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The relationship between unemployment duration and education

The case of school leavers in Belgium

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The relationship between unemployment duration and education

The case of school leavers in Belgium

December 2015

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Abstract - In this study, we investigate the exit rates from unemployment associated with different levels of education in Belgium during two periods characterised respectively by high (2002-2007) and low economic growth (2009-2014). Our estimated exit probabilities confirm that the chances of leaving unemployment are substantially higher for young unemployed who have followed post-secondary education. Moreover, the probabilities of leaving unemployment for low- and medium-skilled school leavers considerably deteriorated between the two periods. On the one hand, the penalty associated with lower education slightly increased while, on the other hand, the advantage associated with postgraduate tertiary education reinforced itself. Finally, our results show considerable heterogeneity according to region of residence and gender.

Abstract - Cette étude analyse, à l'échelle de la Belgique, les taux de sortie du chômage pour différents niveaux de qualification durant deux périodes, respectivement caractérisées par une forte (2002-2007) et une faible (2009-2014) croissance économique. Comme prévu, les estimations des probabilités de sortie confirment que les chances de sortir du chômage sont sensiblement plus élevées chez les jeunes chômeurs diplômés de l'enseignement supérieur. En outre, nos résultats montrent que les probabilités de sortie du chômage pour les jeunes diplômés faiblement et moyennement qualifiés se sont sensiblement détériorées entre les deux périodes. Alors que les pénalités touchant les niveaux de qualification plus faibles se sont intensifiées dans le temps, l'avantage lié à un diplôme de l'enseignement supérieur de

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[1] Marie Duvivier contributed to this research while doing an internship at the Federal Planning Bureau. She also used part of this work in her Master's thesis.

type long s'est renforcé. Enfin, nos résultats font apparaître une grande hétérogénéité selon la région de résidence et le genre.

Abstract - In deze studie onderzoeken wij de uitstroomkansen uit werkloosheid naar opleiding niveau in België tijdens twee periodes die gekenmerkt werden door respectievelijk sterke (2002-2007) en zwakke (2009-2014) economische groei. Onze geraamde uitstroomkansen bevestigen dat jonge werklozen met een diploma hoger onderwijs aanzienlijk meer kans hebben om de werkloosheid te verlaten. Bovendien namen de uitstroomkansen van laag- en middelhooggeschoolde schoolverlaters duidelijk af tussen de twee periodes. De sanctie voor een lager opleidingsniveau steeg licht, terwijl het voordeel voor hoger onderwijs van het lange type versterkt werd. Tot slot blijkt uit onze resultaten dat er aanmerkelijke heterogeniteit bestaat volgens gewest van verblijf en geslacht.

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Executive summary

Previous research has shown that education has a substantial impact on labour market outcomes such as earnings and employment. Education improves the skills of an individual making him/her more productive and thereby increasing his/her prospects on the labour market. Furthermore, education might increase the efficiency of the matching process between vacancies and job seekers as higher educated workers have a broader range of search possibilities.

In this study, we want to examine the relationship between education and labour market performance in Belgium. More specifically, we concentrate on the relationship between unemployment duration and education level among young unemployed without work experience. Youth unemployment rates are structurally higher in Belgium compared to other European countries, especially for low-skilled young adults. While youth unemployment is most acute in Brussels and Wallonia, it is also an issue in Flanders where the ratio between youth and adult unemployment rates is noticeably high.

Our methodology is empirical. We examine exit rates from unemployment associated with different levels of education during two periods characterised respectively by high (2002-2007) and low economic growth (2009-2014). Besides education level, our data comprises information on individual characteristics such as gender, age, region of residence and nationality. Our methodology allows us to assess which educational degrees are associated with low and high exit rates from unemployment at the beginning of the career taking into account observed and unobserved individual characteristics. Comparing the two periods under consideration allows us to examine the evolution of this relationship in time. In addition to the business cycle, factors such as changes in youth labour supply and labour market measures can affect this evolution.

Our main findings can be summarized as follows. First, the chances of leaving unemployment are strongly associated with the level of education of school leavers. In particular, the probability of leaving unemployment is substantially higher for young graduates who have completed post-secondary education. Moreover, our results show that this effect has reinforced itself through time in two ways. While the penalty associated with lower education has intensified over time, the advantage associated with postgraduate higher education has further reinforced itself. Our results are compatible with theories which identify skill-biased technological change and job polarisation as an explanation for the higher incidence and duration of unemployment among low- and medium-skilled workers. Moreover, given the short interval between the two periods in our study, "over-education" seems a likely explanation for the further deterioration which took place in this period.

Second, our data allows us to examine differences in unemployment exit probabilities between the three regions. While Flanders has higher exit rates than the two other regions whatever the diploma, this advantage is relatively higher for low and medium skill degrees. This ability to integrate low-skilled school leavers is nevertheless reduced after the Great Recession of 2008. Inversely, Wallonia appears to favour the unemployment exit rates of high-skilled school leavers, in particular, those holding a Master's degree. This feature is also accentuated after the Great Recession and likely results from crowding-out where higher skilled young people take up jobs for which they are overqualified. Finally, Brussels

is the only region which manages to avoid a further deterioration in the unemployment exit rates of low- and medium-skilled youth after the Great Recession.

Third, our results indicate the presence of negative duration dependence in the unemployment exit rates in Flanders. True negative duration dependence indicates that the chances of exiting unemployment decrease with time spent in unemployment either due to stigmatization or to a loss of skills and motivation. Inversely, the absence of negative duration dependence indicates that long term unemployment results from the characteristics of the unemployed at the beginning of the unemployment spell. We find no evidence of negative duration dependence in Brussels and Wallonia. However, duration dependence also appears for school leavers holding a Master's degree and to a lesser extent for those holding a Bachelor's degree after the first six months. All other diplomas exhibit a rather constant probability of exiting unemployment after the first six months.

Fourth, even if indirectly, our results illustrate some of the effects of the monitoring procedure introduced in 2004. Benefits withdrawal appears to affect more strongly school leavers living in Wallonia than those living in the two other regions. Moreover, it also seems to affect proportionally more low- and medium- skilled school leavers than those holding a Bachelor or a Master's degree.

Finally, our results show that female unemployed school leavers increasingly succeed in leaving unemployment relative to their male peers. Whereas in the 2002-2007 period, only high educated women had similar or higher unemployment exit rates than men, this is also the case in the 2009-2014 period for medium and low educated women (with the exception of school leavers holding a junior high school degree). Employment policies aimed at low-skilled workers such as "Titres-services – Dienstencheques", are likely to be playing an important role in this evolution. Regional differences also appear in terms of gender, with females still performing less than men in Wallonia and better in Flanders. In Brussels, there is no significant difference between men and women.

Synthèse

Des recherches antérieures ont montré que l'éducation influence sensiblement les opportunités offertes sur le marché du travail, comme les possibilités d'emploi ou la rémunération. L'éducation améliore les compétences des individus, leur productivité et accroît ainsi leurs perspectives sur le marché du travail. En outre, elle pourrait favoriser l'appariement entre l'offre et la demande de travail puisque les travailleurs plus qualifiés disposent d'un choix plus vaste.

Dans cette étude, nous examinons la relation entre éducation et opportunités sur le marché du travail belge. Plus particulièrement, nous nous concentrons sur la relation entre la durée de chômage et le niveau de qualification parmi les jeunes chômeurs sans expérience professionnelle. Le taux de chômage des jeunes est structurellement plus élevé en Belgique comparativement aux autres pays européens, plus particulièrement chez les jeunes adultes peu qualifiés. Même si c'est à Bruxelles et en Wallonie que le chômage des jeunes est le plus prononcé, il est également un sujet de préoccupation en Flandre où le rapport entre le chômage des jeunes et des adultes est sensiblement élevé.

Par le biais d'une méthode empirique, nous avons analysé les taux de sortie du chômage pour différents niveaux de qualification durant deux périodes, respectivement caractérisées par une forte (2002-2007) et une faible (2009-2014) croissance économique. Outre le niveau de qualification, nos données englobent des informations sur les caractéristiques individuelles telles que le genre, l'âge, la région de résidence et la nationalité. Notre méthodologie nous permet d'évaluer quels diplômes sont associés avec des taux faibles ou élevés de sortie du chômage en début de carrière, en tenant compte de caractéristiques individuelles observées et non observées. La comparaison des deux périodes envisagées nous a permis d'analyser l'évolution de cette relation dans le temps. Outre le cycle conjoncturel, des facteurs comme des changements au niveau de l'offre de travail parmi les jeunes et la politique du marché du travail peuvent influer sur cette évolution.

Nos principales conclusions sont résumées ici. Premièrement, les probabilités de quitter le chômage sont fortement liées au niveau de qualification atteint à la sortie de l'école. Plus particulièrement, les probabilités de trouver un emploi sont sensiblement plus élevées pour les jeunes diplômés qui ont terminé des études postsecondaires. Il est en outre apparu que ce résultat s'est renforcé dans le temps, et ce de deux manières. Alors que les pénalités touchant les niveaux de qualification plus faibles se sont intensifiées dans le temps, l'avantage lié aux qualifications plus élevées s'est accru. Nos résultats sont cohérents avec des théories qui expliquent une incidence et une durée plus élevées du chômage parmi les travailleurs faiblement et moyennement qualifiés par les changements technologiques qui privilégient les compétences et la polarisation des emplois. De plus, en raison du bref intervalle entre les deux périodes étudiées, la "surqualification" semble constituer une explication plausible de la nouvelle détérioration enregistrée à cette période.

Deuxièmement, nos données nous permettent d'analyser les différences de probabilités de sortie du chômage entre les trois régions. La Flandre se caractérise par des taux de sortie plus élevés comparativement aux deux autres régions, et ce quel que soit le diplôme, mais cette tendance est encore plus marquée pour les niveaux de compétences faibles et moyens. Néanmoins, cette capacité à intégrer les

jeunes diplômés faiblement qualifiés a diminué après la grande récession de 2008. Inversement, en Wallonie, les taux de sortie du chômage des jeunes diplômés hautement qualifiés, et plus particulièrement les titulaires d'un master, sont plus favorables. Cette caractéristique s'est accentuée après la grande récession et s'explique sans doute par le fait que, face à la pénurie d'emplois, les jeunes wallons acceptent des emplois pour lesquels ils sont surqualifiés. Enfin, Bruxelles est la seule région qui parvient à éviter une nouvelle détérioration des taux de sortie du chômage des jeunes faiblement et moyennement qualifiés après la grande récession.

Troisièmement, nos résultats révèlent une dépendance temporelle négative des taux de sortie du chômage en Flandre. Une dépendance temporelle négative signifie que plus la durée de la période de chômage est longue, plus la probabilité de sortir du chômage diminue, soit en raison d'une stigmatisation ou d'une perte de compétences ou de motivation. Inversement, l'absence de dépendance temporelle négative indique que le chômage de longue durée s'explique par le profil du chômeur lors de son entrée dans ce statut. À Bruxelles et en Wallonie, rien n'atteste d'une dépendance temporelle négative. Néanmoins, une dépendance temporelle apparaît aussi pour les jeunes titulaires d'un master, et dans une moindre mesure, pour les jeunes titulaires d'un diplôme de bachelier après les premiers six mois. Tous les autres diplômes se caractérisent par une probabilité de sortie du chômage relativement constante après les premiers six mois.

Quatrièmement, nous résultats illustrent - indirectement - certains effets de la procédure de monitoring introduite en 2004. La suppression des allocations semble affecter plus fortement les jeunes wallons qui quittent l'école que ceux qui vivent dans les deux autres régions, elle impacterait aussi proportionnellement plus les jeunes diplômés faiblement et moyennement qualifiés que les jeunes diplômés titulaires d'un bachelier ou d'un master.

Finalement, nos résultats montrent que les jeunes diplômées sans emploi quittent plus facilement le chômage que leurs homologues masculins. Alors qu'au cours de la période 2002-2007, seules les femmes hautement qualifiées se caractérisaient par des taux de sortie du chômage égaux ou plus élevés que ceux des hommes, c'est désormais le cas pour les femmes faiblement et moyennement qualifiées (à l'exception de celles titulaires d'un certificat de l'enseignement secondaire inférieur) au cours de la période 2009-2014. Les politiques de l'emploi ciblées sur les travailleurs peu qualifiés comme "le système des titres-services" pourraient avoir joué un rôle important dans cette évolution. Néanmoins, certaines différences régionales se marquent au niveau du genre par rapport aux résultats nationaux, les femmes affichant de moins bons résultats que les hommes en Wallonie et de meilleurs résultats en Flandre. À Bruxelles, on ne constate pas de différence significative entre les hommes et les femmes.

Synthese

Uit eerder onderzoek bleek dat onderwijs een aanzienlijke impact heeft op arbeidsmarktresultaten, zoals lonen en werkgelegenheid. Onderwijs bevordert de vaardigheden van personen zodat zij productiever worden en hierdoor betere kansen op de arbeidsmarkt krijgen. Daarenboven zou onderwijs kunnen zorgen voor een efficiëntere koppeling tussen vacatures en werkzoekenden, aangezien hoger opgeleide werknemers over een ruimere waaier aan jobmogelijkheden beschikken.

In deze studie willen wij de relatie tussen onderwijs en arbeidsmarktresultaten in België onderzoeken. Wij richten ons meer bepaald op de relatie tussen werkloosheidsduur en opleidingsniveau onder jonge werklozen zonder werkervaring. De jeugdwerkloosheidsgraad ligt structureel hoger in België in vergelijking met andere Europese landen, in het bijzonder voor laaggeschoolde jongvolwassenen. Hoewel jeugdwerkloosheid het meest acuut is in Brussel en Wallonië, vormt het ook een probleem in Vlaanderen, waar de verhouding tussen jeugd- en volwassen werkloosheidsgraad zeer groot is.

Wij wenden een empirische methodologie aan om de uitstroomkansen uit werkloosheid naar opleidingsniveau te onderzoeken tijdens twee periodes die gekenmerkt werden door respectievelijk sterke (2002-2007) en zwakke (2009-2014) economische groei. Naast het opleidingsniveau, bevatten onze gegevens informatie over andere individuele kenmerken, zoals geslacht, leeftijd, gewest van verblijf en nationaliteit. Via onze methodologie kan bepaald worden welke onderwijsdiploma's verbonden zijn met hoge en lage uitstroomkansen aan het begin van de loopbaan, rekening houdend met waargenomen en niet-waargenomen individuele kenmerken. Door de twee beschouwde periodes met elkaar te vergelijken, kunnen wij de evolutie van die relatie in de tijd onderzoeken. Naast de conjunctuurcyclus, kunnen factoren zoals veranderingen in het arbeidsaanbod van jongeren en arbeidsmarktmaatregelen een invloed hebben op die evolutie.

Onze belangrijkste bevindingen kunnen als volgt samengevat worden. Ten eerste zijn de uitstroomkansen sterk afhankelijk van het opleidingsniveau van de schoolverlaters. De kans om de werkloosheid te verlaten is groter voor jonge afgestudeerden met een diploma hoger onderwijs. Daarenboven tonen onze resultaten dat dit effect op een dubbele manier in de tijd versterkt is. Niet alleen steeg de sanctie verbonden aan een lager opleidingsniveau, ook het voordeel voor langer hoger onderwijs werd nog sterker. Onze resultaten zijn verenigbaar met theorieën die technische veranderingen ten gunste van bepaalde vaardigheden en arbeidspolarisatie als verklaring aanduiden voor de hogere werkloosheidsgraad en langere werkloosheidsduur onder laag- en middelhooggeschoolde werknemers. Bovendien lijkt 'overkwalificatie', gezien de korte tijd tussen de periodes in onze studie, een waarschijnlijke verklaring voor de verdere achteruitgang tijdens die periode.

Ten tweede laten onze gegevens toe de verschillen in de uitstroomkansen uit werkloosheid tussen de drie gewesten te vergelijken. Hoewel de uitstroomkansen in Vlaanderen, ongeacht het diploma hoger liggen dan in de twee andere gewesten, is dat voordeel relatief groter voor laag- en middelhooggeschoolde personen. Na de grote recessie van 2008 vermindert het vermogen om laaggeschoolde schoolverlaters op te nemen in Vlaanderen evenwel sterker. Omgekeerd is in Wallonië het verschil ten gunste van hooggeschoolde schoolverlaters groter, vooral in het geval van een masterdiploma. Dat kenmerk

wordt ook verscherpt na de grote recessie en is wellicht het gevolg van verdringing, waardoor hoger opgeleide jongeren werk aannemen waarvoor ze overgekwalificeerd zijn. Tot slot is Brussel het enige gewest dat erin slaagt een verdere achteruitgang te vermijden van de uitstroomkansen van laag- en middelhooggeschoolde jongeren na de grote recessie.

Ten derde wijzen onze resultaten op de aanwezigheid van negatieve afhankelijkheidsduur in de uitstroomkansen in Vlaanderen. Echte negatieve afhankelijkheidsduur geeft aan dat de kansen om de werkloosheid te verlaten verminderen naarmate de werkloosheid langer duurt, ofwel door stigmatisering ofwel door een verlies van vaardigheden of motivatie. Omgekeerd wijst de afwezigheid van negatieve afhankelijkheidsduur erop dat lange werkloosheid het gevolg is van de kenmerken van de werkloze aan het begin van de periode van werkloosheid. We vinden geen bewijs van negatieve afhankelijkheidsduur in Brussel en Wallonië. Afhankelijkheidsduur komt echter ook bij schoolverlaters met een masterdiploma en, in mindere mate, met een bachelordiploma na de eerste zes maanden. Alle andere diploma's vertonen een redelijk constante uitstroomkans uit werkloosheid na de eerste zes maanden.

Ten vierde tonen onze resultaten, zij het indirect, enkele van de effecten van de in 2004 ingevoerde toezichtprocedure. Hoewel het verlies van uitkeringen een grotere impact heeft op de uitstroomkansen van schoolverlaters in Wallonië dan die in de twee andere gewesten, heeft het ook een relatief grotere invloed op laag- en middelhooggeschoolde schoolverlaters dan op die met een bachelor- of masterdiploma.

Tot slot tonen onze resultaten dat vrouwelijke schoolverlaters er steeds beter in slagen de werkloosheid te verlaten in vergelijking met mannen. Hoewel in de periode 2002-2007 enkel hooggeschoolde vrouwen gelijkaardige of hogere uitstroomkansen hadden dan mannen, is dat ook het geval in de periode 2009-2014 voor laag- en middelhooggeschoolde vrouwen (met uitzondering van de schoolverlaters met een diploma lager secundair onderwijs). Werkgelegenheidsmaatregelen – zoals 'Dienstencheques' – die gericht zijn op laaggeschoolde werknemers spelen mogelijk een belangrijke rol in die evolutie. De resultaten naar geslacht vertonen ook regionale verschillen. Zo presteren vrouwen nog steeds minder goed dan mannen in Wallonië en beter in Vlaanderen. In Brussel is er geen significant verschil tussen mannen en vrouwen.

1. Introduction

Previous research has shown that education has a substantial impact on labour market outcomes such as earnings and employment. Education improves the skills of an individual making him/her more productive and thereby increasing his/her prospects on the labour market. Furthermore, education might increase the efficiency of the matching process between vacancies and job seekers as higher educated workers have a broader range of search possibilities. On the other hand, over-education, which involves higher educated individuals crowding out low educated ones when competing for jobs, has been acknowledged as a factor aggravating the increasingly contrasting employment rates of low- and high-skilled workers. On the demand side, skill-biased and task-biased technological change combined with offshoring have been identified as main factors explaining the increasing difficulties met by certain types of low and medium skilled workers on the labour market.

In this study, we want to examine the relationship between education and labour market performance in Belgium. More specifically, we concentrate on the relationship between unemployment duration and education level among young unemployed without work experience. We examine exit rates from unemployment associated with different levels of education during two periods characterised respectively by high (2002-2007) and low economic growth (2009-2014). Besides education level, our data comprises information on individual characteristics such as gender, age, region of residence and nationality. Our methodology allows us to assess which educational degrees are associated with low and high exit rates from unemployment at the beginning of the career taking into account observed and unobserved individual characteristics. Comparing the two periods under consideration allows us to examine the evolution of this relationship in time. In addition to the business cycle, factors such as changes in youth labour supply and labour market measures can affect this evolution.

Our main findings are in line with those of other studies and show that the chances of leaving unemployment are substantially higher for young unemployed who have followed post-secondary education. Moreover, the probabilities of leaving unemployment for low-skilled youth deteriorated between the two periods. On the one hand, the penalty associated with lower education slightly increased while, on the other hand, the advantage associated with postgraduate tertiary education reinforced itself. Finally, our results show considerable heterogeneity according to region of residence and gender.

The paper is organised as follows. Section 2 describes briefly the youth labour market in Belgium. Section 3 explains the data and the methodology used. Section 4 presents the results and Section 5 concludes.

2. Institutional background

Youth unemployment rates are structurally higher in Belgium compared to other European countries, especially for low-skilled young adults. Cockx (2013) identifies two main reasons behind this phenomenon: high (youth) minimum wages which raise wage costs above productivity making it unprofitable for employers to hire low-skilled youth; and the education system characterized by grade repetition, streaming and limited exposure to work, which badly prepares for the transition into the labour market. While youth unemployment is most acute in Brussels and Wallonia, it is also an issue in Flanders where the ratio between youth and adult unemployment rates is noticeably high[2] (Cockx, 2013; Herremans et al., 2015).

Graph 1   Unemployment rates of young adults aged 15 to 25 years in Belgium (2002-2014)

Source: BFP
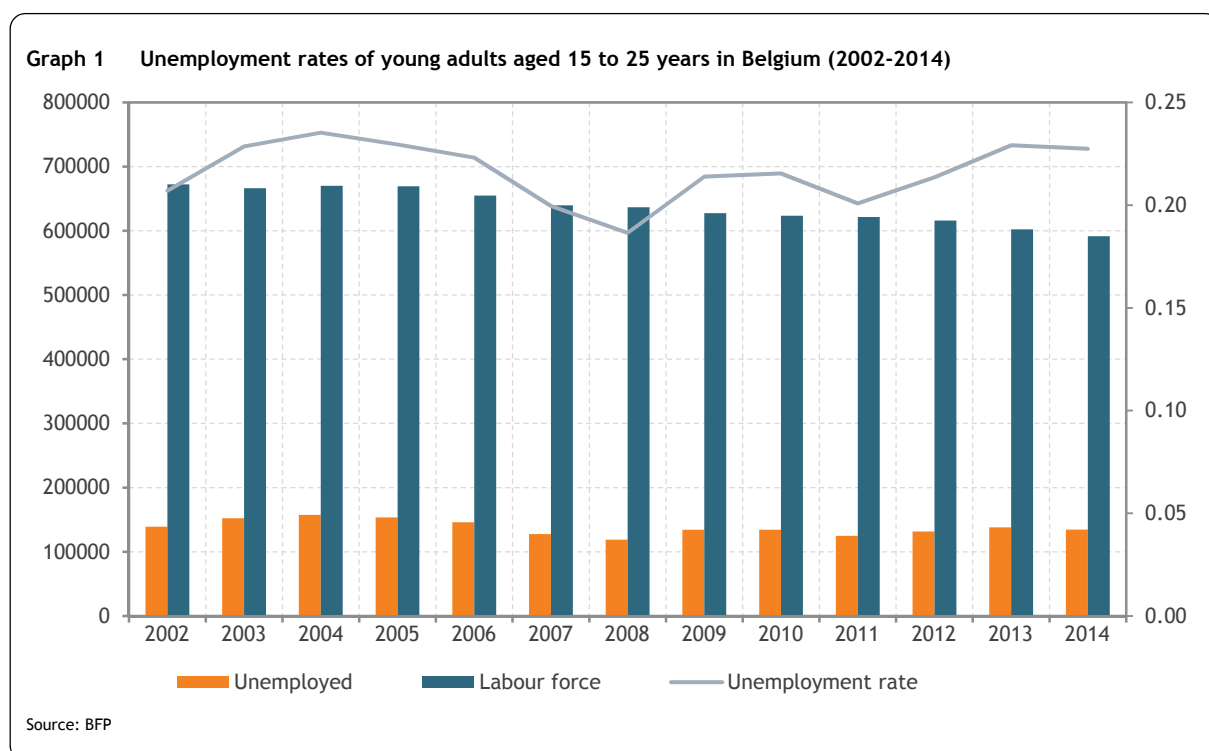
Graph 1 shows the unemployment rate of young adults aged 15 to 25 years and its components (number of young adults in unemployment and in the labour force) in Belgium during the period 2002-2014 using administrative data[3]. The left hand y-axis refers to the numbers in unemployment and in the labour force, the right hand y-axis, to the unemployment rate. The youth unemployment rate first increases between 2002 and 2004 when it reaches its highest level (24%) and then steadily decreases until 2008 reaching its lowest level (19%). After the Great Recession[4], it increases again in 2009 and 2010, then decreases slightly in 2011 and finally increases again in 2012 and 2013. Graph 1 also shows the substantial decrease in the youth labour force during this period (-12%). Herremans et al. (2015) show that this

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[2]   Cockx (2013) quotes an average ratio of 3.3 during the period 2003 to 2012 while Herremans et al. (2015) obtained a ratio of 4 for 2013.

[3]   Youth unemployment rates are derived from administrative employment and unemployment data from the social security offices for salaried and self-employed (ONSS-RSZ, ONSSAPL-RSZPPO, INASTI-RSVZ and ONEM-RVA). Subsequently, the employment data sets are adjusted to be compatible with national accounts employment statistics.

[4]   Great Recession refers to the Great Recession of 2008.

decrease is mostly due to a steady reduction in Flanders during the whole period and a sharp reduction in Brussels since 2008.

School leavers in Belgium are entitled to unemployment benefits even if they have no work experience. To be eligible, they need to register at the unemployment office after leaving school and complete a "waiting period" during which they are supposed to be actively looking for a job. Until 2012, entitlement was granted after a period of six (under 18 years), nine (18-25 years) or twelve months (26-30 years). Benefits depended on age and household composition and while relatively low, they were granted for an indefinite period[5]. Prior to July 2004, benefit exclusions existed for irregularities (false declarations, undeclared work, etc.) and for certain categories of long-term unemployed. In fact, this last device affected mostly women (Bauwens, 2009).

In 2004, a monitoring procedure is introduced aiming at evaluating the job search behaviour of most unemployed[6] including school leavers during their "waiting period". For young unemployed under 25 years, the new procedure involves a notification letter sent after seven months of unemployment and announcing an evaluation meeting with a caseworker eight months later. If the evaluation is negative, an action plan is put in place and a new evaluation meeting is scheduled four months later. If the outcome of the second evaluation meeting turns out to be negative, temporary withdrawal of benefits is applied, a more intense action plan is defined and a third meeting four months later is scheduled. Finally, if the outcome of the third meeting is negative, permanent withdrawal of unemployment benefits is carried out[7].

Graph 2 illustrates the number of benefit sanctions for school leavers due to the monitoring procedure during the period 2005-2010 by region. While the total number of exclusions increases between 2005 and 2009, it decreases afterwards. In 2010, 66% of benefits withdrawals takes place after the second meeting, which corresponds to an unemployment duration of at least 19 or 25 months depending on age. Because most unemployed sign the action plan set by the caseworker during the second evaluation meeting, most exclusions at this stage are temporary. In turn, 33% of withdrawals takes place after the third meeting corresponding to an unemployment duration of at least 23 or 29 months according to age. This time, the withdrawal is permanent and the unemployed can only regain unemployment benefits after a period of one year of employment. Finally, the number of exclusions is especially high in Wallonia compared to the two other regions.

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[5] The regulations for school leavers were adapted in 2012: the waiting period was increased to 310 days (1 year) for all ages and benefit entitlement was limited to 36 months.

[6] Initially, the monitoring procedure did not applied to unemployed older than 50 years.

[7] Since 2012, the system has been reinforced and monitoring of young unemployed during their waiting period includes evaluations every 6 months.

Graph 2 Unemployment benefit exclusions of school leavers due to the monitoring procedure (2005-2010)

Source: ONEM-RVA, FPB
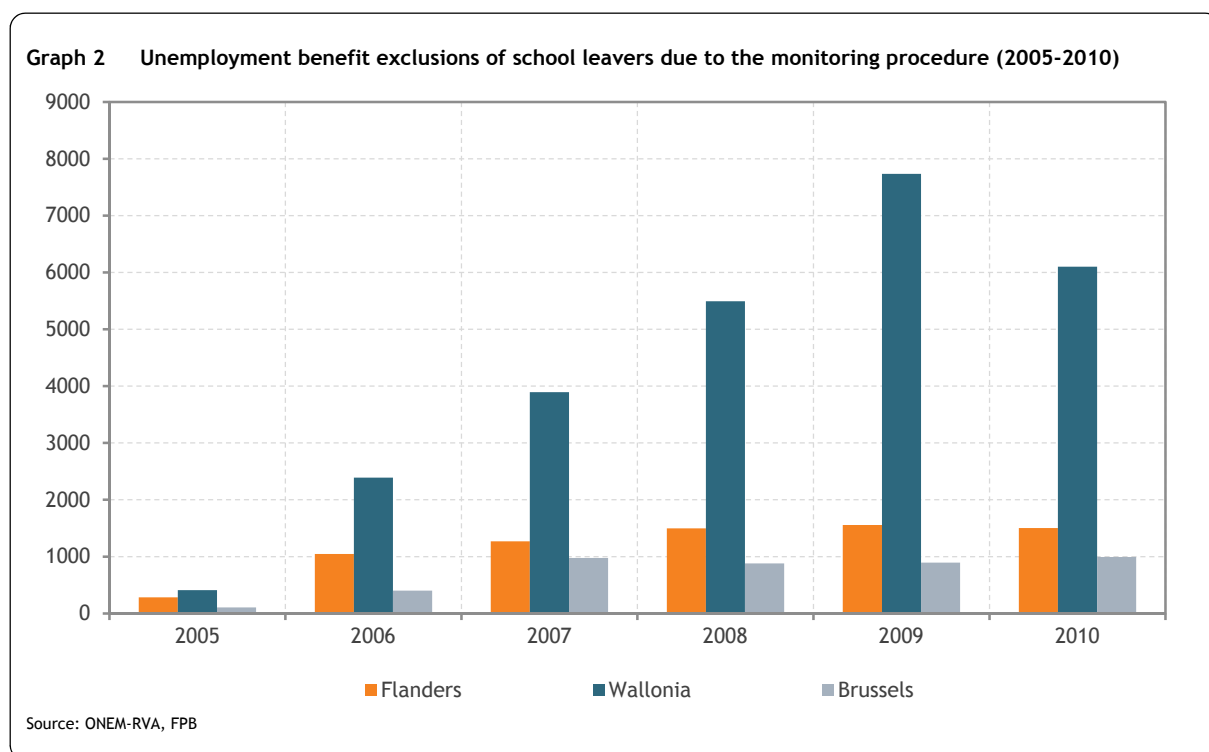
Active labour market policies aimed at young adults are numerous during the period 2002-2014. Measures include hiring subsidies ("activation"), training programs, monitoring and counselling. Hiring subsidies for young unemployed were substantially expanded during this period, in particular, in 2010 and 2011 following the Great Recession, where they accounted for nearly one third of all hiring subsidies. While the entitlement requirements vary considerably during the period, hiring subsidies for young unemployed generally require a minimum unemployment duration of six to twelve months, are temporary with a maximum length of three years and are combined with substantial targeted employers' social security contributions cuts. Moreover, the subsidy is higher for young unemployed who did not complete high school education.

Graph 3 shows the average yearly number of young unemployed under the age of 26 who benefited from activation measures financed by the National Employment Office. While the number of beneficiaries fluctuates between 5,000 and 10,000 before 2010, it substantially increases during the period 2010-2012. The most important measure in this period is the "Win-Win" plan which consisted in a hiring subsidy amounting to between 500 and 1,100 euros for a period of 12 to 24 months. The measure was a temporary reinforcement of an existing measure "Activa", aimed at helping young people and other categories of job seekers find a job. After 2012, Activa remained with a lower hiring subsidy and more restricted entitlement rules.

Graph 3 **"Activation" measures for young unemployed under 26 years (average number of beneficiaries)**
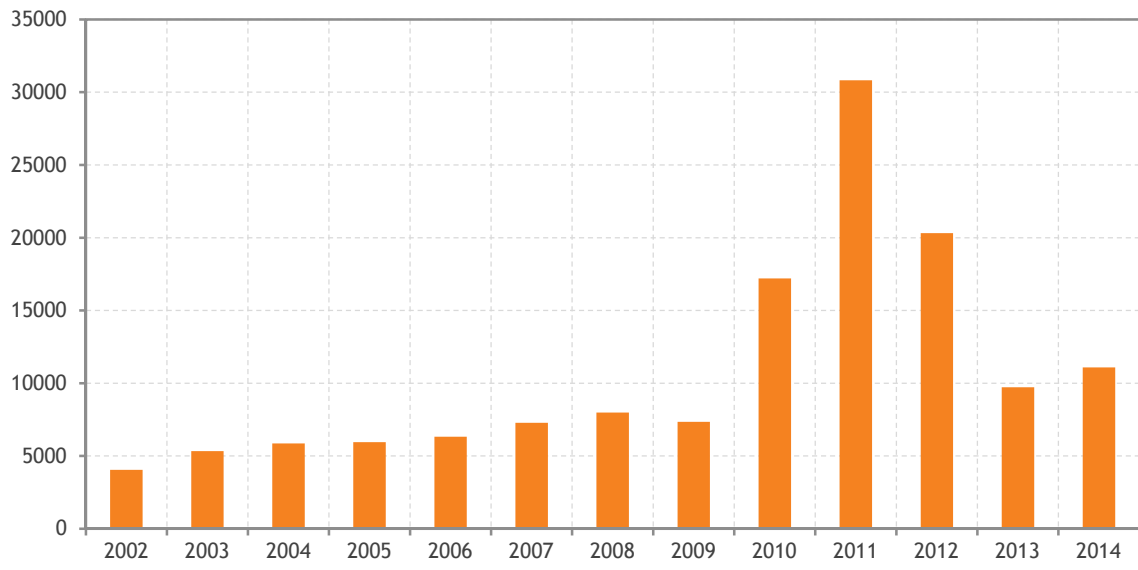
Source: ONEM-RVA, FPB

3. Data and methodology

To better understand the relationship between youth unemployment duration and education level in Belgium, we use data from the National Employment Office (ONEM-RVA)[8] which contains the population of school leavers aged 17 to 25 years entering unemployment in 2002 and 2009 respectively. All school leavers belong to the unemployment category "stage d'attente - wachtuitkeringen", which means that they enter unemployment right after their studies or with a limited work period[9]. We follow these two cohorts monthly for a period of five to six years according to the month of entry into unemployment. The data comprises information on age, gender, education degree, region of residence, nationality and month of entrance into unemployment. An unemployment exit is defined as an absence from the database of minimum three months. Slightly more than half of all young unemployed has more than one unemployment spell during his/her respective observation period. In what follows, we select the first unemployment episode of each individual in each period thereby limiting our sample to a situation where the young unemployed have (almost) no work experience.

Our data does not take into account young school leavers who find a job directly after their studies and who do not register at the unemployment office when graduating. Moreover, it does not contain information on the actual exit destinations from unemployment. Besides employment, other possible destinations are further education, benefit sanctions, withdrawal from the labour force, migration or death. We assume here that the large majority of unemployment exits corresponds to employment.

Table 1 presents the two cohorts of young unemployed[10]. The characteristics reported are those observed at the beginning of the unemployment spell. Despite the start of the recession, the 2009 cohort is smaller than the 2002 cohort. This decrease, which concerns mostly young unemployed under the age of 23 years who live in Flanders, might be accounted for by supply side effects, in particular, a delayed entrance into the labour market due to a longer period of studies (Herremans et al., 2015). Comparing the two cohorts, we see that they are relatively similar in terms of gender, age and nationality. On the other hand, there are slightly more school leavers entering unemployment who live in Wallonia and Brussels than in Flanders in 2009 with respect to 2002. Also, the median unemployment duration slightly increased between the two periods: while half of unemployed school leavers belonging to the 2002 cohort exits unemployment after a period of four months, five months are needed for the 2009 cohort.

Regarding education, about one fifth of all unemployed school leavers is very low educated with at most a degree of junior high school and this for the two periods. While 42% in 2002 and 44% in 2009 holds a high school diploma, the type of high school education varies slightly between the two periods with an increasing share of technical and vocational degrees in 2009. Regarding higher education, while the share of unemployed school leavers with a Bachelor's degree remains constant between the two periods, there are slightly less unemployed school leavers who hold a Master's degree in 2009. Finally,

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[8] The original database (Stat92) is collected by the regional employment offices (VDAB, FOREM and ACTIRIS) and centralized by the ONEM-RVA.

[9] In this period, the maximum length of time allocated to work consistent with unemployment enrolment as "stage d'attente - wachtuitkeringen" would be between 5 and 11 months according to age.

[10] There are several improvements in the present data set with respect to the previous version used in the preliminary study published in the STU (2015).

we see that the share of unemployed school leavers who register in the customary months of July, August and September slightly decreases in 2009 compared to 2002.

Table 1   School leavers entering unemployment in 2002 and 2009

	2002	2009
Female	0.50	0.50
Male	0.50	0.50
17-19 years	0.36	0.36
20-22 years	0.43	0.41
23-25 years	0.21	0.23
Primary school	0.05	0.07
Junior High school	0.15	0.14
High school vocational	0.15	0.18
High school artistic and technical	0.17	0.18
High school general	0.10	0.08
Bachelor degree*	0.21	0.21
Master degree	0.15	0.12
Other**	0.02	0.02
Belgian	0.96	0.94
EU nationals (non-Belgian)	0.02	0.03
Other	0.02	0.03
Brussels	0.10	0.11
Flanders	0.55	0.50
Wallonia	0.35	0.39
Unemployment entry in July	0.36	0.29
Unemployment entry in August	0.16	0.14
Unemployment entry in September	0.18	0.21
Other	0.30	0.36
# of individuals	85,568	80,395
Median unemployment duration (months)	4	5

Source: FPB, ONEM-RVA (Stat92)

*:   for the 2002 cohort, the category "Bachelor degree" comprises higher education degrees (short and long) from non-university institutions.

**:   the category "Other" comprises certificates of apprenticeship and other kinds of trainings. It also includes foreign degrees which are not recognized in Belgium.

Figures 4 and 5 show Kaplan-Meier estimates of the survival functions of the two cohorts disaggregated by education degree. The survival function captures the probability of staying in unemployment past a specific time. The graphs show that the "survival" rate in unemployment decreases rapidly in the first three months. This means that many exits from unemployment take place relatively early, at the beginning of the unemployment spell. After three months, the survival rate continues to decrease until twelve months, but at a lower rate. Beyond one year, the survival rate decreases at a very slow rate, which means that it becomes very difficult to exit unemployment. Eventually almost all unemployed school leavers exit at the end of the observation period. However, we are only considering the first unemployment spell of each individual in each period. More than half of the unemployed school leavers will re-enter unemployment during each period.

Graph 4   Survival in unemployment by education degree (2002-2007)
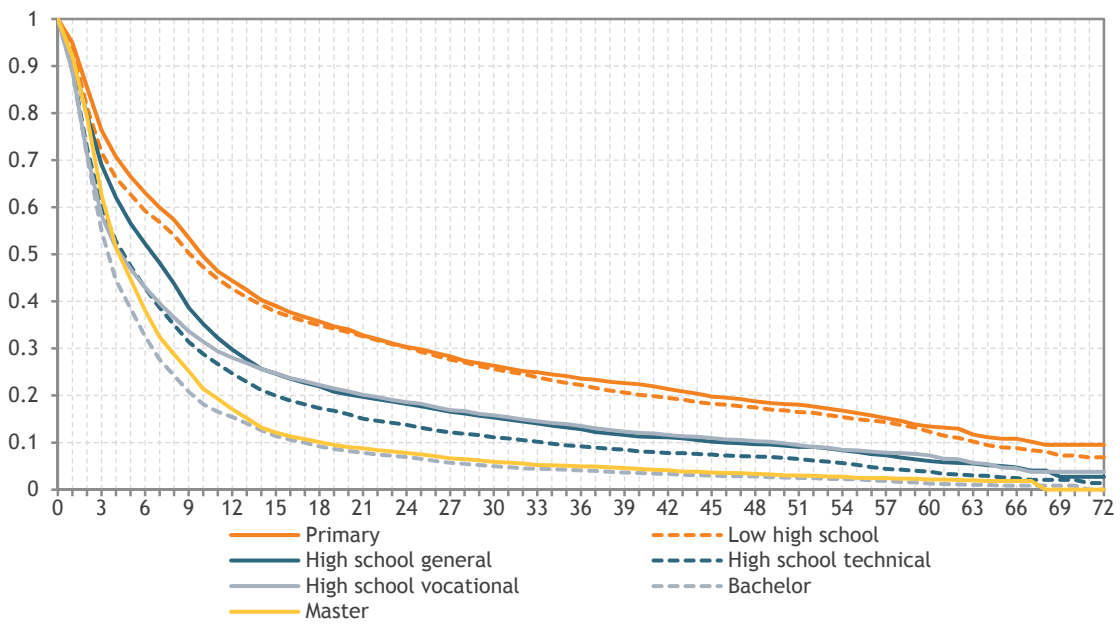
Source: FPB, ONEM-RVA (Stat92)

Graph 5   Survival in unemployment by education degree (2009-2014)
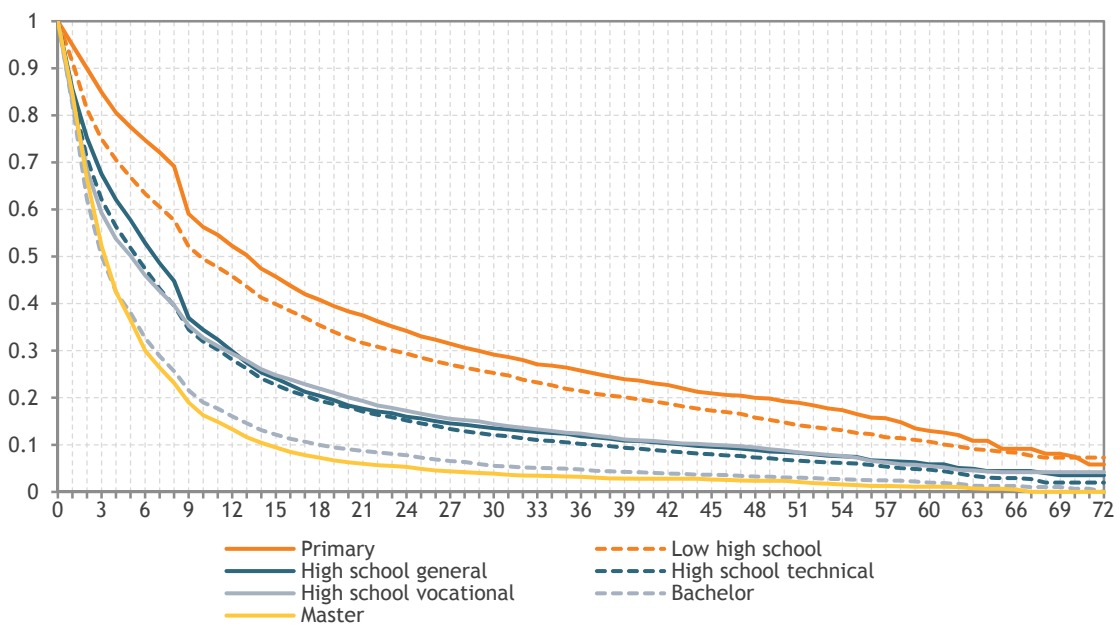
Source: FPB, ONEM-RVA (Stat92)

In both periods, the survival function is highest for low educated school leavers and lowest for high educated ones. This means that low (high) educated school leavers have the lowest (highest) probability of leaving unemployment while medium educated ones have an exit probability in between. The gap between the different education levels persists during the whole period under consideration reaching a maximum between 6 and 18 months.

Finally, differences appear between the two cohorts, in particular, the gap in unemployment survival rates between very low and very high educated school leavers considerably increases between the two periods. Half of school leavers with a primary school degree exits unemployment after 9 months in the 2002-2007 period. After the Great Recession, the median unemployment duration increases to 13 months for this group. Inversely, half of school leavers with a Master's degree exits unemployment after 4.5 months in 2002-2007 while it only takes 3 months in the 2009-2014 period.

In order to better identify the relationship between unemployment duration and education level, we proceed with a multivariate analysis which takes into account the relation between the other characteristics available in our data (age, gender, home region, nationality and month of entrance) and unemployment duration. Because these attributes might also influence the probability of leaving unemployment, a multivariate analysis allows to better isolate the relationship between unemployment duration and education level.

We consider two duration models to estimate this relationship: the standard Cox proportional hazard model (Cox, 1972) and a grouped duration proportional hazard model (Prentice and Gloeckler, 1978; Meyer, 1990). Duration models appropriately take into account the time dimension of the dependent variable (unemployment duration) and allow for censoring and time-varying covariates. Right censoring occurs when the event under study (in our case, exit from unemployment) does not occur for some individuals during the observation period but at a later time. Instead of omitting these observations, duration models are able to take them into account by distinctly introducing these observations in the likelihood function. Time-varying covariates include covariates which change over time such as the unemployment rate which varies annually in our data. Finally, in the two models under consideration, covariates have a proportional and constant effect that is invariant to time. Non-proportional hazards can arise if the effect of a covariate changes over time[11]. In what follows, we make the assumption that our data is generated by a proportional hazard model. According to Allison (2014), even if violated this assumption is a generally good approximation of the data.

In what follows, we present the results of the Cox model for comparison purposes. In fact, grouped duration data models are better suited for discrete data. Moreover, they allow us to add two interesting extensions. First, we are able to introduce a parameter which captures unobserved individual effects. These are individual attributes which are not observed in our data but which might influence the probability of exiting unemployment such as self-confidence or motivation. Second, we model explicitly the baseline hazard as a piecewise constant function. This allows us to examine the shape of the hazard function through time after controlling for observed and unobserved characteristics.

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[11]   We are not able to test for the proportional hazard assumption in the group duration models.

4.   Results of the multivariate analysis

In this section, we present the results of aggregate models for each period using a Cox proportional hazard model and a group duration data model with and without unobserved heterogeneity. Next, we present results of disaggregated models by region of residence and education level for each period respectively. This time, and for reasons of concision, we only present the results of our preferred grouped duration data model with unobserved heterogeneity. All models are estimated using the "stcox" and "pgmhaz" (Jenkins, 1997) routines in Stata 12.1.

4.1. Aggregate models

Table 2 shows the hazard ratios obtained for each characteristic using a Cox duration model and two grouped duration data models (with and without unobserved heterogeneity). With the exception of the unemployment rate, the estimated hazard ratios measure the relation between each characteristic and the instantaneous probability of leaving unemployment (hazard rate) with respect to a reference category. All reference categories have a hazard ratio equal to one: unemployment duration between 0 and 6 months (unemployment duration), man (gender), Bachelor's degree (education), Belgian (nationality), school leavers aged between 20 and 22 years old (age), Flanders (region of residence) and July (month of entrance into unemployment). Regarding the unemployment rate which is a continuous variable, the hazard ratio measures the change in the hazard rate of leaving unemployment following a 1 percentage point increase in the unemployment rate.

A hazard ratio greater (smaller) than one, means that the characteristic is associated with an increase (reduction) in the instantaneous probability of exiting unemployment compared to the reference category. For example, in the period 2002-2007, and controlling for all other characteristics available in our data, women have a smaller probability of leaving unemployment than men. More precisely, women's hazard rate[12] of leaving unemployment is 4% lower than that of men. In the 2009-2014 period, women have, this time, a higher probability of leaving unemployment than men. Their hazard rate is 5-6% higher than that of men depending on the model.

Let us now look at the other results presented in Table 2. First, and with the exception of the unemployment rate, the estimates obtained with the different models are quite close. These similarities are reassuring and tend to confirm the robustness of our results. Moreover, while the parameter estimate for unobserved heterogeneity (gamma variance) is significant for the two periods, there is little difference between the models with and without unobserved heterogeneity for the 2002 cohort. Differences appear for the 2009 cohort, especially for the time dummies. In what follows, we will concentrate on the results of the group duration models which are the most suitable for our discrete data.

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[12]   More formally, the hazard rate or instantaneous probability of leaving unemployment is the probability of leaving unemployment at time t, conditional on being unemployed at least until t. The hazard ratio is the rate of the hazard rates. For example, a hazard ratio of 0.5 for school leavers holding a primary school degree means that compared to school leavers with a Bachelor's degree only half as many school-leavers with a primary degree leave unemployment at any point in time.

As previously said, the obtained hazard ratios for the different education degrees have to be interpreted with respect to a Bachelor's degree. For the 2002 cohort, a Bachelor's degree is associated with the highest hazard rate of leaving unemployment, followed by a Master's. All other degrees considerably reduce the probability of exiting unemployment compared to a Bachelor's degree, in particular, a primary school diploma and a junior high school diploma, which reduce the probability of exiting unemployment by almost 50%. Moreover, small differences appear between high school orientations, with vocational education exhibiting the lowest hazard ratio and therefore the lowest probability of exiting unemployment among high school degrees. Compared to a Bachelor's degree, a Master's reduces the probability of leaving unemployment by 10%.

Table 2   Unemployment duration: Results from Cox and grouped duration data models

Hazard ratios	2002-2007			2009-20014		
	Cox model	Grouped duration data		Cox model	Grouped duration data	
		(1)	(2)		(1)	(2)
Men*	1	1	1	1	1	1
Women	0.96	0.96	0.96	1.05	1.06	1.06
Primary school	0.58	0.50	0.50	0.47	0.46	0.40
Junior high school	0.59	0.52	0.51	0.46	0.43	0.38
High school vocational	0.78	0.67	0.67	0.68	0.63	0.61
High school technical and artistic	0.84	0.76	0.76	0.74	0.71	0.68
High school general	0.82	0.74	0.74	0.76	0.72	0.70
Bachelor*	1	1	1	1	1	1
Master	0.92	0.90	0.90	1.01(ns)	0.98(ns)	0.95
Other	1.07	0.98(ns)	0.98(ns)	0.83	0.80	0.80
Belgian*	1	1	1	1	1	1
EU nationals (non-Belgian)	1.04(ns)	1.00(ns)	1.00(ns)	1.01(ns)	0.99(ns)	1.01(ns)
Other	0.69	0.75	0.75	0.89	0.92	0.90
Brussels	0.52	0.50	0.49	0.52	0.48	0.41
Flanders*	1	1	1	1	1	1
Wallonia	0.57	0.51	0.50	0.51	0.50	0.42
17-19 years	0.98(ns)	0.99(ns)	0.99(ns)	1.00(ns)	1.01(ns)	1.00(ns)
20-22 years*	1	1	1	1	1	1
23-25 years	0.89	0.86	0.86	0.91	0.88	0.88
0-6 months*	-	1	1	-	1	1
7-12 months	-	1.13	1.16	-	0.99(ns)	1.27
13-24 months	-	0.70	0.73	-	0.70	1.11
25-72 months	-	0.51	0.55	-	0.49	0.99(ns)
Unemployment rate	0.59	0.95	0.95	1.00(ns)	0.95	0.96
Gamma Variance	-	-	0.02	-	-	0.24
Log likelihood	-642,388	-253,106	-253,100	-599,869	-233,292	-232,790
# of observations	85,568	798,619	798,619	80,395	705,331	705,331

*: reference category.
(1): grouped duration data model without unobserved heterogeneity; (2) grouped duration data model with unobserved heterogeneity.
All models include controls for month of entry into unemployment.
ns: not statistically significant. All other coefficients are significant at least at the 5% level.

In 2009-2014, a young graduate with a Master's degree exhibits a higher probability of exiting unemployment (with respect to a Bachelor's) than in 2002-2007. In fact, the difference between a Master and a Bachelor is only significant in the model with unobserved heterogeneity where a Master's degree is associated with a 5% lower exit probability. Therefore, it is only after controlling for unobserved characteristics that a significant difference appears between the most highly educated individuals. Finally, all other degrees reduce the probability of leaving unemployment slightly more in 2009-2014 than in 2002-2007.

Regarding other characteristics, living in Wallonia or Brussels reduces considerably and to a similar extent the probability of exiting unemployment compared to living in Flanders. Moreover, this disparity with Flanders appears to have increased over time. On the other hand, there is no difference between the hazard rates of Belgian and EU nationals. While non-EU nationals have a lower probability of leaving unemployment than Belgians and other EU nationals, this penalty is smaller in 2009-2014. However, there are relatively few observations for non-Belgian graduates in our data and nationality is a poor criteria for assessing differences in the labour market between ethnic groups[13].

Concerning age, there is no significant difference between the hazard rates of very young school leavers (17-19 years) and those aged 20 to 22 years. On the other hand, older school leavers (23-25) have lower hazard rates. These findings are analogous between the two periods. Likewise, and looking only at the results of the discrete time models, an increase in the unemployment rate reduces the hazard rate similarly in the two periods. More precisely, a one percentage point increase in the unemployment rate reduces the hazard rate by about 4-5%.

Finally, in the 2002-2007 period, the hazard rate is higher for unemployment spells lasting between seven and twelve months compared to those lasting less. One possible explanation would be that we are capturing "administrative" exits due to the requirement to register again at the end of the "waiting period" at the regional employment office in order to apply for benefits[14]. After twelve months, the hazard rate decreases strongly in the second year of unemployment and even more subsequently.

Results are more variable in the 2009-2014 period between the models with and without unobserved heterogeneity. Once we control for unobserved heterogeneity, the hazard rate increases between seven and twelve months and decreases afterwards but more slowly than in the previous period. In fact, the hazard rate is higher between one and two years than in the first six months. Higher exit rates in this period might partly be due to exclusions following the monitoring procedure. The end of the second year of unemployment corresponds to the period when benefits withdrawal takes place for young school leavers. In the next section, we will see that this relationship also varies according to region of residence and education level.

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[13] We cannot make a distinction between Belgian young unemployed with and without a foreign background in our data. The international literature documents significant differences in unemployment duration between natives and immigrants, including their offspring, even after controlling for observed characteristics. For Belgium, Baert et al. (2013) establishes the existence of ethnic discrimination for school leavers in Flanders using a field experiment.

[14] Another possibility is that the increase in exits is due to hiring subsidies which are available for young unemployed after an unemployment duration of six months. However, our estimates show that only 0.2% of the 2002 cohort benefited from a hiring subsidy.

4.2. Results of models disaggregated by region

In this section, we present the results of models estimated separately by region. In the previous section, we saw that the hazard rates vary considerably according to the region of residence of the young unemployed. Table 3 shows that this characteristic also plays a role in the relationship between unemployment duration and education level. In the 2002-2007 period, and compared to a Bachelor's degree, low- and medium-skilled school leavers have the lowest hazard ratios in Wallonia, followed by Brussels. Interestingly, this is not the case for school leavers holding a Master's degree. In particular, the hazard rate of school leavers holding a Master's degree does not differ from that of those holding a Bachelor's degree in Wallonia while it is around 10% lower in the two other regions.

Table 3   Unemployment duration by region: grouped duration data model with unobserved heterogeneity

Hazard ratios	2002-2007			2009-2014		
	Brussels	Flanders	Wallonia	Brussels	Flanders	Wallonia
Men*	1	1	1	1	1	1
Women	0.99(ns)	1.00(ns)	0.84	0.97(ns)	1.15	0.95
Primary school	0.51	0.58	0.34	0.56	0.38	0.33
Junior high school	0.49	0.57	0.38	0.47	0.43	0.34
High school vocational	0.48	0.78	0.49	0.59	0.74	0.44
High school technical and artistic	0.56	0.84	0.63	0.67	0.80	0.54
High school general	0.67	0.77	0.65	0.69	0.78	0.62
Bachelor*	1	1	1	1	1	1
Master	0.90	0.89	0.96(ns)	1.06(ns)	0.93	1.13
Other	0.83	0.96(ns)	1.00(ns)	0.85	0.83	0.71
Belgian*	1	1	1	1	1	1
EU nationals (non-Belgian)	1.13	0.90	0.98(ns)	1.31	0.77	1.00(ns)
Other	0.81	0.58	0.80	1.01(ns)	0.71	0.98(ns)
17-19 years	0.97(ns)	1.01(ns)	0.92	0.92	1.02(ns)	0.99(ns)
20-22 years*	1	1	1	1	1	1
23-25 years	0.81	0.85	0.84	0.92	0.86	0.87
0-6 months*	1	1	1	1	1	1
7-12 months	1.61	1.02	1.54	1.50	0.81	1.58
13-24 months	0.95(ns)	0.59	1.29	0.82	0.62	1.49
25-72 months	0.63	0.43	1.26	0.77	0.50	1.35
Unemployment rate	0.91	0.94	0.93	0.91	0.95	0.93
Gamma Variance	0.05(ns)	0.00	0.30	0.12	0.09	0.28
Log likelihood	-28,128	-124,171	-100,156	-30,489	-98,746	-102,647
# of observations	120,431	280,939	397,251	121,537	215,476	368,324

*: reference category.
All models include controls for month of entry into unemployment.
ns: not statistically significant. All other coefficients are significant at least at the 5% level.

In the 2009-2014 period, having a primary and junior high school degree compared to a Bachelor is again associated with the highest penalty in Wallonia, but this time closely followed by Flanders. Now, the chances of leaving unemployment associated with a Master's degree compared to a Bachelor's are higher both in Wallonia and Brussels than in Flanders. In Flanders, the hazard rate is 7% lower, while

in Brussels it is not significantly different from that of a Bachelor's degree and in Wallonia, it is 13% higher.

Besides education level, regional differences also appear for other characteristics such as gender. In the 2002-2007 period, there are no differences in the hazard rates between men and women in Brussels and Flanders. On the other hand, there is a large difference in Wallonia where women have a much lower hazard rate than men (16% lower). In the 2009-2014 period, there is still no significant difference between the hazard rates of men and women in Brussels and women's disadvantage in Wallonia is much smaller (5% lower hazard). In Flanders, women have now a higher hazard rate of exiting unemployment than men (15%).

Whereas EU-nationals have higher hazard rates in Brussels and hazard rates not significantly different from Belgians in Wallonia, they have lower hazard rates in Flanders. In the period 2002-2007, non-EU nationals have lower hazard rates compared to Belgians in all regions, especially in Flanders. In the 2009-2014 period, differences only remain for Flanders where non-EU nationals have hazard rates which are 29% lower than Belgians. Concerning age, results are similar to those found in Table 2 for all three regions with lower hazard rates for older school leavers compared to medium aged ones and almost no differences for very young school leavers. Similarly, the hazard ratios of the unemployment rate are similar between the regions in both periods.

Regarding the shape of the hazard function through time, differences also appear between regions. In Flanders, the hazard rate decreases with time spent in unemployment after the first year in the 2002-2007 period. A school leaver whose unemployment duration is longer than one year but less than two years has a hazard rate of leaving unemployment that is 41% lower than a school leaver whose unemployment lasts for less than a year. In the 2009-2014 period, the hazard rate in Flanders is also decreasing even during the first year. This time, the hazard rate is 19% lower when the unemployment duration is between seven and twelve months compared to the first six months of unemployment. Afterwards, it continues to decrease similarly to the previous period. In Brussels, the hazard rate has similar shapes in the two periods. It increases strongly between seven and twelve months and decreases afterwards. As previously said, the increase between seven and twelve months might be partly accounted for by the delay in registering at the regional office at the end of the "waiting period".

In Wallonia, on the other hand, the shape of the hazard function is different. While it also increases between seven and twelve months, it decreases very slowly afterwards, becoming almost flat in both periods. Moreover, exit probabilities after the first year increase in 2009-2014 with respect to 2002-2007. In Section 2, we saw that the number of benefit withdrawals due to the monitoring procedure were especially high in Wallonia. Most temporary and permanent benefits withdrawals affecting young unemployed take place during the second year of unemployment following the second and third evaluation meetings. Therefore, it is likely that the monitoring procedure explains the increase in the exit rates in the second and even third years for the 2009 cohort with respect to 2002 cohort in Wallonia. On the other hand, in the 2002-2007 period, the monitoring procedure is only marginally likely to affect our cohort of school leavers and only in their last period of unemployment (25-72 months). Clearly, other factors which we are not able to measure with our data seem to be determining the shape of the hazard function in Wallonia.

4.3. Results of models disaggregated by education level

Tables 4 and 5 present results from grouped duration data models with unobserved heterogeneity disaggregated by education degree. We saw in Table 2 that women had a lower hazard rate of exiting unemployment compared to men in the 2002-2007 period while it was the other way around in 2009-2014. Examining the results by education level, we see that women's disadvantage in the 2002-2007 period is concentrated in low and medium education levels. In fact, the disadvantage disappears for school leavers holding a high school degree of general orientation where men and women have comparable hazard rates. What is more, women with a Bachelor (13%) and to a lesser extent with a Master's degree (6%) have higher hazard rates of exiting unemployment than men. In the 2009-2014 period, low educated women's disadvantage considerably decreases. In fact, only women holding a junior high school degree still have a lower hazard rate than men (7% lower).

Table 4   Unemployment duration by education level: grouped duration data model with unobserved heterogeneity (2002-2007)

Hazard ratios	Primary	Junior high school	High school vocational	High school technical	High school general	Bachelor	Master
Men*	1	1	1	1	1	1	1
Women	0.89	0.78	0.84	0.89	1.01(ns)	1.13	1.06
Belgian*	1	1	1	1	1	1	1
EU nationals (non-Belgian)	1.07(ns)	1.03	1.04(ns)	0.99(ns)	1.05(ns)	0.93	1.02
Other	0.86(ns)	0.80	0.64	0.67	0.69	0.84(ns)	0.61
Brussels	0.46	0.45	0.35	0.38	0.48	0.54	0.54
Flanders*	1	1	1	1	1	1	1
Wallonia	0.38	0.41	0.39	0.44	0.49	0.56	0.62
17-19 years	0.66	0.94	1.01(ns)	1.11	1.08	-	-
20-22 years*	1	1	1	1	1	1	1
23-25 years	0.94(ns)	0.89	0.91(ns)	0.81	0.86	0.82	0.86
0-6 months*	1	1	1	1	1	1	1
7-12 months	1.41	1.16	1.02(ns)	1.22	1.44	1.30	1.54
13-24 months	1.07(ns)	0.95(ns)	0.71	0.91	0.96(ns)	0.84	0.95(ns)
25-72 months	1.06(ns)	0.99(ns)	0.67	0.71	0.80	0.44	0.53
Unemployment rate	0.94	0.93	0.94	0.94	0.93	0.94	0.93
Gamma Variance	0.25	0.26	0.15	0.11	0.14	0.00(ns)	0.00(ns)
Log likelihood	-15,580	-41,870	-38,170	-41,445	-27,296	-46,612	-35,715
# of observations	70,627	178,069	125,409	121,639	90,359	108,638	89,467

*: reference category.
ns: not statistically significant. All other coefficients are significant at least at the 10% level.

Similar to what we saw in Table 3, differences between regions can, in turn, be examined by education level. While Flanders has the highest hazard rates for all school degrees, this advantage is slightly lower for post-secondary education. On the other hand, the hazard rates of Brussels and Wallonia are quite similar whatever the school degree. The most striking evolution between the two periods is the further decrease of the hazard rates of high school leavers living in Brussels and Wallonia with respect to those

living in Flanders. In particular, school leavers holding a vocational high school degree in Brussels and Wallonia have a hazard rate 70% lower than their peers living in Flanders in 2009-2014.

Table 5   Unemployment duration by education level: grouped duration data model with unobserved heterogeneity (2009-2014)

Hazard ratios	Primary	Junior high school	High school vocational	High school technical	High school general	Bachelor	Master
Men*	1	1	1	1	1	1	1
Women	0.95(ns)	0.93	1.07	1.00(ns)	1.14	1.17	1.06
Belgian*	1	1	1	1	1	1	1
EU nationals (non-Belgian)	1.35	1.15	0.96(ns)	0.86	1.06(ns)	0.98(ns)	0.89(ns)
Other	1.02(ns)	0.83	0.95(ns)	0.64	0.77	0.70	0.57
Brussels	0.56	0.41	0.30	0.32	0.34	0.46	0.52
Flanders*	1	1	1	1	1	1	1
Wallonia	0.52	0.43	0.30	0.33	0.38	0.49	0.62
17-19 years	0.76	0.93	1.06	1.05	1.12	-	-
20-22 years*	1	1	1	1	1	1	1
23-25 years	1.15	1.12(ns)	1.06(ns)	0.80	0.92	0.81	0.89
0-6 months*	1	1	1	1	1	1	1
7-12 months	1.78	1.27	1.28	1.45	1.61	1.11	1.02(ns)
13-24 months	1.42	1.26	1.28	1.43	1.56	0.89	0.71
25-72 months	1.52	1.58	1.37	1.38	1.44	0.47	0.34
Unemployment rate	0.91	0.93	0.95	0.95	0.95	0.95	0.95
Gamma Variance	0.26	0.47	0.42	0.33	0.37	0.10	0.00(ns)
Log likelihood	-21,185	-38,165	-40,741	-41,228	-19,679	-41,402	-24,696
# of observations	92,645	150,877	124,144	119,403	59,494	92,298	53,279

*: reference category.
ns: not statistically significant. All other coefficients are significant at least at the 10% level.

With the exception of low educated school leavers in 2009-2014, there are few differences between hazard rates of Belgians and EU nationals according to education level. More important differences appear between Belgians and non-EU school leavers. In particular, differences are more pronounced for high educated individuals than for lower educated ones, especially in the 2009-2014 period. However, it is important to recall that there are relatively few non-EU school leavers who hold a Bachelor's or a Master's degree in our database.

While older school leavers tend to have a lower hazard rate whatever the education degree, differences between school degrees appear for very young school leavers. In particular, those holding only a primary school degree have lower hazard rates in the two periods.

While in 2002-2007, the unemployment rate has a similar effect according to education level, slight differences appear in the 2009-2014 period with a lower hazard for very low educated school leavers than for higher educated ones. A one percentage point increase in the unemployment rate reduces the hazard rate of school leavers with a primary degree by 9% while it is only 5% for medium and high educated school leavers.

Looking at the relation between unemployment duration and time spent in unemployment, we see that for the 2002-2007 cohort, the hazard rate is the highest during the second half of the first year of unemployment whatever the school degree and decreases after that. For the 2009-2014 cohort, differences appear between school degrees. The hazard rate of school leavers holding a Master's degree is higher the first year of the unemployment spell with no significant difference between the first six months and the rest of the first year. Subsequently, the hazard rate decreases by almost 30% the second year and by 70% thereafter. For school leavers holding a Bachelor's degree, the relation between unemployment duration and time spent in unemployment is similar. This time, the hazard rate of the second half of the first year is higher than the hazard rate of the first six months. Afterwards, the hazard rate decreases, especially after two years of unemployment. For the other degrees, the hazard rate increases strongly after the first six months and remains high after that. Because of the changes between the two periods for low- and medium-skilled school leavers, we are likely capturing exits due to the monitoring procedure. In that case, benefit withdrawal is affecting low skill youth proportionally more.

Finally, the parameter which measures unobserved heterogeneity is not significant for high educated school leavers while it is significant for low and medium educated ones. This tends to indicate that the higher the school degree, the lower the importance of unmeasured skills or characteristics in order to exit unemployment.

5. Discussion and conclusions

Our main findings can be summarized as follows. First, our study confirms that the chances of leaving unemployment are strongly associated with the level of education of school leavers without work experience. In particular, the probability of leaving unemployment is substantially higher for young graduates who have completed post-secondary education. Moreover, our results show that this effect has reinforced itself through time in two ways. Whereas the hazard rates of school leavers holding a primary and a high school degree with respect to a Bachelor's degree decrease between the two periods, those of school leavers holding a Master's degree increase. Our results are compatible with theories which identify skill-biased technological change and job polarisation as an explanation for the higher incidence and duration of unemployment among low- and medium-skilled workers. Moreover, given the short interval between the two periods in our study, "over-education" seems a likely explanation for the further deterioration which took place in this period.

Second, our data allow us to examine the differences in unemployment exit probabilities between the three regions. While Flanders has higher exit rates than the two other regions whatever the diploma, this advantage is relatively higher for low and medium skill degrees. This ability to integrate low-skilled school leavers is nevertheless reduced after the Great Recession. Inversely, Wallonia appears to favour the unemployment exit rates of high skilled school leavers, in particular, those holding a Master's degree. This feature is also accentuated after the Great Recession and likely results from crowding-out where higher skilled young people take up jobs for which they are overqualified. Cockx and Dejemeppe (2002b) find strong crowding-out effects in Wallonia during the 1990's. Finally, Brussels is the only region which manages to avoid a further deterioration in the unemployment exit rates of low- and medium-skilled youth after the Great Recession.

Third, our results indicate the presence of negative duration dependence in the unemployment exit rates in Flanders. This contrasts with previous studies on Flanders which found no negative duration dependence for unemployed aged 18 to 50 during the period 1995-2007 (Heylen, 2010). Our results involve only school leavers aged 17-25 with (almost) no work experience. True negative duration dependence indicates that the chances of exiting unemployment decrease with time spent in unemployment either due to stigmatization or to a loss of skills and motivation. Inversely, the absence of negative duration dependence indicates that long term unemployment results from the characteristics of the unemployed at the beginning of the unemployment spell. We find no evidence of negative duration dependence in Brussels and Wallonia (Cockx and Dejemeppe, 2002). However, duration dependence also appears in the hazard functions of school leavers holding a Master's degree and to a lesser extent for those holding a Bachelor's degree after the first six months. All other diplomas exhibit a rather flat hazard function after the first six months.

Fourth, even if indirectly, our results illustrate some of the effects of benefits withdrawal following the introduction of the monitoring procedure in 2004. While benefits withdrawal affects more strongly school leavers from Wallonia than those living in the two other regions, it also appears to affect proportionally more low- and medium-skilled school leavers than those holding a Bachelor or Master's degree.

Finally, our results show that female unemployed school leavers increasingly succeed in leaving unemployment relative to their male peers. Whereas in the 2002-2007 period, only high educated women had similar or higher unemployment exit rates than men, this is also the case in the 2009-2014 period with medium and low educated women (with the exception of school leavers holding a junior high school degree). Employment policies aimed at low-skilled workers such as "Titres-services – Dienstencheques", are likely to be playing an important role in this evolution. While this measure accounted for about 74,000 jobs in 2009 and almost 120,000 in 2014, 98% of them involved women. Regional differences also appear in terms of gender, with females still performing less than men in Wallonia and better in Flanders. In Brussels, there is no significant difference between men and women.

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