	0.806
less than higher secondary education	0.762	0.295	0.010
higher secondary education (ref)			
higher education	-0.313	0.218	0.150
passive job	-0.439	0.310	0.157
high strain job	-0.072	0.247	0.769
low strain job	-0.215	0.336	0.522
active job (ref)			
Another job offer (ref)			
Number of observations	1574		
Log Likelihood	-536.27		

Other included control variables: gender, number of children and living together

Appendix 3: Results of the binary logit model on the probability of working after involuntary leaving the first job

	Coefficient	Odds	Standard Error
Constant	0.422		0.366
Passive job at 23 (ref)			
High strain job at 23	0.128	1.14	0.287
Low strain job at 23	0.366	1.44	0.267
Active job at 23	0.411	1.51	0.329
Man (ref)			
Woman	-0.183	0.83	0.179
Less than higher secondary education	-0.842***	0.43	0.209
Higher secondary education (ref)			
Higher education	0.618***	1.86	0.229
Number of children at 26	-0.122	0.89	0.2
Not living together with partner (ref)			
Living together with partner	-0.187	0.83	0.19
Number of observations	673		
Log Likelihood	-438.08		

* significant at 10% level, ** significant at 5% level, *** significant at 1% level

Appendix 4: Estimated probabilities for the situation at 26

Only for those who had no unemployment spell between their jobs

	Situation at 26					
	Passive	High strain	Low strain	Active	Unemployed	Studying
lower educated with... first job						
Passive	19.55%	22.04%	29.00%	18.98%	10.43%	0.00%
High strain	10.65%	30.27%	19.76%	28.41%	10.90%	0.00%
Low strain	10.67%	9.20%	44.50%	31.98%	3.65%	0.00%
Active	6.78%	12.34%	23.62%	46.73%	10.53%	0.00%
middle educated with... first job						
Passive	15.83%	24.09%	29.47%	28.48%	2.06%	0.08%
High strain	8.08%	31.00%	18.82%	39.95%	2.02%	0.13%
Low strain	7.67%	8.92%	40.13%	42.59%	0.64%	0.05%
Active	4.76%	11.71%	20.84%	60.86%	1.81%	0.02%
higher educated with... first job						
Passive	7.29%	16.42%	22.93%	52.40%	0.57%	0.38%
High strain	3.26%	18.50%	12.82%	64.37%	0.49%	0.55%
Low strain	2.95%	5.09%	26.10%	65.52%	0.15%	0.19%
Active	1.58%	5.74%	11.66%	80.57%	0.36%	0.08%

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CHAPTER 5

The role of temporary employment for the integration of school-leavers into permanent employment *

Abstract

Many school-leavers enter the labour market in temporary employment. In this paper we investigate the impact of a temporary employment spell at the start of the career on the transition rate into permanent employment. We compare the case of temporary employment with the hypothetical case of a direct transition from unemployment to permanent employment. Using a multivariate grouped duration model with correlated unobserved heterogeneity we control for observed and unobserved characteristics of the workers. Simulation results give more insights into the effect of temporary work. For a large sample of Flemish school-leavers we find that in the short run temporary employment delays the school leaver's transition to permanent employment. However, in the long run temporary employment acts as a stepping stone and decreases the duration until permanent employment.

* This chapter is joined work with Christian Göbel (ZEW, Germany)

We would like to thank Hans De Witte, Gerdie Everaert, Eddy Omey, Dirk Van de gaer and Dieter Verhaest for several valuable comments and critical suggestions.

The authors acknowledge support from the Flemish Ministries of Science and Technology and Education (PBO 1997 and 1998) and the Interuniversity Attraction Poles Program - Belgian Science Policy [Contract no. P5/21].

1. Introduction

In this paper we study the impact of a temporary employment spell on the transition rate into permanent employment for school-leavers in Flanders.[1] We investigate if temporary employment shortens the duration until permanent employment - or in other words: Is temporary employment a stepping stone to permanent employment for school-leavers? To answer this question we contrast the case of temporary employment to the hypothetical case of a direct transition from unemployment to permanent employment. We control for observed and unobserved characteristics of the workers on the basis of a multivariate grouped duration model with correlated unobserved heterogeneity. Simulation results give more insights into the effect of temporary work. We find that in the short run temporary employment delays the school leaver's transition to permanent employment. However, in the long run temporary employment acts as a stepping stone and decreases the duration until permanent employment.

School-leavers are the new human capital to fulfil the needs of companies. If and how these new entrants are efficiently included in the production processes is important for the welfare of a country. Also from the point of view of the well-being of youth in their way to adulthood this transition period from school to work is an important period in life. It influences the further course of life and well-being substantially (SONAR, 2001). Unemployment figures (table 1) indicate that unemployment is much higher among younger people. In 2005 unemployment of people younger than 25 was roughly two (Europe) till three (Flanders) times higher then the unemployment rate for the over 25 years' old.

Table 1: Unemployment in Europe and Flanders (2005)

(%)	2005	
	EU 15	**Flanders**
-25 year	16.9	14.2
+25 year	7.1	4.5

(Eurostat, LFS adjusted series)

Besides the fact that youth seems to have more problems of entering the labour market, they enter the labour market more often through temporary employment (Ryan, 2001). More than one quarter of the workforce below 24 has a temporary job in Flanders, indicating the important role of temporary employment in the transition from school to work (Steunpunt WAV).[2]

[1] Temporary employment is defined as employment with a temporary employment contract. Permanent employment is defined as employment with a permanent employment contract.

[2] In Europe about 30% of the total number of employees are on a temporary basis for the age group younger than 25. For the older working population (+25 year) about 10% of the total number of employees are temporary ones. (Eurostat, LSF series, 2005)

Research into the grounds of accepting temporary job shows that labour market related motives are much more important than personal reasons. De Witte et all. (2001) indicate that people accept a temporary contract mainly in the absence of a permanent one. Guest (2004) summarises a number of studies in different European countries, which indicate that a large majority of temporary workers prefer a permanent one. Further research also offered the differentiation that people work in temporary employment not only because they cannot find a permanent job but also because one hopes to find a permanent job through a temporary job (Declerck at al., 2006).

The question we want to answer is therefore whether temporary employment helps school-leavers to find a permanent job. From a theoretical point of view two different approaches of temporary employment are possible. Temporary employment is sometimes seen as a 'bad' characteristic. Adam Smith (1776) already suggested that the agreeableness of the job depends on 'the constancy of employment'. In the dual labour market hypothesis temporary employment is seen as employment in the secondary segment. According to this hypothesis the labour market consists of two tiers: the primary segment with "good jobs" and the secondary segment with "bad jobs". The secondary market has less attractive jobs with low wages, poor working conditions and little opportunity to advance" (Piore, 1970). Also the insider-outsider argument offers grounds to expect lower wages and less training and career opportunities for temporary workers (Lindbeck & Snower, 2002). The permanent workers will, as insiders, negotiate better conditions for them than for the outsiders (the temporary workers). Empirical research seems to confirm that temporary workers have, compared to permanent workers, lower wages (Sels et al, 2002) and a lower training probability (Forrier et al., 2003; Verhaest et al., 2006). The relation between temporary employment and job satisfaction is not clear (see De Cuyper et al., 2005). Job satisfaction research on part of the used school-leavers' data shows no significant effect (at 5% level) of the contract type on job satisfaction (Verhofstadt et all, 2003).
On the other hand there are economic theories that offer some possible explanations why temporary employment could increase the transition rate into permanent employment. Human capital theory (Becker, 1986) explains that human capital declines when staying unemployed. Taking a temporary employment can be a way to increase the human capital through work experience. Taking a temporary job can also enlarge the network and thus offer more opportunities to get a permanent job. Signalling (Spence, 1973) and screening (Stiglitz, 1975) theory offer an alternative argument in favour of temporary contracts. Temporary contracts are seen as possible signals of willing to work (i.e. a signal of motivation). Or they can be used as a screening device. The employer can hire the employee on a temporary basis during which he gets insight in the productivity of the potential permanent worker.

We evaluate the stepping stone question for school-leavers in this paper. Does taking a temporary job help them in finding a permanent job? To answer this question we use the "timing of events" approach (Abbring and van den Berg,2003) and estimate a multistate duration model. We model the transition from unemployment to temporary employment, from temporary employment to permanent employment and from unemployment directly to permanent employment. The transition rates

depend on observed and unobserved characteristics as well as on the elapsed time spent in the current state. Simulations allow a comparison in probability of having a permanent job between taking a temporary job and staying unemployed. We estimate the different transitions for school-leavers using survey data for Flanders, which is the Northern part of Belgium. These Flemish data have been especially collected to investigate the entry into the labour market for school-leavers. These data allow us to construct the labour market trajectory on a monthly basis.[3] The database is exceptionally rich on details and contains a whole range of possible explanatory variables (which are often not available), for example information on parents' education, financial independence, driving license, regional unemployment and the pollster's impression of the respondent.

The first main contribution of our work is that we do the relative evaluation of temporary employment. We compare the duration to a permanent job when taking a temporary job to a direct transition from unemployment to permanent employment. This differs from the majority of the literature concerning temporary employment. Most papers consider the probability of getting a temporary or permanent contract[4], the subsequent labour market outcomes of temporary workers[5], or estimate the duration in temporary employment before finding a permanent job.[6] Our approach to compare the duration to permanent employment for individuals between taking a temporary employment and the counterfactual situation of staying unemployed has got less attention. Research of this kind for Germany (Hagen, 2003), the Netherlands (Zijl et al., 2004) and Italy (Ichino et al., 2005) has indicated that temporary work accelerates the transition to permanent work in these countries.[7]
Two different methods are used to handle our question (i.e. the potential stepping stone effect of temporary employment for unemployed): propensity score matching and duration analysis. Hagen (2003) and Ichino et al. (2005) use the first method, which has as disadvantage that it rules out a possible impact of unobserved characteristics.[8] In our context it is reasonable to assume that

[3] Since the data set contains monthly information for some key variables, we have the contract type for every job. This is an advantage compared to the paper of Zijl et al. (2004), who use a similar method, because they have to infer the contract type of jobs between interview times from other variables.

[4] e.g. Amuedo-Dorantes (2000), Morris & Vekker (2001), Caparros Ruiz & Navarra Gomez (2003), Giesecke & Gross, (2003) and Kahn (2005)

[5] e.g. Korpi & Levin (2001), Booth et all. (2002), Giesecke & Gross, (2003), Steijn & Need (2003), Michaud & Roger (2003), McGinnity et al.(2004), Scherer (2004), Casquet and Cunyat (2004), D'Addio & Rosholm (2005) and Gagliarducci (2005)

[6] e.g.. Booth et all. (2002), Guëll and Petrongolo (2003)

[7] Zijl et al. (2005) summarize the research with respect to the intermediate position of temporary employment (between unemployment and permanent employment). They conclude that in France, Germany, Great Britain, Italy and the Netherlands temporary employment is often an intermediate position between unemployment and permanent employment. The exception is Spain where segmentation is found. The fact that temporary employment is often an intermediate position does not necessarily imply that a temporary job is a stepping stone to permanent employment.

[8] See the papers of Hagen (2003) and Ichino et al. (2005) for more details about the propensity score matching approach.

unobserved characteristics such as motivation and effort affect both the probability to get a temporary contract and the probability of getting a permanent contract. In the method we use (a duration model), which joins in with the approach of Zijl et al. (2004), we control for both selection in observable and unobservable characteristics.

The second main contribution of our work is that we evaluate temporary employment for school-leavers. None of the mentioned studies that compare the duration to a permanent employment when taking a temporary job to a direct transition from unemployment to permanent employment focus on school-leavers. Scherer (2004) and McGinnity et al. (2005) focus on this specific group in their research about temporary employment but they tackle a different question. McGinnity et al. (2005) compare the probability of future unemployment while Scherer (2004) only considers the occupational status of future employment.

The remaining of this paper is structured as follows. Section 2 provides background information on the situation and legislation concerning school-leavers and temporary employment in Flanders. Section 3 provides some details about the used data and the considered sample. Afterwards section 4 gives a brief description of the sample. In section 5 we explain the econometric model and in section 6 we provide the key results. Section 7 concludes.

2. The Flemish context

Flemish school-leavers

In Flanders there is compulsory education until the age of eighteen. From the age of fifteen or sixteen only part-time compulsory education is applicable. There is no obligatory military service and school-leavers enter the labour market directly after the end of schooling.

Different from other countries is the Flemish system of waiting period before school-leavers can claim unemployment benefits. This period starts wit the registration at the employment office after the end of the last school year. During this period (233 days for school-leavers between 18 and 26 year) the unemployed school-leaver only gets a waiting period benefit, which is lower than the regular unemployment benefits. The waiting period also runs during working days. So school-leavers should register in the employment office even if they have already an employment contract after leaving school. This gives them the advantage to claim unemployment benefits earlier in the event of a subsequent unemployment spell.

The most important labour market policy for unemployed Flemish school-leavers is the First Job Agreement. This program offers employers a reduction in social security contributions (up to 1.000 EURO quarterly). For larger companies (more then 50 employees) there is also an obligation of achieving a youth quota of at least 3% of their work force.

Employment contracts in Flanders

Labour regulation distinguishes two types of employment contracts: with or without time stipulation. The latter are permanent contracts. Employment contracts with a time stipulation are what we call 'temporary employment'. Temporary employment contracts can be concluded between employee and employer or through intermediation of a temporary employment agency.

Several consecutive temporary employment contracts between employee and employer are in principle considered as being a permanent contract, unless they are justified through the nature of the job or other legal reasons. A departure form the general rule is possible (given permission of the Social Inspection Law) in the case of consecutive fixed-term contracts of at least 6 months with a total duration of maximum 3 years.

A temporary contract has a starting date and an ending date and will end automatically on the date agreed. This means that there is no dismissal procedure involved. The option for termination of the contract before the final date has to be part of the contract. A permanent labour contract can be ended by one of the parties whereby the legal terms of notice need to be respected (depending on the duration of the contract). The rules are different for employers and employees. The employee has the right to end the contract without a procedure, but he or she has to respect the legal and agreed determination period, which usually is a one-month notice minimum.

3. Flemish school-leavers data

Sonar data

We use a survey database for Flanders (SONAR). The database had been created to study the transition from education to the labour market. Therefore the database is exceptionally rich on labour market information for school-leavers in their first working experiences. The database contains monthly information on the labour market status from the moment one leaves school until the moment of the last interview as well as a whole range of socio economic variables. As a consequence the dataset contains information, which is often not available in other samples.

This data collection has been achieved in two phases. First, a survey of a large and heterogeneous sample of young adults of the same age is taken at regular intervals. Next, the same age group is surveyed again at a later stage (longitudinal follow-up design). This study will use the longitudinal data of two birth cohorts (young adults born in 1976 and in 1978). These young Flemish adults were questioned a first time when they were 23 years old and a second time when they were 26 year old. The samples were randomly selected and trained interviewers performed the oral interviews at the interviewees' home address. The dataset is thus based on self-reported information of the respondents.

The SONAR group tries to investigate the representativity of the database. (SONAR, 2000) The sample consists of 51% men and 49% of women, which is a similar proportion as in national population statistics. Comparing the sample with respect to other characteristics is more difficult because of a lack of comparable data. A cautious comparison tells that the sample is representatitive with respect to family formation. In line with response in other surveys, lower educated, unemployed and respondents from lower social classes are somewhat underrepresented.

Sample

The original database consists of 5909 respondents. Since we concentrate at school-leavers, respondents (421) still studying at the moment of the last interview[9] are left out. Those who have a direct transition to self-employment at the end of schooling or who reported that they never looked for a job as employee (179) are also left out. In the present paper we study the effect of temporary employment on the transition to permanent employment. We keep only those who did not yet have permanent employment at the start. The resulting sample contains information on 4277 school-leavers.

We will provide estimates for two samples. For the first sample we consider all school-leavers seeking for permanent employment (we will refer to it as 'all school-leavers'). The second sample contains unemployed school-leavers seeking for permanent employment (referred to by 'unemployed school-leavers'). The first sample provides insights into the general role of temporary employment as an intermediate state to permanent employment for school-leavers. This sample contains all 4277 school-leavers. The latter sample is useful to study the role of temporary employment for school-leavers who can be supposed to look actively for a job at the end of schooling. About 90% of school-leavers end school in June but the first employment typically starts in September or October. So school-leavers who have already found a job at the end of schooling report either inactivity or unemployment for these months between the end of schooling and the start of the contract. [10] To be sure that somebody is actively looking for a permanent employment, we therefore restrict this second sample to school-leavers who are unemployed in the third month after leaving school. This approach restricts the sample of unemployed school-leavers to 1542 individuals.

4. Description of the sample

A complete overview of the explanatory variables and some summary statistics can be found in appendix 1. In this description part we will first explain the meaning of the different explanatory

[9] Either at age 23 or at age 26. The response rate for the follow up interview was about 70%. So for about 30% of the original sample at 23 year the information stops at the age of 23.

[10] The empirical test of Flinn and Heckman (1983) support our view that unemployed are more actively looking for a job. Flinn and Heckman tested empirically whether the exit rate from unemployment to employment is the same as that from out of the labour force to employment, while examining observed and unobserved individual differences in explanatory variables.

variables. In a second part we compare the two samples: 'all school-leavers' and 'unemployed school-leavers'. The first two columns of appendix 1 show the statistics for these two samples. Thirdly we distinguish between workers who have a transition to temporary employment and workers with a direct transition from unemployment to permanent employment (last two columns of appendix 1). This distinction is only made for the sample of all school-leavers.[11]

As already mentioned the used dataset is exceptionally rich on possible explanatory variables. Beside gender and the nationality of the respondent, the data also include the nationality of the grandmother (on mother's side) of the respondent. This variable is often used for determining the ethnical background. The statistics show a higher percentage of respondents who have a not Belgian grandmother (about 10%) while the percentage of not Belgian respondents is hardly 3%. The educational level of the mother can be used as an indicator for social background. Together with the educational degree of the respondents, we have three additional variables reflecting the educational career of the respondents (apprenticeship, student work, vocational education).

The following two variables (membership of club and pollster's impression) are included in the database to capture some characteristics of the school-leavers which might influence their potential on the labour market but which are not often available for empirical research. The first one gives an indication of the social capital of the respondents. More of half from the 23 years old population in our sample was member of some club (youth movement, sports club, political movement) in the last five years. The second variable helps to include unmeasured characteristics of the respondents in the data. The pollsters had to answer 8 questions to get insight in how they experience the respondent. Therefore the pollsters have to score the respondents to which account they are energetic, active, calm, friendly, cheerful, open, optimistic an motivated to answer. Using factor analysis we created a single variable indicating how others perceive the respondents. We only used the items calm, friendly and open since we believe that these variables are unlikely to change over time.[12]

A welfare typology is calculated based on the place of residence (which is only known at the age of 23)

Among the time-dependent variables are the regional unemployment rate and variables indicating the living and family situation of the individual. We have information when respondents succeeded in acquiring their driving license. These variables are either measured at the start of the period (month after leaving school in the first sample, third month after leaving school for the second sample) or at the start of the temporary employment spell.

When we compare the two samples, the composition of both seems to differ significantly on a number of variables. The sample of unemployed school-leavers contains more respondents with a non-Belgian grandmother (12.3%) and more lower educated. This sample of unemployed school-

[11] Comparable statistics for the second sample are available on request, from the authors.

[12] Variables like optimistic or motivated could be the outcome of the labour market history. We exclude these variables to avoid endogeneity bias.

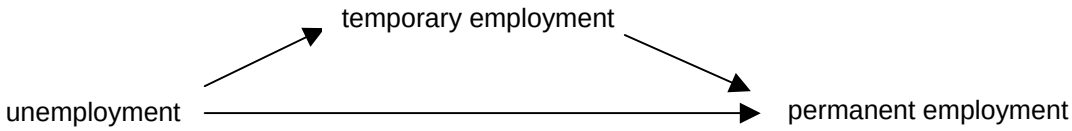
leavers has also a lower proportion of respondents who had done some student work during their education (36.3% against 41.9% in sample of all school-leavers) as well as a lower proportion of individuals who are member of a club (52.8% against 58% in sample of all school-leavers). As expected the sample of unemployed school-leavers has unfavourable labour market characteristics compared to the sample of all school-leavers. The fact that this sample of unemployed school-leavers is less in the possession of a driving license adds to this view.

Between workers with a transition to temporary employment and respondents who get permanent employment without intermediate temporary employment we also find some differences. The most remarkable is the large gender difference. Where in the general sample the preponderance of women over men is relatively small (1.5%), it is more pronounced in the subgroup of the workers with a transition to temporary employment participants (5%). In the other subgroup (transition to permanent employment) men have a clear preponderance. The variables referring to ethnicity, social background of the individual and the number of siblings are very similar in both groups. Regarding the educational degree it are especially those with a lower tertiary degree who are over represented in the subgroup of temporary workers. Respondents with a higher secondary degree are somewhat overrepresented in the subgroup of permanent workers. Temporary workers have also a higher fraction of apprenticeships (67.5%) but a lower fraction of ending education in a vocational type (6.2%) than permanent workers. The distribution for the welfare typology also differs significantly between both subgroups. A transition to temporary employment seems more common in urbanised areas. In living areas the fraction of a transition to permanent employment is higher than among those with a transition to temporary employment.
When contrasting the descriptive statistics for the two subgroups for the sample of unemployed school-leavers, we find similar differences.[13]

5. Econometric model

The idea behind our approach is to consider a transition to temporary employment as a treatment that applies to school-leavers, and considering if this treatment accelerates the transition into permanent employment (compared to the counterfactual situation without a “treatment”).
In our empirical model school-leavers either have a transition to temporary employment or to permanent employment. For school-leavers who have a transition into temporary employment, we consider the subsequent duration until a transition into permanent employment. The latter duration is permitted to be composed of several temporary employment or unemployment periods.

[13] the differences with respect to the education of the respondent are less clear.



The observed spells can be censored for various reasons. If we don't observe a transition out of the respective labour market state then the spell is censored at the end of the observation period. Moreover, if a worker has a transition into an active labour market program, self-employment or full time education, then the spells are censored at the end of the time-period just before this transition is observed.

In order to identify the causal effect of a transition into temporary employment on the duration until a transition into permanent employment we apply the "timing of events" approach (Abbring and van den Berg, 2003). This approach is able to solve the endogeneity problem caused by selective treatment, without the need of exclusion restrictions. Instead, the variation in the timing of the transition to temporary employment is exploited, in order to identify the effect on the duration of interest.[14] Roughly speaking, this is achieved in a duration model, where the selection process and the transition of interest can be related via a multivariate error-term.

To estimate the causal effect of temporary employment we have to consider that the characteristics of school-leavers who have a transition to temporary employment might be systematically different from those with a direct transition to permanent employment without intermediate temporary employment. Therefore, we have to take observed and unobserved characteristics of the individuals into account. To control for selection in observed characteristics we include a large set of explanatory variables in our duration model. These variables (cf. appendix 1) include individual characteristics, information on the socio economic background of the individuals and information about the local labour market conditions.
In order to control for selection in unobserved characteristics we proceed in two steps. First we test the presence of remaining unobserved heterogeneity for each of the transition rates in a model with independent transition rates. Given that we find unobserved heterogeneity for the two destination states, we estimate a model with dependent unobserved characteristics between the transition rates, in a second step.

Identification of the mixed proportional hazard model

In this section we are going to discuss some key assumptions, which are required for the identification of causal effects within our empirical model.[15]

[14] The identification of the "timing-of-events" approach relies on various assumptions (Abbring and van den Berg, 2003). Several of these assumptions are discussed in the next subsection.

[15] For a detailed discussion of the identification of the timing-of-events approach we refer to Abbring and Van den Berg (2003).

In order to be able to identify this model it is necessary to assume independence between the vector of the unobserved heterogeneity terms and the observed characteristics.[16] In addition, we have to include at least two continuous explanatory variables that affect the competing transition rates in different ways and that are not collinear. In the present paper we include several continuous explanatory variables: the regional unemployment rate, the subjective impression that the pollster has from the school-leaver and the age of the worker. The age of the worker is available in grouped form (i.e. month of age) and provides a mere proxy for a real continuous variable. However, arguments in the literature on the identification of MMPH models suggest that also this type of variable is useful for identification. Furthermore, we need variation in the timing of the transitions. In the data we have considerable variation in the timing of the transitions into the various transitions. Moreover, it is likely that there exists considerable randomness in the timing of the job offers for unemployed workers.[17]

An important condition for identification is the absence of anticipation of the timing of treatment. To satisfy this condition we need either that workers do not know the exact moment of a transition to temporary employment in advance or that they do not change their behaviour conditional on this information.

We argue that the plausibility of this assumption depends on the selected sample. The sample of all school-leavers contains some workers who have a transition into temporary employment shortly after the end of schooling. A part of these workers can be expected to know the exact timing of a transition into temporary employment in advance e.g. in the case where they got a job offer during schooling time. Unfortunately we don't observe if this information changes the searching behaviour of school-leavers. However, the induced bias can be expected to be small, since the workers who have accepted a job offer during schooling-time can be expected to leave the risk set shortly after the end of schooling.

For workers in the *sample of unemployed school-leav*ers it is unlikely that the timing of a transition into temporary employment is known much in advance. By definition, these workers are still unemployed in the third month after the end of schooling. For this group it is unlikely that they have accepted a job offer during schooling time, since these jobs would typically start during the first three months after the end of schooling.[18] For the school-leavers in this sample it is consequently unlikely that anticipation effects play a noteworthy role.

[16] In the absence of repeated observation of the same transition for one individual, this type of assumption is required for the identification of the parameters that are associated to the observed characteristics in a multivariate mixed proportional hazard (MMPH)-model (Abbring, 2006).

[17] The idea of random job offer rates is also present in the job-search literature (e.g. Mortensen, 1986)

[18] In Belgium, like in most European countries, it is not uncommon to have a short spell of inactivity or unemployment between the end of schooling and the start of the first employment, even for the case where the workers have already accepted a job offer during their schooling time.

To summarise, the assumption of non-anticipation can be put into question for the sample of all school-leavers. However, it is plausible to assume that non-anticipation is satisfied for the sample of unemployed school-leavers.

Specification of the likelihood-function

In our empirical model we allow for three different labour market states: unemployment u, temporary employment t and permanent employment p. The model is of the multivariate mixed proportional hazard (MMPH) type (see also van den Berg 2001). The equations for the different transition rates are estimated simultaneously by the means of maximum likelihood. In this model the observed explanatory variables X and the unobserved characteristic V shift the baseline hazard function $\lambda(t)$ proportionally. The transition rates out of unemployment can be written as: $\theta_{uq}(t|x,V_q) = \lambda_{uq}(t)\cdot\exp(x'\beta_{uq} + V_q)$, for $q \in \{t,p\}$. The transition rate from temporary employment to permanent employment as: $\theta_{tp}(t|t_{ut}x,V_p) = \lambda_{tp}(t)\cdot\exp(x'\beta_{tp} + V_p)$.

We specify piecewise constant baseline hazards $\lambda(t) = \exp(\alpha_{lm,k})$ where k indicates the month in origin state l. We impose the following normalisation: $\alpha_{up,1} = \alpha_{ut,1} = \alpha_{tp,1} = 1$. For details on the derivation of the individual likelihood contributions we refer to appendix 2.

Using $S_u(t_k)$ to note the survival rate at the end of the k-th period in unemployment and $S_t(t_l)$ for the survival rate at the end of the l-th period after the transition to temporary employment, we can write the individual likelihood contribution as:

$$l_m = \left\{ \frac{\left[\theta_{ut}(t_k|\cdot)^{(p_{ut})}\right]\cdot\left[\theta_{up}(t_k|\cdot)^{(1-p_{ut})}\right]}{\sum_{q\in\{t,p\}}\theta_{uq}(t_k|\cdot)} \left[S_u(t_{k-1}|\cdot) - S_u(t_k|\cdot)\right] \right\}^{(1-c_u)} \times \left[S_t(t_{l-1}|\cdot) - S_t(t_l|\cdot)\right]^{(1-c_t)\cdot p_{ut}} \times \left[S_u(t_k|\cdot)\right]^{c_u} \times \left[S_t(t_l|\cdot)\right]^{(1-c_u)\cdot c_t\cdot p_{ut}} \quad (1)$$

Equation 1 represents all possible trajectories the individual can have in our model. Although for notational simplicity not explicitly written, all components used in equation 1 are conditional on a set of explanatory variables. Censoring in the respective states (unemployment and temporary employment) is indicated by c_u and c_t. A transition to temporary employment is indicated by p_{ut}.

We specify the unobserved heterogeneity terms by a multivariate discrete distribution. Van den Berg (2001) argues that discrete distributions provide flexibility while limiting the computational costs of the estimation. We suppose that the unobserved component, v_q with $q \in \{t,p\}$, can take two values v_{q1} and v_{q2} for each possible destination state q.

The resulting individual likelihood contribution can then be written as:

$l_m = \sum_{a=1}^{2}\sum_{b=1}^{2} P_{ab} \cdot l_m(v_{ta}, v_{pb})$, where P_{ab} is the associated probability to each combination of these values. The probabilities are specified as multinomial logit.

Details on the specification of the unobserved heterogeneity can be found in appendix 3. In the given framework, no selection in unobserved characteristics is equivalent to independence between the unobserved heterogeneity terms for the two possible transition rates (temporary employment and permanent employment). Finally, the lack of unobserved heterogeneity for at least one of the two destination states would indicate the absence of relevant selection in unobserved characteristics. In this case, either unobserved heterogeneity is not important for the selection into temporary employment or unobserved heterogeneity is not important to explain the duration of interest (the duration until a transition into permanent employment). In both cases selection in unobserved characteristics would not be relevant for our evaluation.

6. Results

Piecewise constant baseline hazard

Figures 1 and 2 show the baseline hazards for the three transition rates: the rate at which an individual flows from one state to another given that he/she survives in this state until the current moment. Figure 1 is for the sample of all school-leavers, figure 2 for the sample of unemployed school-leavers. For both samples we see in the short run a negative duration dependence for the transition out of unemployment (transition to temporary employment and to permanent employment) but less pronounced for the sample of all school-leavers. In the long run there seems to be no duration dependence. For the sample of all school-leavers we notice a very high transition rate from unemployment to temporary employment during the first months. Also the transition from unemployment to permanent employment is rather high the first months. In the sample of unemployed school-leavers there is less time dependence. The transition from temporary employment to permanent employment has a peak at 6 and 12 months. This points to the fact that 6 and 12 months are common contract durations for temporary employment.

No selection in unobserved characteristics

Our estimates indicate that there is no selection in unobserved characteristics. When we estimate the model with independent unobserved heterogeneity distribution, the two possible values for the transition to temporary employment converge to one point.[19] In the reported results in appendix 4 and 5 we therefore restrict the two possible values for the transition to temporary employment (v_{t1} and v_{t2}) to be equal. We find there is unobserved heterogeneity for the transition to permanent.

[19] This is independent of the starting values we have chosen.

Since there is no unobserved heterogeneity in the transition to temporary employment, selection in unobserved characteristics is ruled out. The reason why we do not have unobserved heterogeneity is probably due to the very rich dataset. As already said our database contains many variables not available in other research. Variables like club membership and pollster's impression of the respondent might reflect the unobserved characteristics of the workers rather well.

Effect of covariates

Appendices 4 (for all school-leavers) and 5 (for unemployed school-leavers) give the results of the covariates on the different transitions. Since most of the variables have the expected sign, we only present the most interesting variables. Having a tertiary degree and apprenticeships increase the probability of leaving unemployment. A higher unemployment rate and a non-Belgian nationality reduce as expected the probability of leaving unemployment. A driving license increases all transition probabilities. Female respondents have lower transition rates to permanent employment.
Membership of a club, student work and living in an urbanised area increase the transition from unemployment to temporary employment. The transition from unemployment to permanent employment is higher for those who end their education in a vocational type.

Simulations

To get more insight into what the estimates actually mean, we elaborate some simulations. The general idea is to use the estimates of our model to simulate durations to permanent employment for the case of taking a temporary employment and for the case of staying unemployed. For details about the simulation process we refer to appendix 6.

To check if our model together with the simulations is able to reproduce the observed outcomes, figures 3 and 4 compare the fraction of individuals in permanent employment after t months from the real data with that fraction obtained from the simulation. We simulated the data 400 times and calculated always the same fraction of workers who had already a transition to permanent employment after t months. The line represents the median value of the simulations with its confidence intervals. The simulated fractions are close to the observed ones. Notice also that the observed fractions are never outside the 95% bounds of our simulations.
Figure 5 adds the simulation for the hypothetical case of staying unemployed (and not taking temporary employment). This figure thus presents the simulated fractions for temporary workers versus non-temporary workers. In the short run the fraction (of individuals in permanent employment after t months) for non-temporary workers seems higher than the fraction for temporary workers. In the longer run the difference between the fraction of both groups is small. Figure 6 also presents the simulated data for temporary workers and non-temporary workers for the sample of unemployed school-leavers. For this sample we observe a similar behaviour for non-temporary workers versus temporary workers in the short run. In the long run, however, the opposite is true. The fraction of individuals in permanent employment after t months is higher for temporary workers than for non-temporary workers.

Stepping stone effect

To get the simulated difference caused by temporary employment (i.e. the possible stepping stone effect), we have to compute the difference in the fraction for each draw of the data. Figures 7 and 8 show the median of the difference and 95% bounds for both samples. Figure 7 shows no clear stepping stone of temporary employment for school-leavers. Until 40 months after the month of transition to temporary employment the median of the fraction of workers in temporary employment who obtain permanent employment is lower than the median of the fraction of non- temporary workers who obtain permanent employment. Only after 40 months workers in temporary employment do better. A different picture is obtained when we consider the sample of unemployed school-leavers. For this sample we see a stepping stone effect of temporary employment (figure 8). Again there is a negative effect of temporary employment during the first months, but from 21 months on workers in temporary employment perform better compared to the hypothetical situation where they stayed unemployed and looked for permanent employment directly.

A negative effect during the first month can be explained by the fact that workers who accept a temporary job are initially strongly attached to that job because of contractual reasons for example. These temporary contracts explain the jumps at 6 and 12 months as 6 and 12 months are typical contract duration for temporary jobs. In addition to the contractual reasons the negative effect during the first months could be due to the limited time temporary workers might have to devote on job search (compared with unemployed school-leavers). In the long run we find a positive effect of temporary employment for both samples, especially for the sample of unemployed school-leavers. Different from the comparable empirical work for other countries (cfr. introduction), we thus find a stepping stone effect in the long run for the specific group of school-leavers. Especially for unemployed school-leavers temporary employment is a possible stepping stone to permanent employment.

The different results between both samples seem to indicate that the group of school-leavers who find a job within the first three months after school has less advantage by taking a temporary job in order to achieve a permanent one afterwards. Most of these school-leavers might already have a permanent contract by the end of schooling. The sample description suggests that the sample of unemployed school-leavers contains more lower educated and more respondents with a non-Belgian grandmother. The descriptive statistics also reflect a smaller social network for the sample of unemployed school-leavers, given for example the different figures for membership of a club. We could conclude that temporary employment, as a stepping stone is really important for the high risk groups with respect to unemployment.

7. Conclusion

In this paper we investigate whether temporary employment can act as a stepping stone for school-leavers. We compare the transition rate into permanent employment between school-leavers who stay unemployed and those taking up temporary employment. We contribute to literature by investigating this question for school-leavers, controlling for possible selection in unobserved characteristics.

Our estimation results indicate that there is no selection in unobserved characteristics. We argue that this is due to our exceptionally rich database containing variables, which are often not observed (like the pollster's impression an club membership). Our database contains detailed information on the labour market history of school-leavers and we use a large set of explanatory variables.

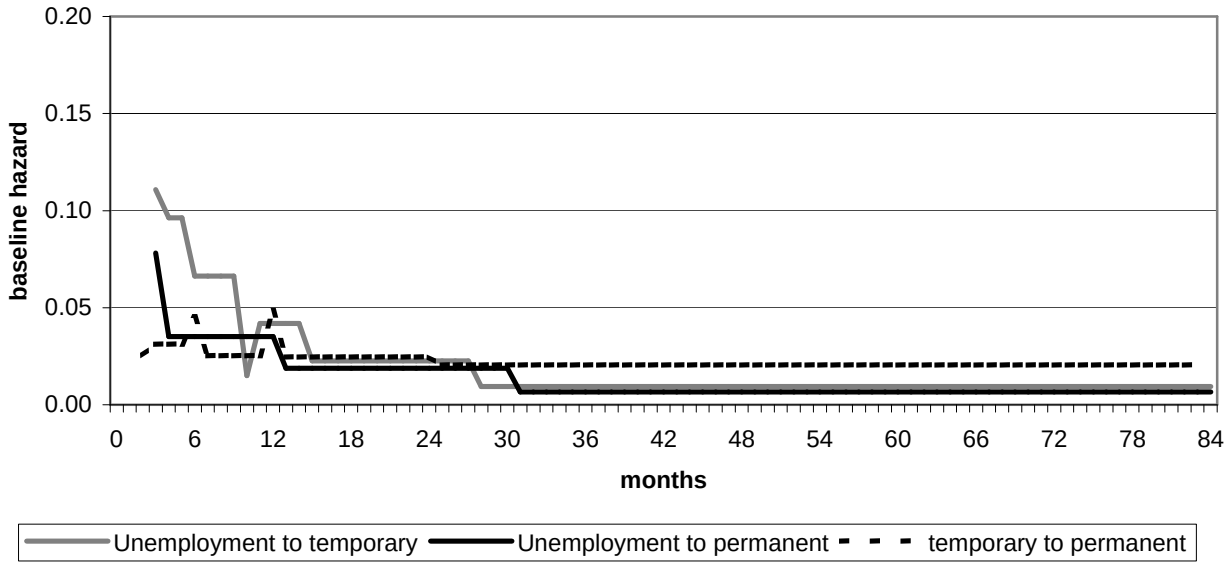
Simulations are used to investigate the effect of temporary employment on the transition to permanent employment. The results differ for our two samples but for both we observe a time varying effect. Workers who accept a temporary job have a low transition rate into permanent employment at the start of the temporary employment spell, which results in a lower fraction of those obtaining a permanent contract in the short run (compared with the hypothetical situation where these individuals remained unemployed). In the long run (from 40 months in the sample of all school-leavers, 21 months in the sample of unemployed school-leavers) participants in temporary employment do better than school-leavers who remain unemployed during their search for a permanent job. So we can conclude that on average for all school-leavers taking a temporary job delays the transition to a permanent job for the observed sample. We do find a strong stepping stone effect for our sample of unemployed school-leavers.

This stepping stone effect of temporary employment should encourage employment offices to help young unemployed to find a job as soon as possible even if it is a temporary job since it increases their chances afterwards. The recent OECD report 'Jobs for Youth' for Belgium also suggest to 'eventually abolish the waiting allowance and at the same time modify substantially the rules applying to new entrants to the unemployment offices' in order to reduce youth unemployment. For the unemployed individual school leaver this would increase his search effort and the likelihood to accept a temporary job, which ceteris paribus, shortens his duration to get a permanent job afterwards. However it is not sure that the same results would appear given a different school to work context. Therefore one should also take the macro effects of such a reform into account.

Figure 1: Baseline hazard for sample of all school-leavers

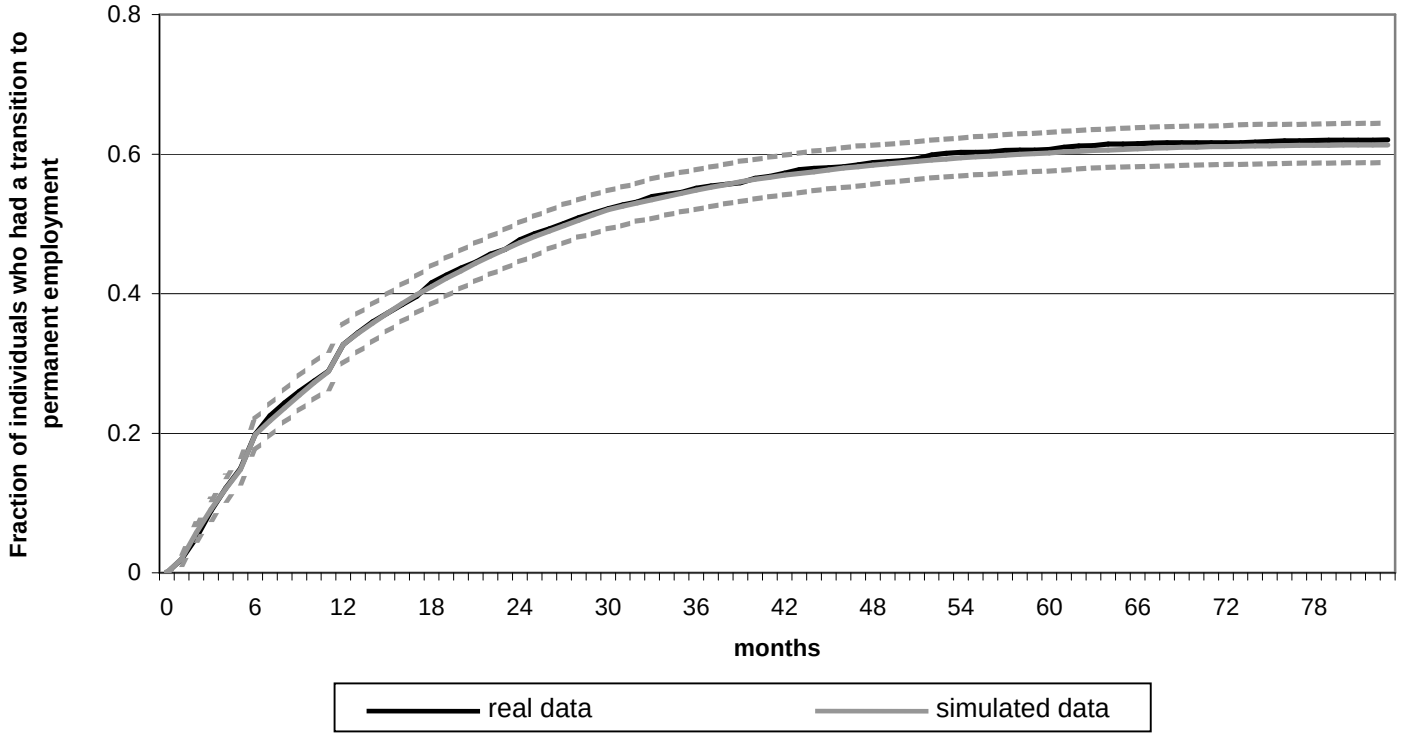
Note: the duration starting point is always the start of the initial state. For the transitions from unemployment to temporary and permanent employment this is the month after leaving school. For the transition from temporary to permanent employment this is the start of the temporary employment spell.

Figure 2: Baseline hazard for sample of unemployed school-leavers



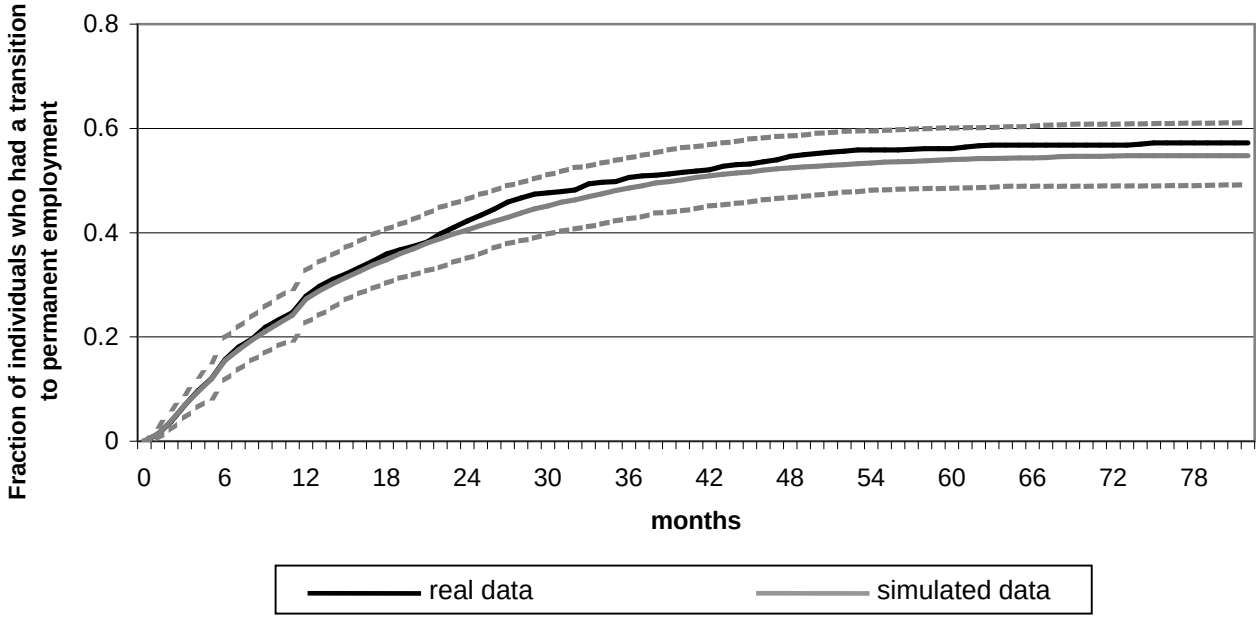
Note: the duration starting point is always the start of the initial state. For the transitions from unemployment to temporary and permanent employment this is the third month after leaving school. For the transition from temporary to permanent employment this is the start of the temporary employment spell.

Figure 3: Simulated versus real data for the sample of all school-leavers



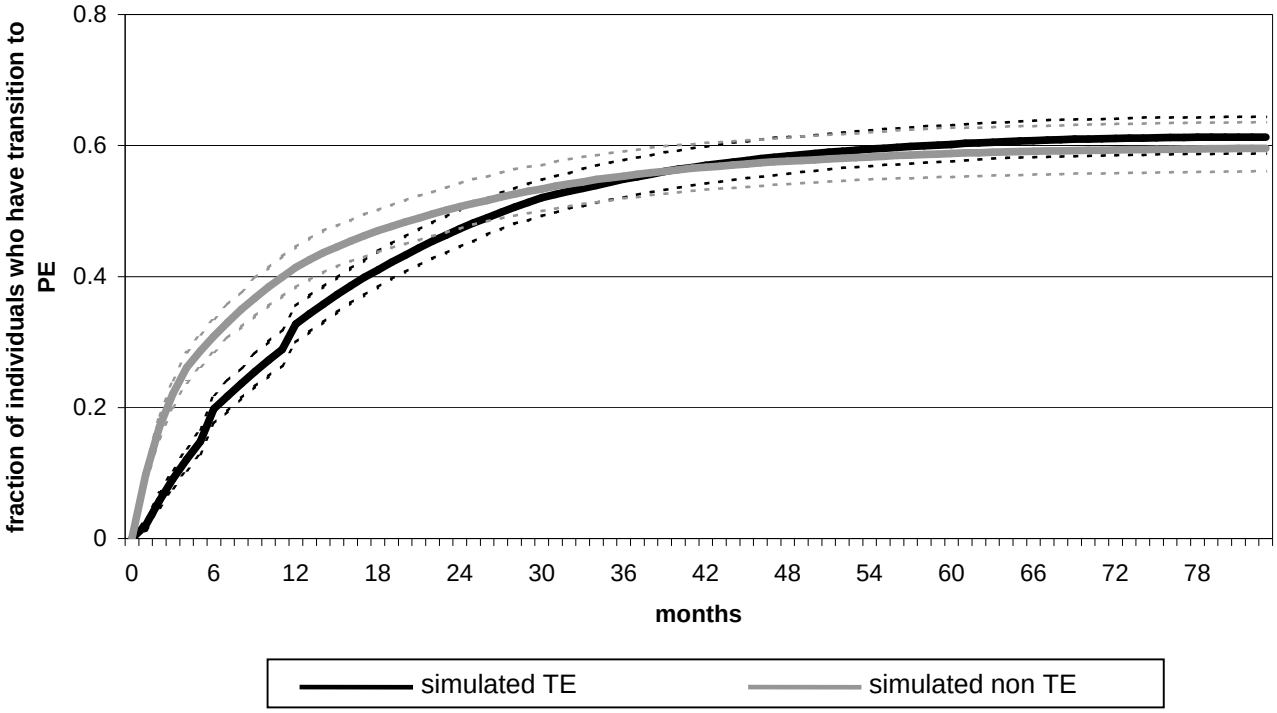
Note: time start with the month of a transition into temporary employment spell
95% of the simulations results are within the confidence bounds

Figure 4: Simulated versus real data for the sample of unemployed school-leavers



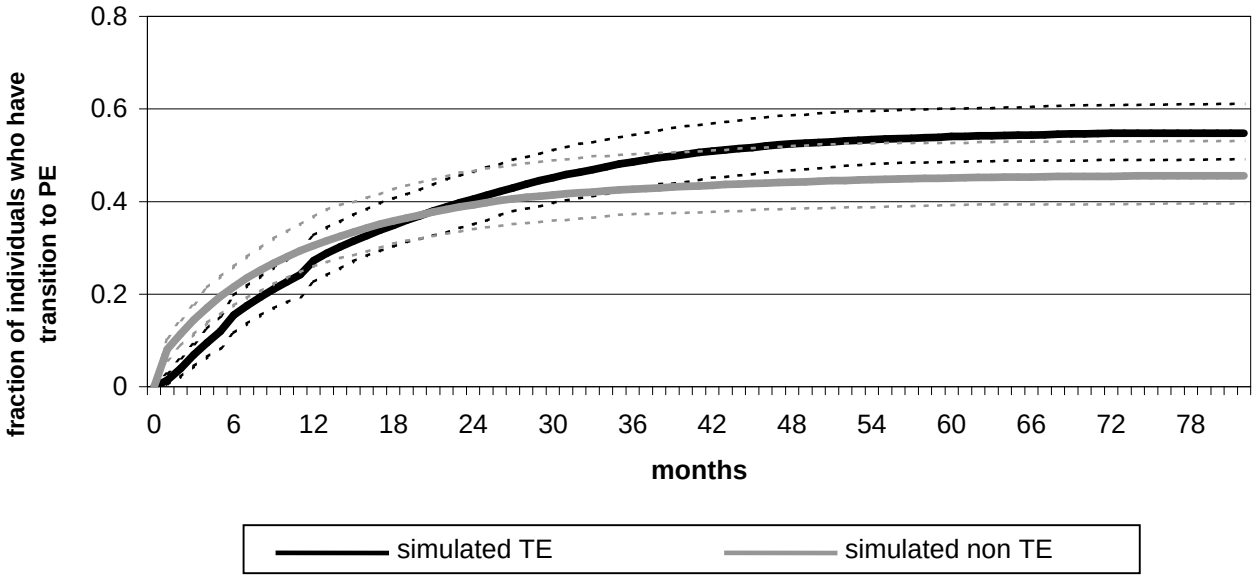
Note: time start with the month of a transition into temporary employment spell
95% of the simulations results are within the confidence bounds

Figure 5: Simulation of the counterfactual situation for the sample of all school-leavers



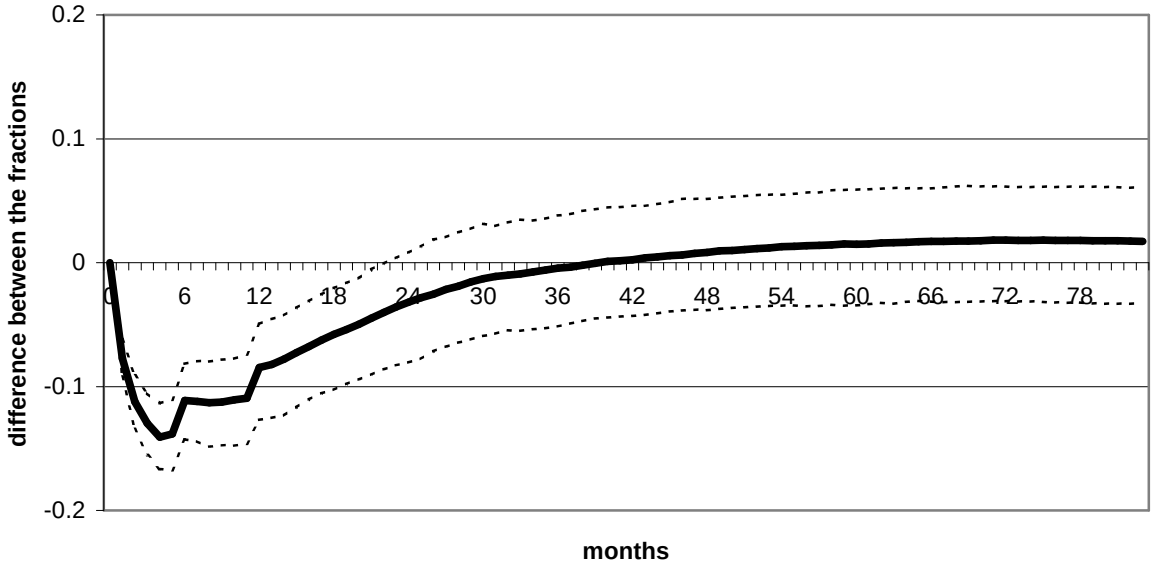
Note: time start with the month of a transition into temporary employment (TE) spell
95% of the simulations results are within the confidence bounds

Figure 6: Simulation of the counterfactual situation for the sample of unemployed school-leavers



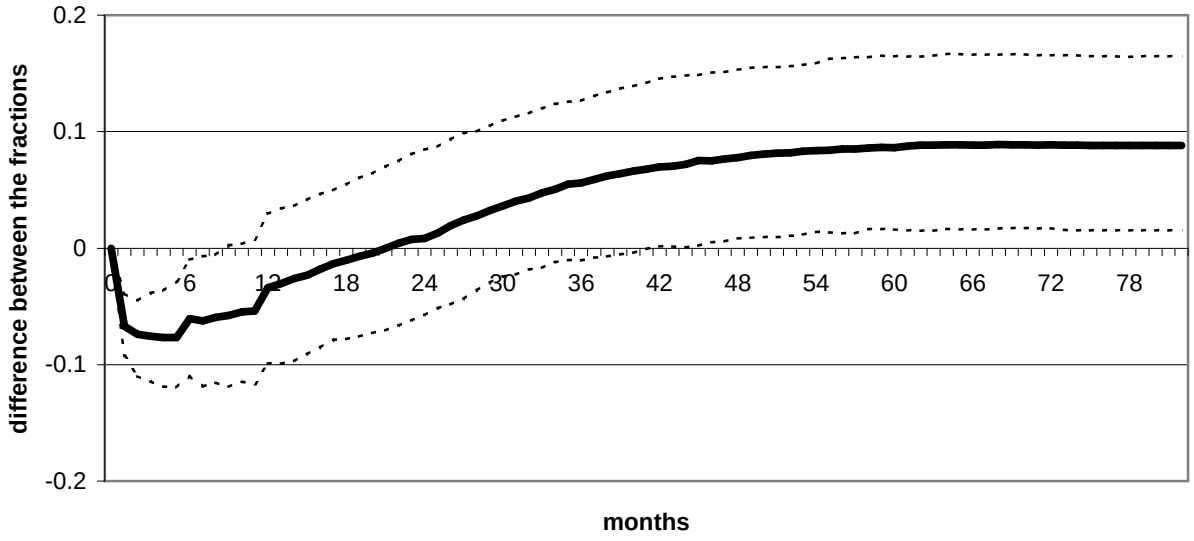
Note: time start with the month of a transition into temporary employment (TE) spell
95% of the simulations results are within the confidence bounds

Figure 7: Stepping stone effect for all school-leavers



Note: time start with the month of a transition into temporary employment spell
95% of the simulated differences are within the confidence bounds

Figure 8: Stepping stone effect for the sample of unemployed school-leavers



Note: time start with the month of a transition into temporary employment spell
95% of the simulated differences are within the confidence bounds

Appendix 1: Descriptive statistics of explanatory variables

Sample 1: all school-leavers seeking for permanent employment

Sample 2: unemployed school-leavers seeking for permanent employment

Variables	Sample 1 All	Sample 2 All	Sample 1 Transition to PE (without TE)	Sample 1 Transition to TE
Number of observations	4277	1542	1079	2514
Time independent variables				
Women	51.5%	53.6%	***45.1%***	***55.0%***
Age in months	253.85 (25.85)	253.88 (26.95)	***251.07 (25.61)***	***253.33 (24.75)***
Respondent Belgian	97.4%	97.0%	97.7%	97.9%
Respondent not Belgian	2.6%	3.0%	2.3%	2.1%
Number of brothers and sisters	1.72 (1.49)	1.78 (1.51)	1.71 (1.45)	1.69 (1.46)
Mother primary or lower secondary education	36.1%	35.9%	34.2%	37.2%
Mother higher secondary education	30.7%	29.8%	31.2%	31.5%
Mother tertiary education	22.8%	21.7%	24.7%	21.4%
Mother unknown education	10.5%	12.6%	9.9%	9.9%
Grandmother of respondent Belgian	***89.9%***	***87.7%***	91.2%	89.9%
Grandmother of respondent not Belgian	***10.2%***	***12.3%***	8.8%	10.1%
Respondent primary education	***3.9%***	***5.6%***	***4.3%***	***3.4%***
Respondent lower secondary education	***7.7%***	***9.3%***	***8.1%***	***7.8%***
Respondent higher secondary education	***43.6%***	***47.0%***	***47.2%***	***42.9%***
Respondent lower tertiary education	***27.0%***	***19.2%***	***20.9%***	***30.0%***
Respondent higher tertiary education	***17.8%***	***18.9%***	***19.6%***	***15.9%***
Any apprenticeships during education	***65.1%***	***60.6%***	***63.0%***	***67.5%***
Any student work during education	***41.9%***	***36.3%***	45.0%	44.9%
End education in vocational type (part time learning part time work)	6.6%	6.9%	***8.1%***	***6.2%***
Member of any kind of club (youth movement, sports club, political movement)	***58.0%***	***52.8%***	56.5%	58.4%
Pollsters impression of the respondent (only based on: calm, friendly and open)	0.060 (2.34)	0.038 (0.96)	0.068 (3.18)	0.061 (2.18)
Welfare typology *(based on place of residence at 23)*				
Living residentials	9.4%	11.0%	***12.0%***	***7.6%***
Urban living with average welfare	26.0%	23.8%	***26.5%***	***24.6%***
Older industrial and working-class residential areas	26.0%	28.3%	***26.9%***	***26.1%***
Modern urbanised areas	25.2%	25.2%	***22.6%***	***26.6%***
Traditional rural areas with recent urbanisation'.	13.3%	11.7%	***12.0%***	***15.1%***
Time dependent variables				
Financial independent of parents at t0	***7.5%***	***9.1%***	***5.3%***	***7.3%***
Living together at t0	5.3%	5.8%	4.8%	5.1%
Number of children at t0	0.012 (0.13)	0.018 (0.16)	0.008 (0.10)	0.012 (0.13)
Driving license at t0	***50.1%***	***44.3%***	49.3%	49.6%
Unemployment rate at t0	10.23 (3.46)	10.14 (3.40)	10.14 (3.44)	10.20 (3.47)

Financial independent of parents at start TE		13.9%
Living together at start TE		7.7%
Number of children at start TE		0.023 (0.19)
Driving license at start TE		53.0%
Unemployment rate at start TE		9.68 (3.28)

Note:

- The number of respondents with a transition to permanent employment –PE- (1079) and those with a transition to temporary employment –TE- (2514) together with the 684 censored individuals (not yet a transition to temporary employment or permanent employment at the moment of the last interview) sum ut to the first sample size (4277)
- t0 is for the sample of all school-leavers the first month after leaving school, for the sample of unemployed school-leavers it is the third month after leaving school
- Significant differences are indicated in ***Bold Italic***. We compare the two samples (column 1 and 2) and transition to permanent employment with transition to temporary employment (column 3 and 4).

Appendix 2: The likelihood function of the duration model

First we consider the state of unemployment. For this state we define two random durations T_{uq}: the random duration from unemployment to state q (with $q \in \{t,p\}$). Similarly for the temporary employment state we define T_{tp}: the random duration in temporary employment until permanent employment

We assume that all individual differences in the joint distribution $T = (T_{ut}, T_{up}, T_{tp})$ can be characterised by explanatory variables X, V where X is observed and V is not.

This joint distribution T|X, V can be expressed in terms of the distributions $(T_{ut} | X = x, V)$, $(T_{up} | X = x, V)$

and $(T_{tp} | T_{up} = t_{up}, X = x, V)$. The latter distributions are characterised by their transition rates: $\theta_{ut}(t|x,V)$, $\theta_{up}(t|x,V)$ and $\theta_{tp}(t|t_{ut},x,V)$.

Let $V = (V_t, V_p)$ be a (2 × 1)-vector of unobserved (destination specific) covariates, implying that:

$\theta_{ut}(t|x,V) = \theta_{ut}(t|x,V_t)$,

$\theta_{up}(t|x,V) = \theta_{up}(t|x,V_p)$,

$\theta_{tp}(t|t_{ut},x,V) = \theta_{tp}(t|t_{ut},x,V_p)$.

Individual contributions to the likelihood function

Now, we consider the individual contributions to the likelihood function.

Consider an individual in the flow sample and consider the likelihood contribution. We can distinguish the following cases:

1. right censored at unemployment duration t_k:

$$l_1(V) = P(T_{ut} > t_k, T_{up} > t_k \,|\cdot)$$
$$= S_u(t_k \,|\cdot)$$

2. leaving first unemployment for temporary employment within $[t_{k-1}, t_k]$ and right censored during temporary employment after t_l months:

$$l_2(V) = P(t_{k-1} < T_{ut} \le t_k, T_{tp} > t_l \,|\cdot)$$
$$= \left\{ \frac{\theta_{ut}(t_k)}{\sum_{q\in\{t,p\}} \theta_{uq}(t_k)} [S_u(t_{k-1}) - S_u(t_k)] \right\} S_t(t_l \,|\cdot)$$

3. leaving unemployment for temporary employment within $[t_{k-1}, t_k]$ and leaving for permanent employment within $[t_{l-1}, t_l]$.

$$l_3(V) = P(t_{k-1} < T_{ut} \le t_k, t_{l-1} < T_{tp} \le t_l)$$
$$= \left\{ \frac{\theta_{ut}(t_k)}{\sum_{q\in\{t,p\}} \theta_{uq}(t_k)} [S_u(t_{k-1}) - S_u(t_k)] \right\} \times [S_t(t_{l-1}) - S_t(t_l)]$$

4. leaving first unemployment for permanent employment within $[t_{k-1}, t_k]$.

$$l_4(V) = P(t_{k-1} < T_{up} \le t_k, T_{ut} > t_k \,|\cdot)$$
$$= \left\{ \frac{\theta_{up}(t_k)}{\sum_{q\in\{t,p\}} \theta_{uq}(t_k)} [S_u(t_{k-1}) - S_u(t_k)] \right\}$$

Appendix 3: Specification of the heterogeneity distribution

Suppose that $V_q\left(q \in \{t,p\}\right)$ can take two values v_{q1} and v_{q2} for each possible destination state q.

In the case of independence between the unobserved heterogeneity terms for the two possible destinations (temporary employment and permanent employment) we estimate the probabilities for the two points of support independently by a binomial logit model:

$$p_{1t} = \frac{\exp(\lambda_{1t})}{1+\exp(\lambda_{1t})} \qquad p_{2t} = 1 - p_{1t} \qquad \text{and} \qquad p_{1p} = \frac{\exp(\lambda_{1p})}{1+\exp(\lambda_{1p})} \qquad p_{2p} = 1 - p_{1p}$$

Then the joint probabilities for the independent UH can be written as the product of these independent probabilities:

$$P_{11} = P(V_t = v_{t1}, V_p = v_{p1}) = p_{1t} \cdot p_{1p}$$
$$P_{12} = P(V_t = v_{t1}, V_p = v_{p2}) = p_{1t} \cdot p_{2p}$$
$$P_{21} = P(V_t = v_{t2}, V_p = v_{p1}) = p_{2t} \cdot p_{1p}$$
$$P_{22} = P(V_t = v_{t2}, V_p = v_{p2}) = p_{2t} \cdot p_{2p}$$

In the case of a model with multivariate dependent UH we have a joint heterogeneity distribution with 4 points of support and the following probabilities associated to these:

$$P_{11} = P(V_t = v_{t1}, V_p = v_{p1}) = p_1$$
$$P_{12} = P(V_t = v_{t1}, V_p = v_{p2}) = p_2$$
$$P_{21} = P(V_t = v_{t2}, V_p = v_{p1}) = p_3$$
$$P_{22} = P(V_t = v_{t2}, V_p = v_{p2}) = p_4$$

Or in a shortcut notation $P_{ab} = P(V_t = v_{ta}, V_p = v_{pb}) = p_j$ where each of the elements a, b can take one of the values 1,2 (which results in 2^2 different combinations), each unique combination is named by p_j where j = 1,…,4.

We specify the probabilities by a multinomial logit model:

$$p_j = \frac{\exp(\lambda_j)}{1+\sum_{i=1}^{3}\exp(\lambda_i)}$$

for j = 1,2,3 and

$$p_4 = 1 - \sum_{j=1}^{3}\exp(\lambda_j) = \frac{1}{1+\sum_{i=1}^{3}\exp(\lambda_i)}$$

Appendix 4: Estimation results for sample of all school-leavers

		b	se	t
Transition				
U-TE	woman	0.015	0.044	0.333
	age (in months)	-0.004	0.002	-2.467
	not Belgian	-0.414	0.141	-2.936
	number siblings	-0.035	0.015	-2.313
	mother primary or lower secondary education (ref)			
	mother higher secondary education	-0.047	0.052	-0.904
	mother tertiary education	-0.190	0.062	-3.065
	mother unknown education	-0.138	0.074	-1.871
	not Belgian. grandmother	-0.011	0.079	-0.134
	primary education	-0.455	0.130	-3.497
	lower secondary education	-0.121	0.082	-1.474
	higher secondary education (ref)			
	tertiary education	0.342	0.067	5.134
	no apprenticeship	-0.199	0.047	-4.236
	no student work	-0.323	0.064	-5.060
	no vocational training	-0.142	0.087	-1.643
	not member club	-0.151	0.045	-3.365
	pollster's impression of respondent	0.011	0.009	1.233
	living residentials	-0.280	0.087	-3.226
	urban living with average welfare	0.025	0.059	0.419
	older industrial and working-class residential areas (ref)			
	modern urbanised areas	0.156	0.062	2.530
	traditional rural areas with recent urbanisation'.	0.218	0.069	3.170
	financial independent of parents	0.176	0.084	2.103
	living together	-0.028	0.102	-0.270
	number children	-0.068	0.152	-0.450
	driving license	0.144	0.048	3.008
	regional unemployment rate	-0.027	0.009	-2.871
	cohort1976	-0.351	0.067	-5.278
U-PE	woman	-0.472	0.081	-5.852
	age (in months)	-0.011	0.003	-3.964
	not Belgian	-0.438	0.261	-1.680
	number siblings	-0.021	0.026	-0.813
	mother primary or lower secondary education (ref)			
	mother higher secondary education	0.047	0.093	0.501
	mother tertiary education	0.010	0.105	0.098
	mother unknown education	-0.150	0.132	-1.137
	not Belgian grandmother	-0.326	0.146	-2.230
	primary education	-0.759	0.211	-3.604
	lower secondary education	-0.528	0.158	-3.347
	higher secondary education (ref)			
	tertiary education	0.433	0.113	3.818
	no apprenticeship	-0.241	0.081	-2.979
	no student work	-0.177	0.109	-1.619
	no vocational training	-0.524	0.151	-3.471
	not member club	-0.051	0.079	-0.649
	pollster's impression of respondent	0.032	0.033	0.943
	living residentials	0.128	0.131	0.979
	urban living with average welfare	0.116	0.101	1.151
	older industrial and working-class residential areas (ref)			
	modern urbanised areas	0.077	0.111	0.689
	traditional rural areas with recent urbanisation'.	-0.029	0.130	-0.223

	financial independent of parents	-0.181	0.187	-0.969
	living together	0.203	0.186	1.091
	number children	-0.453	0.365	-1.242
	driving license	0.421	0.088	4.789
	regional unemployment rate	-0.055	0.017	-3.254
	cohort1976	-0.203	0.114	-1.781
TE-PE	woman	-0.337	0.062	-5.472
	age (in months)	-0.001	0.002	-0.591
	not Belgian	0.047	0.217	0.216
	number siblings	-0.025	0.021	-1.205
	Mother primary or lower secondary education (ref)			
	mother higher secondary education	-0.037	0.070	-0.532
	mother tertiary education	-0.102	0.084	-1.209
	mother unknown education	-0.080	0.094	-0.849
	not Belgian grandmother	-0.170	0.108	-1.574
	primary education	-0.632	0.173	-3.649
	lower secondary education	-0.252	0.117	-2.156
	higher secondary education (ref)			
	tertiary education	-0.372	0.092	-4.058
	no apprenticeship	0.146	0.064	2.279
	no student work	-0.163	0.087	-1.874
	no vocational training	0.124	0.123	1.008
	not member club	0.017	0.060	0.282
	pollster's impression of respondent	0.008	0.013	0.597
	living residentials	0.100	0.119	0.844
	urban living with average welfare	0.107	0.082	1.308
	older industrial and working-class residential areas (ref)			
	modern urbanised areas	-0.055	0.082	-0.672
	traditional rural areas with recent urbanisation'.	0.116	0.087	1.341
	financial independent of parents	0.102	0.087	1.167
	living together	-0.192	0.120	-1.594
	number children	-0.324	0.223	-1.452
	driving license	0.212	0.065	3.271
	regional unemployment rate	-0.005	0.012	-0.382
	cohort1976	-0.036	0.091	-0.392
Baseline hazard				
U-TE	month 2	-1.055	0.072	-14.761
	month 3	-0.292	0.060	-4.852
	month 4	-0.481	0.074	-6.506
	month 5	-0.806	0.095	-8.466
	month 6	-1.094	0.119	-9.227
	month 7	-0.841	0.116	-7.281
	month 8-11	-1.311	0.090	-14.578
	month 12	-2.515	0.340	-7.392
	month 13-15	-1.376	0.127	-10.850
	month 16-24	-2.007	0.127	-15.767
	month 25-36	-2.504	0.181	-13.857
	month 37-84	-2.752	0.190	-14.514
U-PE	month 3	0.791	0.122	6.464
	month 4-5	0.790	0.158	5.017
	month 6-15	0.103	0.174	0.591
	month 16-36	-0.292	0.203	-1.436
	month 37-84	-0.553	0.268	-2.068

TE-PE	month 2-5	0.738	0.167	4.413
	month 6	1.458	0.195	7.464
	month 7-11	0.657	0.191	3.444
	month 12	1.562	0.210	7.445
	month 13-30	0.746	0.188	3.966
	month 31-60	0.515	0.198	2.608
	month 61-83	0.932	0.253	3.691
Unobserved heterogeneity				
const U-TE	vt1	-0.250	0.214	-1.168
	vt2			
const U-PE	vp1	0.608	0.453	1.344
	vp2	-1.805	0.391	-4.617
mult TE-PE	multiTP	-2.175	0.493	-4.413
prob	lam1t			
	lam1p	-2.304	0.340	-6.776
	-Log(likelihood)	18138.5		
	number of parameters	107		
	number of school-leavers	4277		

Appendix 5: Estimation results for sample of unemployed school-leavers

		b	**se**	t
Transition				
U-TE	woman	0.1075	0.0834	1.28897
	age (in months)	-0.0036	0.0028	-1.2857
	not Belgian	-0.6876	0.2495	-2.7559
	number siblings	-0.0534	0.0291	-1.8351
	mother primary or lower secondary education (ref)			
	mother higher secondary education	0.1527	0.0959	1.59228
	mother tertiary education	-0.1733	0.1243	-1.3942
	mother unknown education	-0.0444	0.1277	-0.3477
	not Belgian grandmother	0.1189	0.1342	0.88599
	primary education	-0.2386	0.2063	-1.1566
	lower secondary education	-0.2868	0.1502	-1.9095
	higher secondary education (ref)			
	tertiary education	0.683	0.1208	5.65397
	no apprenticeship	-0.2304	0.0863	-2.6698
	no student work	-0.3944	0.1194	-3.3032
	no vocational training	-0.2389	0.1719	-1.3898
	not member club	-0.0824	0.0833	-0.9892
	pollster's impression of respondent	-0.0521	0.0408	-1.277
	living residentials	-0.3844	0.1578	-2.436
	urban living with average welfare	-0.1748	0.1123	-1.5565
	older industrial and working-class residential areas (ref)			
	modern urbanised areas	0.0268	0.1121	0.23907
	traditional rural areas with recent urbanisation'.	0.2917	0.128	2.27891
	financial independent of parents	-0.0111	0.14	-0.0793
	living together	-0.0432	0.1945	-0.2221
	number children	-0.2164	0.2679	-0.8078
	driving license	0.2684	0.0933	2.87674
	regional unemployment rate	-0.0136	0.0186	-0.7312
	cohort1976	-0.2555	0.1241	-2.0588

U-PE	woman	-0.4188	0.127	-3.2976
	age (in months)	-0.0076	0.0041	-1.8537
	not Belgian	-0.7749	0.4139	-1.8722
	number siblings	0.0176	0.0424	0.41509
	mother primary or lower secondary education (ref)			
	mother higher secondary education	0.0961	0.1559	0.61642
	mother tertiary education	0.18	0.1703	1.05696
	mother unknown education	-0.163	0.1935	-0.8424
	not Belgian grandmother	-0.4137	0.2192	-1.8873
	primary education	-0.2601	0.2694	-0.9655
	lower secondary education	-0.3065	0.2319	-1.3217
	higher secondary education (ref)			
	tertiary education	0.4248	0.1836	2.31373
	no apprenticeship	-0.4029	0.1292	-3.1184
	no student work	-0.1742	0.169	-1.0308
	no vocational training	-0.3898	0.2526	-1.5432
	not member club	-0.2706	0.1258	-2.151
	pollster's impression of respondent	0.0327	0.0612	0.53431
	living residentials	0.4006	0.1934	2.07135
	urban living with average welfare	0.136	0.1628	0.83538
	older industrial and working-class residential areas (ref)			
	modern urbanised areas	-0.0065	0.1798	-0.0362
	traditional rural areas with recent urbanisation'.	0.0889	0.1985	0.44786
	financial independent of parents	-0.5001	0.2511	-1.9916
	living together	-0.0278	0.2982	-0.0932
	number children	-0.0186	0.3529	-0.0527
	driving license	0.4401	0.1455	3.02474
	regional unemployment rate	-0.0575	0.0269	-2.1375
	cohort1976	-0.1544	0.17	-0.9082
TE-PE	woman	-0.6154	0.1538	-4.0013
	age (in months)	-0.0067	0.0051	-1.3137
	not Belgian	-0.2699	0.4943	-0.546
	number siblings	-0.0773	0.053	-1.4585
	mother primary or lower secondary education (ref)			
	mother higher secondary education	0.0279	0.164	0.17012
	mother tertiary education	-0.129	0.1981	-0.6512
	mother unknown education	-0.0629	0.2026	-0.3105
	not Belgian grandmother	-0.3469	0.2594	-1.3373
	primary education	-0.5075	0.3013	-1.6844
	lower secondary education	-0.2714	0.2699	-1.0056
	higher secondary education (ref)			
	tertiary education	-0.1794	0.2183	-0.8218
	no apprenticeship	0.3336	0.1452	2.29752
	no student work	-0.1984	0.2133	-0.9301
	no vocational training	0.2462	0.2853	0.86295
	not member club	0.073	0.1399	0.5218
	pollster's impression of respondent	0.1802	0.073	2.46849
	living residentials	0.5521	0.2669	2.06857
	urban living with average welfare	0.4774	0.1963	2.43199
	older industrial and working-class residential areas (ref)			
	modern urbanised areas	0.0786	0.1865	0.42145
	traditional rural areas with recent urbanisation'.	0.3802	0.2115	1.79764
	financial independent of parents	0.1828	0.1823	1.00274
	living together	-0.2385	0.2513	-0.9491
	number children	-0.0404	0.4413	-0.0915
	driving license	0.3119	0.1489	2.09469

	regional unemployment rate	-0.0393	0.0295	-1.3322
	cohort1976	-0.0222	0.219	-0.1014
Baseline hazard				
U-TE	month 3	-0.2189	0.123	-1.7797
	month 4-5	-0.2721	0.1149	-2.3681
	month 6-9	-0.5225	0.1177	-4.4393
	month 10	-1.9548	0.4286	-4.5609
	month 11-14	-0.8877	0.1602	-5.5412
	month 15-27	-1.3853	0.1569	-8.8292
	month 28-84	-2.0707	0.2079	-9.9601
U-PE	month 3	-0.0244	0.1553	-0.1571
	month 4-12	-0.5558	0.1482	-3.7503
	month 13-30	-0.6891	0.2225	-3.0971
	month 31-84	-1.2636	0.3447	-3.6658
TE-PE	month 2	0.6223	0.4154	1.49807
	month 3-5	0.8814	0.3619	2.43548
	month 6	1.3331	0.3876	3.43937
	month 7-11	0.8445	0.3613	2.33739
	month 12	1.5818	0.4098	3.85993
	month 13-24	1.0227	0.3697	2.7663
	month 25-82	1.1852	0.3967	2.98765
Unobserved heterogeneity				
const U-TE	vt1	-1.1686	0.4255	-2.7464
	vt2			
const U-PE	vp1	-0.5739	0.6297	-0.9114
	vp2	-2.0984	0.6446	-3.2554
mult TE-PE	multiTP	-2.7488	0.9411	-2.9208
prob	lam1t			
	lam1p	-0.1013	0.5185	-0.1954
	-Log(likelihood)	6254.35		
	number of parameters	101		
	number of school-leavers	1542		

Appendix 6: Simulation of the effect of temporary employment

For the simulation we proceed like follows:

1. Make a random draw from estimated parameters for each individual. (Assuming that the parameters are distributed normally and have the mean equal to the parameter estimate and the standard deviation equal to the standard error of the parameters)

2. Using the parameter estimates and the characteristics of the individuals to compute the (random) transition rate for each individual and for each possible transition. We have performed an auxiliary estimation for the transition rates of censoring.

3. Given the transition rates, draw a random durations for all possible transitions

4. The smallest durations for transitions are assumed to be realized

5. The remaining random draws are used to obtain the duration for the counterfactual case of no transition to temporary employment

6. Use the simulated data to compute the statistics (the fraction who had a transition to permanent employment)

(7. Optional: Check if the model is able to reproduce the real data (e.g. see figure 2))

(8. Optional: Contrast the simulated participation with the simulated counterfactual (e.g. see figure 3 and figure 5)

9. Compute the differences: this is the effect of temporary employment on the fraction of people who had a transition to permanent employment (e.g. see figure 4 and figure 6)

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