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The “Crowding Out effect” of the Student Occupation Contract reform of January 2017 in Belgium

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Abstract

The reform of the Belgian law related to the student occupation contract became effective on January 1st, 2017. The reform allows the students and employers who contract within the framework of the student occupation contract to remain exempt from the ordinary social security scheme up to a maximum of 475 hours of work per calendar year. Since its implementation, the reform triggered a substantial increase in both the number of students and the number of hours they have worked. In this paper, I aim at evaluating the existence of a potential “crowding out effect” of students on the employment level of young non-student workers occupied in the HORECA by estimating the overall impact of the student occupation contract reform on the gender and age-specific employment level of non-student workers occupied in the HORECA over the period 2017q1 – 2017q3. To that purpose, I compare the observed growth of the employment level of non-student workers aged between 18 and 24 in the HORECA with its predicted one over the period following the implementation of the reform. The predicted growth is constructed based on the estimates of an identification equation of the employment level of non-student workers in the HORECA. The difference between the observed and predicted growth of the employment level of non-student workers in the HORECA is interpreted as the causal impact of the reform. The results exhibit a negative and significant impact of the reform on the employment level of non-student workers aged between 18 and 24 in the HORECA. This suggests an evidence of a “crowding out effect” of students, especially for the younger age group of 18-19 years old.

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1. Introduction

In Belgium, the participation of students to the labor market is substantial. On January 1st, 2017, a legislative reform dealing with the student occupation contract was enforced¹: students and employers contracting within the framework of the student occupation contract remain exempt from social security contributions to the National Social Security Office (NSSO hereafter) for a maximum of 475 hours per calendar year. By substituting (and increasing) the previous legally authorized “contingent” of 50 days of student work per calendar with this new “contingent” of 475 hours per calendar year, the goal of the reform was to enhance the participation of students to the labor market as well as enable student work to be more flexible.

Because the reform is believed to have increased both the number of student workers and the number of hours worked since its implementation, the aim of my analysis is to explore the existence of a potential “crowding out effect” of students on the employment level of non-student workers occupied in the Ho(tel)Re(staurant)Ca(fe) sector (HORECA sector hereafter). The “crowding-out” literature identifies competition for jobs between students and non-student workers. To this purpose, I intend to evaluate the effect of the reform on the employment level of gender and age-specific non-student workers occupied in the HORECA: did the reform have any significant effect on their employment level compared to a “non-reform” counterfactual scenario? Did the student occupation contract reform lead to a decrease in the employment level of non-student workers in the HORECA, thereby crowding them out from the labor market? In this way, I search for a link of causality between the reform and the evolution of the employment level of gender and age-specific non-student workers from 2017q1 onwards. Since I believe the potential “crowding-out effect” to happen the most likely between comparable workers, I performed the impact’s evaluation on the employment level of non-student workers aged between 18 and 24 occupied in the HORECA. Although non-student workers aged between 18 – 24 represent only 15% of the total non-student workforce in the HORECA, the motivation behind this analysis is that an evaluation of the “crowding out effect” of students on the employment level of similarly aged non-student workers has never been carried out in Belgium. Nonetheless, its results are important for policy making.

I chose the HORECA sector as field of analysis for three main reasons. First, based on annual statistics published by the NSSO for the year 2016, the sector of *Accommodation and Food Service Activities* (alternative name for the HORECA) was the sector of economic activity occupying the largest number of student workers (although the reform was not yet implemented). In 2016, a total of 111674 jobs were occupied by students in this sector. Taking all the Belgian sectors of economic activity together, it represents 26.2% of the total number of student jobs in 2016 (*Figure 1.1*). Second, the Belgian HORECA is characterized by a relatively young age structure, a high proportion of part-time workers as well as a relatively low level of skills requirement (**Hambije & Hertveldt 2011**); which are three common features of the student workforce as well. Lastly, employers in the HORECA commonly hire student workers to insure the continuity of their business services and manage the fluctuations related to seasonal work. Consequently, before the enforcement of the student occupation contract reform (SOC reform hereafter), the competition between students and non-student workers was

¹ Modification of the Royal Decree of November 28th, 1969 adopted pursuant to the Law of June 27th, 1969 revising the decree-law of December 28th, 1944 on social security for workers.

already intense in the sector. It is thus appropriate to raise concerns about a potential “crowding-out effect” in the wake of the SOC reform.

The evaluation method consists in comparing the observed quarterly evolution of the gender and age-specific employment level of non-student workers in the HORECA over the period 2017q1-2017q3 (i.e. post reform period) with a counterfactual scenario. The counterfactual scenario computes the growth of the gender and age-specific employment level of non-student workers in the HORECA in the absence of the SOC reform. It is constructed based on the estimates of an equation of regression developed to explain the quarterly age and gender-specific employment level of non-student workers in the HORECA over the period 2000q1 (first data available) to 2016q4 (last data before the enforcement of the SOC reform). Then, using the estimates of the equation, I generated dynamic forecasts of the employment level for the period 2017q1, 2017q2 and 2017q3 (i.e. 3 values forecasted by gender and age group) and I constructed a 95% confidence interval (on the basis of the standard errors) to assess the statistical significance of the obtained results. A negative difference between the observed and the predicted value of the gender and age-specific employment level can be interpreted as a negative effect of the SOC reform and suggests the existence of a crowding out effect of students on the employment level of non-student workers in the HORECA.

For the identification of the gender and age-specific employment level of non-student workers in the HORECA I relied on a relatively simple model. I considered the employment level of non-student workers in the HORECA to be explained by the actual and past levels of the Belgian real GDP as well as by the recent (2016q3) implementation of the Cash Register System. To improve the explanation power of the model, I considered the latter since it substantially increased the overall employment level in the HORECA at its implementation (more information in section 4). Other determinants usually found in the literature to explain the employment level include the cost of labor, the median wage or the level of employment protection in the group under study (**Bodart *et al.*, 2009 ; Jousten *et al.*, 2008**). However, due to data limitations for the Belgian HORECA sector, I couldn’t include explanatory variables related to the wages or the level of employment protection. Besides, to avoid simultaneity issues and trust the forecasts to represent a reliable counterfactual scenario, I purposefully decided to exclude both the growth of the labor costs prevailing in the HORECA and the growth of the number of hours worked in the sector from the explanatory variables. The SOC reform likely impacts the latter in a way that is only explainable using a structural model of wages and hours worked and this is outside the scope of this paper. Lastly, to ensure the validity of the identification equation and the reliability of the evaluation strategy, I made sure that no major shocks, other than the SOC reform, impacted the gender and age-specific employment levels of non-student workers in the HORECA over the period 2017q1-2017q3.

Results depict a negative (and statistically significant at conventional levels) impact of the SOC reform on the gender and aged-specific employment level of non-student workers in the HORECA considered in the present analysis. This can be interpreted as an evidence of a “crowding out effect” of students on the employment level of similarly aged non-student workers in the HORECA.

An identical “counterfactual scenario” evaluation method was used by **Dejemeppe *et al.*, (2015)** in their assessment of the overall impact of the Intergenerational Solidarity Pact (ISP hereafter) on the employment rate of age-specific workers in Belgium for the period 2007q1-2008q2. They estimated

a macro-econometric model explaining the quarterly age and gender-specific employment rate over the period 1997q1- 2006q4. After that, they predicted the employment rate for the following six quarters and provided a conclusion on the impact of the ISP by computing the difference between the actual values and the predicted values of the age and gender-specific employment rate. Another methodology commonly adopted in the literature to assess the impacts of labor market policies is the use of variations in program scales (expressed either in terms of spending or in the number of participants) over time and/or across regions/countries (**Crepon et al., 2012**). This approach appears less suitable for the evaluation of the impact of the SOC reform; it could be possible (but unfair) to proceed to variations in the number of participants (e.g. implementation of the reform in a restricted number of economic sectors), but since the reform consists in a single change (i.e. legally authorized “contingent” was increased up to 475 hours per calendar year) it is more difficult to think about variations in the core of the reform.

To the best of my knowledge, no paper investigating the overall “crowding out effect” of students on the employment level of non-student workers exists in Belgium. Nevertheless, a couple of papers have been carried out within the framework of the “crowding-out literature”. At the European level, the question related to the existence of a potential “crowding out effect” of the student workforce on the non-student employment has recently been tackled by **Beblavy and Fabo (2015)**. Authors analyzed and discussed the structure of student labor within the framework of the crowding out literature. However, their analysis is purely descriptive; there is no causal impact evaluation of the increasing student workforce on the employment rate of non-student workers. **Hofman and Steijn (2003)** and **Mytna Kureková (2015)** also addressed the issue of competition between those two types of workers and attempted to evaluate the extent to which students might crowd out low-skilled workers from the labor market². Again, their respective evaluation doesn’t investigate a causal impact of student workers on non-student workers, they simply carried out an exploratory analysis of the observable structure/functioning of the labor market. **Hofman and Steijn (2003)** used data from two types of interviews conducted among higher vocational and/or university students and among employers and **Mytna Kureková (2015)** adopted a demand-side labor market approach and analyzed employers’ preferences for posting low-skilled vacancies rather than student vacancies. While the former authors found evidence of a “crowding out effect” (i.e. discrimination against low-skilled workers because of low labor demand and thus limited access to the labor market), **Mytna Kureková (2015)** supported a “complementarity view”: low-skilled workers and students meet employer’s demands for different types of hard and soft skills.

The “crowding out literature” extends beyond the analysis of the competition issues between students and non-student workers. Conversely to the inexistent literature addressing the causal effect of student work on the labor market outcomes of non-student workers, there exist a large body of literature addressing the causal effect of immigration on labor market outcomes of native workers (**Foged & Peri 2015; Basten & Siegenthaler 2013; Bonin 2005; Friedberg 2001; Ortega & Verdugo 2014**; among others). For that purpose, all of them regressed the labor market outcome of interest (i.e. native wages and employment) on the presence of immigrants and some other

² Students are defined as “those who follow full-time courses at an institution of higher vocational education or university”. Low-skilled workers are those “whose educational level is not more than general secondary education or pre-vocational education”

individual and time fixed effects. Because the presence of an endogeneity bias constitutes a major (and very common) threat to this type of evaluation method, all of them relied on credible instruments to represent the immigrants' characteristics and estimated their impact on the native labor market outcomes using a two stage least square estimation. This approach could be conceivable for the evaluation of the impact of the SOC reform. By regressing the gender and age-specific employment level of non-student workers in the HORECA on some selected explanatory variables and a dummy variable reflecting the treatment effect "Before/After the reform" (i.e. the dummy takes value 1 if $t \geq 2017$ Q1 and 0 otherwise), one could hope to get a fair insight of the causal impact of the reform. Yet, the counterfactual method is more flexible than estimating the coefficient of a treatment effect within a regression. Indeed, because the dummy is time independent, the model can only capture a single impact. However, it usually takes some time for all parties taking part to the labour market to adapt to the implementation of a new reform. It follows that the impact of a reform usually appears a while after its implementation. This suggests that a time-dependant dummy would better reflect the real impact. Yet, the "counterfactual scenario" is able to assess such time varying impact.

Docquier *et al.*, (2011) built an aggregate model of the economy where they distinguished workers by skill level (i.e. low or high) and place of birth (i.e. native or foreign born). Labor market movements change the relative composition of workers which results in both changes in relative marginal productivity and labor supply of native workers and thus in variations in their wages and employment opportunities. Although appealing, this approach is not applicable to the evaluation of the impact of the SOC reform because of data limitations. Databases classifying workers according to their educational level are not available in Belgium.

The remainder of this work is organized as follows. Section 2 describes the current legislation framing the student occupation contract in Belgium, the 2017 reform and its expected effects. Data used for the analysis are presented in section 3 and section 4 details the methods adopted to assess the overall impact of the SOC reform on the gender and age-specific employment level of non-student workers in the HORECA and thereby investigate the existence of a potential "crowding out effect". I present and interpret the results in section 5 before concluding in the final section.

2. Student work in Belgium, the 2017 reform and its expected effects

This section is divided in two parts. The first sub-section gives a succinct overview of the legal framework applicable to the occupation of students in Belgium. The summary of the legislation is largely inspired by the webpage of the Federal Public Services, "Student Occupation Contract" (**Service Public Fédéral, Emploi Travail et Concertation Sociale, 2018**). The second sub-section presents the description of the reform and discusses its expected effects.

2.1 Student work in Belgium before the 2017 reform

2.1.1. The Belgian legal framework of student work

According to article 121 of the law of 3rd of July 1978 relative to contracts of employment ("the Law of 1978"), a student occupation contract ("SOC" hereafter) is an employment contract concluded between a student and an employer. The SOC is subject to the main legal rules applicable to

employment contracts and described in the Law of 1978. On top of that, given the specific nature of the SOC, specific legal rules also apply (Title 7 of the law of 1978).

As a matter of principle, a SOC is always concluded with a student. However, there is no legal definition of a “student”. The concept must be interpreted broadly and fall under the scope of “student” individuals:

- enrolled in high school, university or any other type of superior education (after high school) recognized by the authorities;
- who have studying as their main activity (working allowed only the accessory to the studies)

There is no age limit to be regarded as a student. Individuals can conclude SOC as from 15 years old minimum, provided they are not subject to the compulsory full-time school attendance³.

Said legal requirements will be analyzed in *concreto*.

Provided the above-mentioned requirements are fulfilled, to be enforceable, the SOC must:

- be concluded in writing for a fixed term period and
- contain mandatory provisions (e.g. hours of work, daily basis remuneration, starting date, description of the function etc....).
- be signed by both parties at the commencement of the employment at the latest.
-

A SOC can be concluded at any time of the year and its duration is not limited⁴. The first three working days are always considered as a trial period, even in the absence of specific contractual clause. Being always concluded for a fixed term period, the arrival of the contractually foreseen term triggers the automatic end of the SOC. However, it is possible for each party to anticipatively terminate the contract by notifying a notice period to the other party. The is shorter than the "regular" legal notice period applicable to the employment contracts and will vary according (i) to the length of the occupation of the student and (ii) the author of the termination (employer or student) (e.g. for occupation longer than 1 month of service, the notice period is 7 days in case of dismissal and 3 days in case of resignation).

Nevertheless, if

- the contract is not written nor contains all the compulsory mentions or;
- a copy of contract has not been sent within the seven days to the Labour Administration;
- no Déclaration IMmédiatE/ONmiddellijke Aangifte (DIMONA IN hereafter, see below) notification was entered to the National Social Security Office;

the student can terminate his contract with immediate effect without payment of an indemnity in lieu.

³ Compulsory schooling covers a period of 12 years. It begins on the school year during which the child reaches the age of 6 years and ends on June 30th of the year during which this same person reaches the age of 18 years old. The compulsory schooling's period consists of a period of full-time compulsory education, followed by a period of part-time compulsory education. The compulsory full-time schooling education ends as soon as the young person has fulfilled at least the two first year of secondary education. And in any case, it ends as soon as the young person reaches the age of 16 – whether he passed these 2 first years or not. From this moment onwards, the young person is only subjected to the compulsory part-time education. This obligation comes to an end on June 30th of the year during which the young person reaches the age of 18 years.

⁴ However, if a student has worked continuously with the same employer for a full calendar year, it is no longer possible to conclude a student contract with that employer for the following year. Nevertheless, working for this employer is still possible but under the standard employment contract and the student is still allowed to conclude a student occupation contract with other employers.

Although the remuneration of student work may vary between employers and occupations, the student will always be entitled to the “average monthly minimum income” determined by the National Work Council. The minimum wage applicable to student is determined based on the age of the student and is computed as a percentage of the minimum salary applicable for a student aged 21. *Figure 2.1* provides an overview of the gross minimum wage in force for students since June 2017.

2.1.2. Social Security Scheme applicable to the students

At the start of the student occupation, the employer must submit a DIMONA IN declaration at the National Social Security Office (NSSO hereafter). The latter must clearly mention the number of hours that the student will be working, per quarter, under the SOC.

As a matter of principle, every worker in Belgium is subject to the national social security scheme. The employer is liable to the payment of social security contributions on the remuneration. As from January 1st, 2018, the employer social security contributions on regular white-collar worker equal approximately 28% of the gross remuneration. The employee social security contributions, for their part, equal 13.07% of the worker’s gross remuneration. This percentage will be withheld from the gross remuneration the worker is entitled to and will be paid directly to the NSSO by the employer (or his payroll agent).

Student work represents an exception to the general social security scheme described above. Both students and employers will not be subjected to the general social security scheme detailed above if the following two conditions are satisfied:

1. The student works within the framework of a (written) student occupation contract
2. The student doesn’t exceed the legally authorized “contingent” of work.

This being said, a so-called "solidarity contribution" is still due to the NSSO by the two parties to the work relationship. While the employer will be liable to pay a solidarity contribution equivalent to 5.42% of the gross remuneration paid to the student, the student solidarity contribution corresponds to 2.71% of the gross remuneration he receives. Such an amount is withheld by the employer on the student’s total gross remuneration and is paid directly to the NSSO by the employer.

The exemption from the general social security regime and its substitution with the reduced solidarity contributions scheme makes student work very attractive on the labor market and is likely to be the reason behind the high value given to student work in Belgium: everything else remaining equal, students represent a cheaper workforce for employers. The legal framework regulating the SOC also specifies a few additional exceptions to the general social security scheme. The latter can be found in the appendix.

In this regard, a comparative chart of the costs for an employer between (i) a student worker of 18 and 21 years old overview and (ii) a regular worker paid according to the average monthly minimum wage (2018):

	Student 18 years old	Student 21 years old	Employee 18 years old & +
Employer's total costs	8.20€	10.00€	12.15€
Employer social security contributions	5.42% - 0.42€/hour	5.42% - 0.51€/hour	28%* ⁵ -2.66€/hour
Gross salary ⁶	7.78€	9.49€	9.49€
Employee social security contributions	2.71% 0.21€/hour	2,71% 0,26€/hour	13.07%** 1.24€/hour
Taxable income	7.57€	9.23€	8.25€
Tax withholding	N/A	N/A	35% ⁷ -2.89€
Employee net salary	7.57 €	9.23€	5.36€

Source - Table constructed based on the publication "Guide de la réglementation sociale pour les entreprises" - Edition 2018, Verbrugge F.

* On January 1st, 2014, a reform aimed at "full-time fixed workers" occupied in the HORECA sector was enforced. It involved reductions of social security contributions for employers working with the "Cash Register" system in the HORECA sector. In a nutshell, an employer employing a maximum of 49 workers and who registers, on a daily basis, his workers' start and end time of work via the "Cash Register" system, might be entitled to social security reductions. Reductions are applicable to a maximum of 5 workers and are capped to 800€/quarter for workers younger than 26 years old and 500€/quarters for the others. Consequently, provided the requirement are fulfilled, the employer social security contributions might be lower

** The employee social security contributions rate is likely to be lower if the employee is eligible for the "employment bonus". This bonus refers to a reduction in the employee social security contributions by an amount that varies in the opposite direction of the gross salary of the employee under consideration (the higher the gross salary, the lower the bonus). The employment bonus allows the employee to benefit from a higher net salary without increasing the gross salary.

Nevertheless, the student and his employer won't be able to benefit from the reduced solidarity contribution scheme if the employer fails to submit the DIMONA IN declaration to the NSSO. Besides, as soon as the student exceeds the legally authorized "contingent" of work, the reduced solidarity contributions scheme no longer applies. Both the employer and the student become subject to the general social security scheme (i.e. payment of respectively 28% and 13.07% on the remuneration the student is entitled to).

⁵ As from January 1st, 2018, the employer social security contributions for an employee (white-collar worker) corresponds to 28% of the gross remuneration. This is a consequence of the tax shift adopted by the Federal government Michel I. The rate is likely to be reduced to 25% as from 1 January 2020.

⁶ This salary represents the average monthly minimum income; the minimum salary to which a student/young worker is entitled when there doesn't exist a salary fixed by the joint commission. Besides, it is the salary on which solidarity contributions are due at the rate of 2,71%. This salary is not subjected to tax if it represents the only income of the student.

⁷ This rate is given on a purely indicative note. For the present contribution, it was assumed that the worker is isolated (not supporting inactive family member).

2.2 The 2017 reform

2.2.1 Description

As explained in sub-section 2.1.2, student work is exempt from the application of the general social security scheme if the following two conditions are satisfied:

1. The student works within the framework of a (written) student occupation contract
2. The student doesn't exceed the legally authorized "contingent" of work.

The reform of 2017 modified the second condition. Before January 1st, 2017, the legally authorized contingent of work was restricted to a maximum of 50 days per calendar year. Since then, this maximum has been increased and replaced by a contingent of work expressed in hours: for a **contingent of 475 hours per calendar year**, both the student and the employer, contracting within the framework of the SOC are exempt from the general social security scheme. The latter is replaced by the reduced solidarity contributions scheme.

As depicted in *figure 2.2* the reform follows a pattern increasing flexibility, both for students and employers. Since the enforcement of the student occupation contract in 1978⁸, the legally authorized contingent of work has been gradually increased. Before October 2005, the application of the reduced solidarity contributions scheme was restricted to the third quarter of the calendar year (i.e. July, August and September) and the contingent of work was limited to a maximum of 23 workdays. The reform of October 2005 lifted these restrictions by doubling legally authorized contingent of work (i.e. 46 workdays) and allowing the reduced solidarity contribution scheme to be enforceable during the entire calendar year. However, a distinction was made between the third quarter (23 days maximum) and the rest of the calendar year (23 days maximum). In 2012, legally authorized contingent of work was further increased to a maximum of 50 days per calendar year and the distinction of the two periods was dropped. Finally, since January 2017, the legally authorized contingent of work is no longer computed in days but in hours: students can perform under the SOC for a maximum of 475 hours per calendar year and still be entitled to the reduced solidarity contributions scheme.

In the light of the above, since the introduction of the first reform of the SOC in October 2005, the legally authorized "contingent" of work has more than doubled: it increased from a limit of 23 days * 8 hours⁹ per day = 184 hours per calendar year to a maximum of 475 hours per calendar year.

2.2.2 Evidence of a break

By increasing the legally authorized contingent of work, the reform aimed improving both the attractiveness and the access of students to the labor market. Accordingly, it is reasonable to expect both the number of student workers and the number of hours worked by them to have substantially increased since the implementation of the reform. In this sub-section, I attempted to detect a discontinuity (i.e. over-proportional growth) in the general increasing trend of both the number of student workers and the number of hours they have worked since 2017q1. The magnitude of the discontinuity provides a measure of the impact of the SOC reform on the student workforce. I relied on data published by the NSSO, however, because the reform introduced a change in the computation of the legally authorized "contingent" of work (i.e. from days to hours), the data published prior to the reform (i.e. before 2017q1) are different from the ones published after the

⁸ Law applicable to the employment contract (Belgian official Journal, August 22nd, 1978).

⁹ According to the labor law of 16 March 1971, 8 hours is the maximum legal amount of time that an individual can work per day.

reform (i.e. amount of work reported in number of days and then in number of hours). It follows that the growth of the number of hours worked by students is impossible to track as such. Therefore, to get around that problem, I relied on a proxy identifying the quarterly growth of the average number of jobs held by a student over a quarter between 2013-2017. Besides, I also considered the quarterly growth of the number of students occupied by respectively 1, 2, 3, 4, 5, 6, 7 or 8 different employers between 2013-2017.

This section presents and comments on the data gathered on the quarterly number of student workers occupied under the SOC and both the growth of the quarterly average number of jobs held by a student and the quarterly number of students occupied by several employers over the period 2013q1 – 2017q3¹⁰. All the figures are to be found in the appendix.

Figure 2.3 shows the quarterly growth of the number of students occupied under the SOC in Belgium. Since 2012, the number of students occupied under the SOC is on the rise. Between 2012 and 2017, this number displayed an annual average increase (i.e. CAGR¹¹) of 8.34% for the first quarter, 7.46% for the second quarter and 2.67% for the third quarter. The comparison of these quarterly-specified CAGR with their respective quarterly-specified 2016/2017 annual growth rate reveals a substantial increase in the number of students occupied under the SOC in 2017q2 and 2017q3. For those two quarters (the conclusion doesn't hold for the first quarter), the 2016/2017 annual growth rate significantly deviated from the general growth trend (measured by the CAGR). Such gap in the trend can be considered as the impact of the SOC reform: following the enforcement and the increase of the legally authorized "contingent" of work, relatively more students entered the labor force and contracted within the SOC framework. Figure 2.3 reports a growth of 9.50% between 2016q2 and 2017q2 (against a CAGR of 7.46%) and a growth of 4.68% between 2016q3 and 2017q3 (against a CAGR of 2.67%). Those divergences suggest that the number of students working under the SOC grew relatively faster between the second quarter of 2016 and the second quarter of 2017 (same for the third quarter) than it did between the second quarters of all the years prior to 2016. Since no major shock, other than the SOC reform, occurred on the student labor market at that time, the SOC reform possibly account (at least partly) for the faster expansion of the student workforce occupied under the SOC that has been observed in 2017q2 and 2017q3.

Figure 2.4 shows the quarterly growth of the average number of jobs held by a student between 2013 and 2017. This proxy for the growth of the number of hours worked is obtained by dividing the quarterly number of student working positions by the number of student workers of the corresponding quarter: $\frac{\text{Quarterly number of student working positions}}{\text{Quarterly number of student workers}}$.

The quarterly statistics of the working position counts the number of students occupied by every employer during the quarter. If a student was working for more than one employer during a quarter, he was counted several times. The quarterly statistics of the number of students occupied under the SOC rests on the elimination of the double counting stemming from possible multiple occupations of the same student over a quarter.

¹⁰ At the time when I realized the descriptive analysis of a structural break, annual data of 2017 were not yet released. NSSO had only published data related to the first, second and third quarters of 2017.

¹¹ $CAGR = \left(\frac{\text{Ending value}}{\text{Beginning value}} \right)^{\frac{1}{\text{number of years}}} - 1$

Since 2013, the quarterly average number of jobs held by a student is on the rise. The comparison of the quarterly-specified 2016/2017 annual growth rate of the average number of jobs held by a student with its respective quarterly-specified CAGR (i.e. the growth trend) presents a departure from the general increasing trend (as measured by the CAGR). For both the second and third quarter, the 2016/2017 annual growth rate of the average number of jobs held by a student is more than twice as large as its respective CAGR (i.e. 2.63% versus 1.11% for the second quarter and 2.59% versus 1.07% for the third quarter). This large departure from the trend suggests a strong increase of the average number of jobs held by a student between 2016 and 2017. *Figure 2.5* summarizes these findings. For years prior to 2016, the quarterly-specified annual growth rates of the ratio usually neighbored their respective quarterly-specified CAGR. Yet, when computed for 2016/2017, the quarterly-specified annual growth rate significantly moved away from its respective quarterly-specified CAGR (less obvious for the first quarter). This observation potentially confirms the positive impact of the SOC reform produced some effects on the student workforce: a student had relatively more jobs during the second and third quarters of 2017 than he used to have before 2017. Perhaps, the increased flexibility due to the computation of the legally authorized contingent of work in hours enhanced the growth depicted above. Before the reform, any started workday was recorded as a full working day, no matter how many hours the student had worked. This scheme was less favorable to “short schedule” work and could potentially explain the relatively lower averages number of jobs that has been observed for the period preceding the enforcement of the SOC reform.

Figure 2.6 presents the quarterly growth of the number of students occupied by respectively 1, 2, 3, 4, 5, 6, 7 or 8 different employers between 2013-2017. The latter can be considered as an honest indicator of the intensity level of the student’s occupation in the labor market. Three comments are worth making from this table. First, for all employers’ categories, data clearly confirm that the number of students occupied under the SOC is on the rise since 2013. Second, the quarterly-specified growth rate between the data for 2017 and the data for 2016 (considered as the measure of the impact of the SOC reform) are proportionately larger than any other quarterly-specified growth rate taken for years prior to 2017. *Figure 2.7* depicts the quarterly-specified annual growth rates of the number of students occupied by respectively 1, 2, 3 or 4 different employers: a sharp increase is observed over 2016/2017, especially for the number of students occupied by 3 or 4 employers. It suggests that somewhat more students were occupied by several different employers (i.e. 3 or 4) as from 2017q1. Third, over the last few quarters, some students started to contract with a relatively larger number of employers (i.e. 5 employers and more). Although this number is extremely small in comparison to the number of students occupied by 1 employer (i.e. approximately 0,1%), the simple fact that some students are starting to contract with a relatively larger number of employers as from 2017q1 presents another way of acknowledging that the reform produced some effects. Perhaps, because the legally authorized contingent of work is expressed in hours, students can more easily cumulate a larger number of contracts (i.e. different occupations with several different employers) before exceeding the legally authorized contingent of work of 475 hours per calendar year and having to pay the ordinary social security contributions to the NSSO.

In summary, the three evolutions reviewed above present a departure from their respective general trend since 2017. The SOC reform produced some effects on the student labour market: student workers are more numerous, they work more and they seem to contract with a larger number of employers. It is thus legitimate to evaluate the causal impact of the SOC reform on the employment

level of the youngest non-student workers (i.e. non-student workers the closest in terms of age from student workers) occupied in the HORECA and thereby investigate the existence of a “crowding out effect”.

2.2.3 Expected effects

A more flexible student labor market characterized by a larger student workforce inevitably leads to a fiercer competition on the overall labor market. In this section I explore the mechanisms through which the reform of the student occupation contract should have an impact on the short-run level of employment of age-specific non-student workers in the HORECA (i.e. over the three quarters following the reform). Since such causal impact evaluation has never been carried out before, empirical evidences are lacking. The overall picture of the expected effects that I present here is mainly intuitive.

The announcement of the adoption of the SOC reform has been communicated around the summer before its implementation. Therefore, I can reasonably believe that agents could not anticipate the measures agreed upon and that the reform produced its effects at its enforcement.

As highlighted in the previous section, the SOC reform is believed to have contributed in increasing both the number of student workers and the number of hours worked. There are two main intuitive explanations behind these observations. The first explanation is that the enforcement of a contingent expressed in hours rather than in days improved equity between all students: before 2017, each day on which work had been performed was recorded as a full working day, even if the student had only worked for a few hours. The implementation of the reform put an end to this bias by enabling all students to work the same amount of time and benefit from the reduced solidarity contributions scheme, regardless of the structure of their working time. The second explanation relates to the fact that a contingent computed in hours eases the accumulation of a larger number of contracts of shorter period of time and/or with several different employers without exceeding the legally authorized “contingent” of work. Accordingly, the SOC reform as whole could have caused changes in the point of views of both students and employers, eventually leading to changes in the demand side of the HORECA labor market.

If I assume that employers consider students and non-student workers to be perfect substitutes in all other respects but their status and if I make the hypothesis of a fixed lump of labor in the economy, I can reasonably expect the SOC reform to have a significant negative impact on the labor demand for non-student workers. Besides, based on financial grounds, this expected negative effect is likely to be strong. As a matter of fact, sub-section 2.1.2 presented a comparison of the labor costs incurred by an employer for a student worker aged 18 and 21 and a regular worker (paid according to the average monthly minimum wage (2018)). Other things being equal, the occupation of student is significantly more cost-effective than the employment of a similarly aged non-student worker.

Bodart *et al.*, (2009) provided evidence that, at given growth rate of GDP, the level of employment is expected to grow when labor costs are moderate. Hence, I may reasonably expect the SOC reform to lead to an increased labor demand for students (i.e. an increase in the level of employment of students) at the expense of non-student workers (if the lump of labor is fixed). Such substitution effect may, all other things remaining equal, be characterized by a decreasing employment level of non-student workers and thereby confirm the existence of a “crowding out” effect.

However, this “picture” should be qualified. The aforementioned assumptions needed for the expected effects to occur (i.e. students are perfect substitutes for non-student workers and lump of labor is fixed) do not perfectly match the reality of the Belgian/HORECA labor market.

Firstly, there is no foundations for a fixed lump of labor in the Belgian HORECA. *Figure 2.8* illustrates the growth of the number of working positions¹² occupied by both students and non-student workers in the HORECA. *Figure 2.8* contradicts the assumption of a fixed lump of labor: the amount of work to be done in the economy is not fixed, on the contrary, the employment of labor can expand the overall size of the economy which may lead to further job creation. The number of working positions filled by both types of workers has evolved throughout the years. Nevertheless, over the past quarters, students’ working positions have grown at a faster rate than non-students’ working positions. Thus, although a fixed lump of labor is a fallacy, recent evolutions in the HORECA point to an increasing representation of the student workforce.

Secondly, students and young non-student workers are not completely substitutable in all aspects. The literature investigating the “crowding out effect” of students on the employment level of non-student workers highlighted a large array of characteristics distinguishing these two types of workers. Dissimilarities between both groups are identified in terms of flexibility and ability to adapt rapidly (**Hofman & Steijn 2003**), skills (**Mytna Kureková 2015**), differences with regard to their respective demands for the content of their work and/or the aspirations they have for their work (**Lucas & Ralston 1997**) as well as in terms of the motivations driving them to accept a job (**Curtis & Lucas 2001**). Overall, students are identified as being more flexible (i.e. work in the evenings and during the week-end), less demanding for the content of their job and easily trainable. Besides, students are usually appreciated for their communication skills and computer skills. Lastly, as previously emphasized, students differ from non-student workers in terms of costs and contractual obligations to their employers. Consequently, even though both types of workers are not perfectly substitutable, students’ special characteristics can be real assets for employers and can make the difference in employers’ hiring decisions. Some employers may thus favor student work to the detriment of non-student workers, which could still lead to a “crowding out” effect.

Given the above, the impact of the SOC reform on the gender and age-specific employment level of non-student workers in the HORECA is expected to be negative but not as critical as it would have been in case of perfect substitutability between both types of workers and a fixed lump of labor.

Lastly, it is possible that the implementation of the SOC reform also discouraged some young non-student workers seeking for a steady job to look for an occupation in a sector known to have a large student workforce and to be sensitive to seasonal fluctuations. Such discouragement effect may reinforce the expected negative impact of the SOC reform on the employment level of young non-student workers in the HORECA and so enhance a conclusion that will point to an evidence of a “crowding out effect”.

¹² Recall that the statistic of the working position is defined by the NSSO as follow: “the number of workers (students) occupied by every employer at the end of (during) the quarter. If a worker (students) was working for more than one employer at the end of (during) a quarter, he will be counted several times.

3. Data and sample

The outcome variable of my evaluation analysis is the quarterly statistics of the (gender and age-specific) number of non-student workers, expressed in full-time equivalent (FTE), occupied in the Belgian HORECA sector. I extracted the statistic from the databases of the National Social Security Organization of Belgium (NSSO hereafter). The HORECA (Hotel Restaurants and Cafes) refers to the sector of the *Accommodation and Food Services Activities*, code NACE-Bel 55-56 of the NACE-Bel 2008 nomenclature¹³. The quarterly number of the “full-time equivalent” in the HORECA is computed based on the number of working days that have been declared and remunerated by the employers of the sector (vacation days are included as remunerated days) over the course of a quarter. Paid working periods that are fictitious (i.e. allowances and paid days in case of contract’s termination) are excluded from the computation of the full time equivalent. In this way, the definition of the quarterly number of “full-time equivalent” does not rely on the duration of work planned in the employment contract but rather on the quarterly real working hours that have been reported by employers (reports must be made by each employer at the end of each quarter, through the Declaration Multifonctionnelle/Multifunctionele Aangifte notification – the latter is used as basis for the computation of social security contributions that must be paid to the NSSO). This mode of computation better reflects the work that has actually been performed and is, on the whole, an accurate indicator of the level of employment within a sector. Because the employment level in the HORECA has been shown to be strongly affected by seasonality components (**Hambije & Hertveldt 2011**), I used JDemetra+¹⁴ to adjust for seasonality each dataset constituting the outcome variable of my analysis (gender and age-specific). Besides, after consultation with the NSSO, I corrected all the series related to the employment level of women by removing the observations between 2003q1 and 2003q4 considered as outliers because of statistical errors.

The target of the SOC reform are the students. To investigate a potential “crowding out effect” of students on non-student workers’ employment level, I decided to focus my analysis on workers who are the closest as possible in terms of age from student workers. Consequently, I restricted the evaluation of the impact of the SOC reform on the level of employment of some age-specific categories of non-student workers. I selected those categories based on an analysis of the student’s age structure observed on the Belgian labor market in 2016. Based on a report published by the NSSO in 2016, the majority of the student working positions (identified in the entire Belgian economy) appeared to be occupied by students aged between 18 and 23 years old. *Figure 3.1* depicts the distribution, by age group, of the student working positions in 2016 (all sectors of economic activities combined - NACE-Bel 2008 nomenclature). Rapid computations yield that, in 2016, more than 70% of the student working positions were held by students aged between 18 and 23 years old: 41.68% (18-20 years) + 28.66% (21-23 years) = 70.34%. In view of the foregoing, I decided to target the causal impact (i.e. potential “crowding out effect”) of the SOC reform on the employment level of non-student workers occupied in the HORECA and aged between 18 and 24

¹³ The code system NACE (Nomenclature générale des Activités économiques dans la Communauté Européenne) is based on the International Standard Industrial Classification of All Economic Activities (ISIC) of the United Nations. The NACE sections are classified by the EU but the subsections may be amended by the Member States after approval of the European Commission. In Belgium, the amended NACE-Bel 2008 nomenclature is valid since 2008

¹⁴ On January 2016, JDemetra+ has been officially recommended as software for the seasonal adjustment of official statistic by the European Commission. I use the software with the specification X13.

(the age-group classification reported for non-student workers runs up to 24 years old rather than 23 years old).

The quarterly growth of each gender and age-specific employment level of non-student workers in the HORECA is displayed in *Figure 3.2*. The vertical lines mark the successive reforms of the SOC. The employment level of the youngest workers (i.e. 18 & 19 years old) appears to be declining since 2000q1; in 20 years' time, it almost reduced by half. This can partially be explained by the fact that, in 20 years' time, education became accessible to a larger number of young people. Consequently, young people progressively started to enter the labor force at older ages than 18-19 years old (which explains the decline in the employment level). However, the decline may also represent an evidence of a "crowding out effect" of students on the employment level of young people aged 18-19 years old: following the successive SOC reforms, the occupation of students progressively started to take place at the expense of non-student workers aged 18-19.

Besides, focusing on the employment level in the period following the reform of January 2017, I observe that the latter has only been decreasing for both genders aged 18-19 (and not for the two other age groups). At the aggregate level (i.e. 18-24 years old), I note that the employment level of the men has roughly remained constant in the post-reform period while the employment level of the women has faced a decline.

On a more general note, each age-specific evolution of the employment level seems to follow some common lines of conduct: a downward trend until 2010 followed by a short but sustained growth until around 2012. The period after 2012 exhibits a new short decline until mid-2013/2014, period from which the employment level started to increase again for all age groups but the youngest one (i.e. 18-19 years old). These evolutions can be explained by the following facts:

1. In October 2010, an agreement between the government and the HORECA sector was concluded to reduce the VAT applicable on all catering services from 21% to 12%. This led to an expansion of the sector through the creation of roughly 6000 new jobs¹⁵ which resulted in higher employment levels.
2. The implementation of the SOC reform of January 2012 potentially led to a short-run substitution effect between students and non-student workers, hence the decrease in overall employment levels.
3. On January 1st, 2014, a reform aimed at "full-time fixed workers" occupied in the HORECA sector was enforced. Employers occupying a maximum of 49 workers and who register, on a daily basis, their workers' start and end time of work via the "Cash Register" system (see below) became entitled to reductions in social security contributions. Reductions apply to a maximum of 5 workers and are capped to 800€/quarter for workers younger than 26 years old and 500€/quarters for the others. Besides, as from October 1st, 2015, the total amount of overtime¹⁶ performed by full-time workers free of tax and social liabilities has been increased to 300 hours (360 hours for workers occupied by employers using the Cash Register System). Lastly, on December 1st, 2015, the "Flexi-Job" system was enforced in the HORECA. The system aimed at

¹⁵ "Baisse TVA dans l'HORECA: effet retour de 50% serait un succès" – RTBF, 23/06/2018

¹⁶ Extra hours within the framework of an unusual increase in the workload or following from an unforeseen necessity. "Extra" because the worker decided not to recover them. "Extra net hours" means that the net cost of those extra hours is equivalent to its gross cost. Those provisions fall within the scope of de minimis aid to Commission Regulation (EC) No 1407/2013 of 18 December 2013.

enabling employers to temporarily occupy, at reduced cost, additional workers. Under this system, the employer is liable of the payment of social security contributions corresponding to 25% of the income perceived by the worker with the “flexi-job” status (and not the ordinary 28%). The combination of those three reforms likely explains the observable increase in the gender and age-specific employment level in the HORECA since 2014.

In this paper, I consider the gross domestic product of Belgium (GDP) as the evident indicator of the economic activity capable to explain the growth rate of the gender and age-specific employment level of non-student workers occupied in the HORECA. In an alternative identification strategy, I consider the quarterly growth rate of the HORECA turnover.

I used the online database of the National Bank of Belgium to pull the growth of the seasonally adjusted Belgian quarterly real GDP from the first quarter of 2000 up to the third quarter of 2017. *Figure 3.3* exhibits the evolution of the Belgian real GDP over the period 2000q1 – 2017q4. Belgium underwent a big economic slowdown between 2008 and 2010, namely the Great recession. The combination of the economic crisis and the political crisis (i.e. no government for 541 days in Belgium) led to a significant drop in confidence from businesses, households and investors and so, in a drop of output. Aside from this major shock and smaller slowdowns at the end of 2002 and the beginning of 2016 (i.e. bombing attacks in Brussels), the evolution of the Belgian GDP reveals an increasing trend.

For the alternative identification strategy, I extracted the data on the quarterly-specified turnover of the HORECA sector from STATBEL. The HORECA turnover includes all the amounts (VAT not included) charged by the firms who are active in the HORECA and liable for VAT. The income that are considered as other operational income, financial income and extraordinary income in the accounts of the firms are excluded from the computation of the turnover. I used JDemetra+ to adjust the dataset for seasonality. The sample of data runs from the first quarter of 2005 to the third quarter of 2017. *Figure 3.4* exhibits the evolution of the HORECA turnover over the period 2005q1 – 2017q3. As with the evolution of the real Belgian GDP, I observe a slowdown of the HORECA turnover during the period of the Great recession. Besides, the beginning of 2016 presents a disruption in the general increasing trend. It is believed that the enforcement of the Cash Register System (see details below) decreased the turnover of the sector temporarily since it entailed high costs in terms of implementation (one shot cost) and compliance with the rules. A Cash Register is estimated to cost between 1500€ and 4000€¹⁷ and failures to comply with the rules entail substantial fines¹⁸. Aside from these, the evolution of the HORECA turnover reveals an increasing trend.

Lastly, I also allowed the gender and age-specific employment level to be explained by the enforcement of the Cash Register System in 2016q3. On January 1st, 2014, the government implemented the Cash Register System Regulation to strengthen control of the sector’s activities and tackle tax fraud pertaining to VAT. A period of transition was spread until July 1st, 2016, date at which each company with an annual turnover (net of VAT) above 25.000€ had to be in possession of the Cash Register System and had to deliver (via the system) a receipt and a VAT stamp to each customer in order to comply with the new HORECA law. Such reform likely contributed in increasing the overall

¹⁷ Kraft de la Saulx, D. (2017) – Impact du Système de Caisse Enregistreuse sur le secteur HORECA en Belgique.

¹⁸ Fines range from 1500€ in the absence of Cash Register, 3000€ when the Cash Register is not activated up to 5000€ in case of recidivism within the three months following the latest warning.

employment level observed in the sector since it forced employers to declare performance of their workers. Not accounting for the implementation of this reform will likely decrease the goodness of fit of the specification.

4. The evaluation method and identification strategies

This section consists in two sub-sections. The first sub-section explains the two identification strategies, the evaluation method adopted to study the overall impact of the SOC reform as well as the potential simultaneity issues specific to each identification strategy. The second sub-section presents the equation of regression for each identification strategy and elaborates further on the evaluation method.

4.1 The evaluation method

The purpose of this paper is to measure the potential negative impact of the SOC reform on the employment level of the youngest (i.e. aged between 18 and 24) non-student workers occupied in the HORECA. For that purpose, I need to prove that without the SOC reform (i.e. the counterfactual scenario), the employment level of these age-specific non-student workers in the HORECA would have been higher.

Because the reform applies to all students who are occupied under a SOC in Belgium, there doesn't exist any control group which could be taken as benchmark to assess the effect of the reform. Consequently, using a control experiment or a quasi-experimental method is not feasible to carry out the present analysis. Hence, I decided to rely on a "counterfactual scenario" strategy (**Dejemeppe et al., 2015**). The evaluation method boils down to comparing the current evolution of the gender and age-specific employment level of non-student workers occupied in the HORECA to a counterfactual evolution over the period 2017q1 – 2017q3 (i.e. post reform period). I constructed the counterfactual scenario based on an equation of regression that I estimated over a period going from the first quarter of 2000 to the last quarter of 2016 (i.e. period preceding the SOC reform). This equation of regression attempts to explain the quarterly variations in the (gender and age-specific) employment level of non-student workers occupied in the HORECA by actual and past variations of the Belgian real GDP, the enforcement of the Cash Register System as well as by past evolutions of the endogenous variable itself.

To avoid an endogeneity bias, I deliberately decided to exclude both the labor costs and the number of hours worked from the identification equation of the gender and age-specific employment level. The SOC reform likely affected these variables. Consequently, including them as explanatory variables will seriously distort the identification strategy and result in the creation of unreliable forecasts for the counterfactual scenario. The estimation period concludes on the last quarter of 2016 (quarter preceding the implementation of the reform) and the three available quarters of 2017 constitute the evaluation period. An important pitfall of the identification strategy outlined above refers to the eventuality of a reverse causality issue; is it the growth rate of the real Belgian GDP that determines the gender and age-specific employment level of non-student workers in the HORECA or rather an increase in the latter that contributes in improving the growth rate of the real Belgian GDP? Yet, for three main reasons, I may reasonably believe that such reverse causality issue is not a threat to the present analysis. Firstly, the evaluation strategy for the causal impact of the SOC reform is carried out in the HORECA solely. The latter sector is unlikely to influence single-handedly the total

Belgian GDP. In 2005, the HORECA was estimated to have contributed to 2.9% of the Belgian GDP (Hambije & Hertveldt (2011)). Secondly, since the analysis is restricted to the youngest non-student workers, the eventuality of a causality from the employment level to the real Belgian GDP is lessened. This is especially true in the present analysis since the three age brackets taken together represent less than 15% of the total non-student workforce occupied in the HORECA (12553 non-student FTE aged 18-24 against a total of 84918 non-student FTE in 2017q3). Lastly, Dejemeppe *et al.*, (2015) faced the exact same questioning in their evaluation of the overall impact of the Intergenerational Solidarity Pact on the employment rate of age-specific workers in Belgium. To tackle the issue, they developed an alternative model specification where they included the growth rate of the mean real GDP of Belgium's neighboring countries (France, Luxembourg, Germany, The Netherlands and the United Kingdom) instead of the Belgian GDP to explain the employment rate of age-specific workers in Belgium. The results led them to reject the eventuality of a simultaneity bias. Taking those three reasons together, I decided to confidently reject the eventuality of a simultaneity bias for the identification strategy developed in this paper.

The HORECA is a fast-moving sector. Over the years, it faced a body of reforms aimed to stimulate the economic activity, jobs growth, reduce employment costs and encourage entrepreneurship. It is thus reasonable to trust the gender and age-specific employment level in the sector to be sensitive to variations in the turnover of the sector. Therefore, I developed an alternative identification strategy where the quarterly variations in the gender and age-specific employment level of non-student workers occupied in the HORECA are explained by the actual and past variations of the quarterly HORECA turnover as well as the past evolutions of the endogenous variable itself.

However, this identification strategy may also be affected by a simultaneity bias, especially because I allow the gender and age-specific employment level in the HORECA at time t to depend on the level of the HORECA turnover at time t . Indeed, the HORECA turnover is very likely to influence the employment level in the HORECA but the latter may also affect the HORECA turnover. In the absence of autocorrelation in the error terms of the model, the simultaneity bias will arise when the specification allows the current value of the growth rate of the HORECA turnover to be included as explanatory variable. The problem may thus be avoided by removing from the identification equation the contemporaneous value of the growth rate of the HORECA turnover and only allow for the lagged values of the latter growth rate to be included. I'm aware that this is a major shortcoming of this identification strategy. However, fixing the problem is out of the scope of this paper and I leave it for future research.

4.2 Equations of regression

General identification strategy

The presence of a unit root when conducting a time series analysis can lead to unpredictable results. Hence, working with stationary series is always preferable. A stationary series is a process whose unconditional joint probability distribution does not vary when shifted in time. If a unit root happens to be present, stochastic shocks will have permanent effects and the process will thus not be mean-reverting. To test the null hypothesis of the presence of a unit root in a time series sample, one usually performs an Augmented Dickey-Fuller test (ADF) for unit root. The application of the latter to both the outcome variable (i.e. gender and age-specific employment level of non-student workers occupied in the HORECA) and the real Belgian GDP did not systematically reject (at conventional

levels of significance) the null hypothesis of the presence of a unit root. However, the application of the Phillips-Perron test rejected the null hypothesis of a unit root for each gender and age specific outcome variable. This test is believed to have greater power than the traditional ADF test because it is robust with respect to the unmentioned autocorrelation and heteroscedasticity in the disturbance process of the test equation. Given the above, I can reasonably conclude that both the gender and age-specific employment level series as well as the Belgian real GDP series are stationary in the data¹⁹.

Besides, to avoid spurious regressions it is important that no cointegration relationship exist between the evolution of the gender and age-specific employment level and the real Belgian GDP. These processes must be linearly independent from one another. The test of Engle and Granger for cointegration (1987) consistently failed to reject the null hypothesis of no cointegration. Therefore, I reasonably assumed that no cointegration relationship were to be found between the gender and age-specific employment level in the HORECA and the real Belgian GDP. These results follow the conclusions obtained by **Bodart et al., (2009)** who attempted to estimate an employment equation for the period 1980-2002 in Belgium.

Because there is no cointegration between the gender and age-specific employment level of non-student workers in the HORECA and the real Belgian GDP, I estimated the equation of regression in first difference. The first difference of the gender and age-specific employment level in the HORECA represents the endogenous variable and the first difference of the real Belgian GDP is the exogenous variable. Economic growth, widely-used determinant of the overall employment level in the economy, is usually positively associated with job creation and thus with an increase in the growth rate of the level of employment in the economy. However, increases in the employment level usually fit with delay to variations of the economic activity (i.e. hiring and dismissing workers is a time-consuming process and adjustments in the workforce usually occur only when variations in the economic activity are believed to be permanent) (**Bodart et al., 2009**). Consequently, I also allow the past levels of the Belgian real GDP to influence the current variation of the age and gender-specific employment level of non-student workers in the HORECA. After performing several OLS regressions including different lags of the GDP growth rate, I found out that the identification equation minimizing both the Akaike information criterion (AIC) and the Bayesian information criterion (BIC) was the one including one lag of the GDP growth rate. AIC and BIC criteria are tools used for the selection of a model; they are estimators of the relative quality of the different statistical models that could be suitable for a specific set of data. Both estimate the relative information that is lost when a given model is used to reproduce the process that delivered the specific set of data. They do not provide any information about the absolute quality of a given model; they only deal with the trade-off between the relative goodness of fit of a model and its simplicity.

The equation of regression stands as follow:

$$\Delta \log(EL)_{g,a,t} = \alpha_0 + \beta_1 \Delta \log(GDP)_t + \beta_2 \Delta \log(GDP)_{t-1} + \theta \Delta \log(EL)_{g,a,t-1} + \delta \text{Cash} - \text{Register} + \Delta \varepsilon_{g,a,t} \quad (1)$$

¹⁹ The results of the ADF tests and Phillips-Perron tests are available upon request

In equation (1) $\Delta \log(EL)_{g,a,t}$ corresponds to the first difference of the employment level (expressed in FTE) of gender and age-specific non-student workers occupied in the HORECA. The subscripts a stands for the age-specific group 18-19, 20-21, 22-24 and 18-24 years old, g corresponds to gender and t to time. $\Delta \log(GDP)_t$ is the quarterly growth rate of the real Belgian GDP at time t . *Cash – Register* is the dummy representing the enforcement of the mandatory Cash Register system in 2016q3. Lastly, $\Delta \varepsilon_{g,a,t}$ is the error term peculiar to each group of observation.

It is important to proceed to a general check of the adequacy of the identification equation to each gender and age-specific set of data. This can be done by conducting a Breusch Godfrey test for white noise; it tests for the presence of serial correlation in the residuals of a model. White noise residuals are evidence of a well-specified and accurately fitted time-series model. The application of the Breusch Godfrey test for white noise to each gender and age-specific equation (1) systematically failed to reject (at conventional significance levels) the null hypothesis of the absence of autocorrelation. Hence, I can reasonably believe that the model represented in equation (1) is suitable for the identification of the gender and age-specific employment level of non-student workers in the HORECA.

Overall, I reasonably expect the coefficients of the growth rate of the real Belgian GDP to be positive if the growth rate of the gender and age-specific employment level of non-student workers in the HORECA is to increase when the economic activity rises. Besides, I also expect the coefficient of *Cash – Register* to be positive.

I estimated by OLS the model of equation (1) (by gender and age-group) over the period 2000q1 to 2016q4. Then, I generated dynamic forecasts for the period 2017q1, 2017q2 and 2017q3 (i.e. 3 values forecasted by gender and age group). The forecasts are generated based on the estimated parameters, the actual and past value of the real Belgian GDP as well as the past value of the employment level (by gender and age group). Following the methodology adopted by **Dejemeppe et al., (2015)**, to generate accurate forecasts, I relied on the actual values of the employment level (gender and age-specific) until 2016q4 and then use the predicted ones. For the real Belgian GDP, I always used the actual values. Then, to evaluate the potential impact of the reform on the employment level (gender and age-specific) of non-student workers occupied in the HORECA, I compared the observed (i.e. actual) employment level to the predicted one (i.e. counterfactual scenario) in each quarter following the implementation of the SOC reform (i.e. 2017q1, 2017q2 and 2017q3).

The impact of the reform relates to the portion of the employment level that cannot be explained by its own past dynamics and the economic activity (as measured by the GDP). It is evaluated by gender and age group and is measured by the difference between the observed and predicted employment level. Besides, to appraise its statistical significance of the computed impact, I constructed (based on the standard errors of the predicted values of the gender and age-specific employment level) a 95% and a 90% confidence interval around the three predicted values. An actual employment level that is below (above) the lower (upper) bound of the confidence interval is evidence of a negative (positive) and statistically significant impact of the SOC reform on the gender and age-specific employment level of non-student workers occupied in the HORECA.

Alternative specification

The evaluation method for the alternative identification strategy is exactly the same as the one broadly explained above. The only difference is the substitution of the real Belgian GDP with the HORECA turnover. Besides, following the minimization of the AIC and BIC, I added an extra lag of the growth rate of the HORECA turnover in the model specification. The equation of regression stands as follow:

$$\Delta \log(EL)_{g,a,t} = \alpha_0 + \beta_1 \Delta \log(\text{Turnover})_t + \beta_2 \Delta \log(\text{Turnover})_{t-1} + \beta_3 \Delta \log(\text{Turnover})_{t-2} + \theta \Delta \log(EL)_{g,a,t-1} + \delta \text{Cash} - \text{Register} + \Delta \varepsilon_{g,a,t} \quad (2)$$

I estimated by OLS the model of equation (1) (by gender and age-group) over the period 2005q1 to 2016q4. Based on the estimated parameters, I generated dynamic forecasts for the period 2017q1, 2017q2 and 2017q3 (i.e. 3 values forecasted by gender and age group). As with the first identification strategy, to generate the forecasts, I always used the actual values of the gender and age-specific employment level until 2016q4 and then used the predicted ones. For the values of the HORECA turnover, I always used the actual ones.

Overall, I reasonably expect the coefficients of the growth rate of the HORECA turnover to be positive if the growth rate of the (gender and age-specific) employment level of non-student workers in the HORECA is to increase when the economic activity specific to the HORECA sector rises.

5. Results

Figure 5.1 presents, by gender and age group, the estimated parameters of the general model specification of equation (1). As expected, the coefficients of the growth rate of the real Belgian GDP are positive for all age specifications (the only exception being for the men aged 22-24). Although statistically not significant, I can reasonably believe that an increase in the economic activity leads, other things being equal, to an increase in the growth rate of the employment level of young non-student workers (aged between 18 and 24) occupied in the HORECA. Besides, as expected, the enforcement of the Cash Register System had a positive effect on the employment level of all age categories in 2016q3. Its impact appears to be the largest (and significative at 1% level) for the youngest age group occupied in the HORECA; it increased by 10% (9%) the employment level of male (female) non-student workers aged 18-19 in 2016q3.

Overall, the model of equation (1) performs better for male data sets; its predictive power (i.e. R^2) is systematically higher and the standard errors of the estimates are on average smaller.

The section is divided in two parts. In the first part I focus on the general identification strategy and present the estimated impact of the SOC reform on the quarterly gender and age-specific employment level in the HORECA. In the second part, I explore the sensitivity of my results by investigating the impact of the SOC reform following from the alternative identification strategy.

5.1 The impact of the SOC reform

The estimated effect of the SOC reform on the gender and age-specific employment level of non-student workers in the HORECA is depicted graphically on figure 5.2. The blue and purple lines stand for the observed and predicted values of the gender and aged-specific employment level. The green

and orange lines are the lower and upper bounds of the 95% confidence interval built around the forecasts.

For both genders aged 18-19, both the observed and predicted values of the employment level have been decreasing since 2017q1. So, even in the absence of the SOC reform, the employment level of the youngest age group would have decreased as a consequence of the economic activity. However, *figure 5.2* shows that the decline would have been lower in the absence of the reform (i.e. for both genders, actual employment level is below the predicted one since 2017q1). This observation highlights the negative impact of the reform on the employment level of the youngest non-student workers in the HORECA and suggests an evidence of a “crowding out effect”. Moreover, as the 95% confidence interval constructed around the forecasts doesn’t include the observed value of the employment level (for both genders), I can reasonably conclude that the impact is statistically significant at a level of 5%.

The trend is less obvious for male and female non-student workers aged 20-21. The employment level of the latter is recorded to be higher in 2017q3 than it used to be during the period preceding the reform (i.e. before 2017q1). However, for female non-student workers, the actual employment level lies below the predicted one in 2017q3, thereby suggesting a negative impact of the SOC reform. This observation doesn’t hold for the male non-student workers aged 20-21.

For both genders aged 22-24 the increase in the employment level would also have been bigger in the absence of the reform (i.e. predicted value of the employment level lies above the observed one). So, the SOC reform also negatively impacted this age group. Yet, the negative impact of the reform appears to be statistically significant at the 5% level for the men but not for the women (i.e. confidence interval includes the observed value of the employment level).

Considering the three age groups together, in 2017q3, I observe that the actual level of employment is below the predicted one for both genders and that the former lies outside the 95% confidence interval built around the forecasts. This descriptive analysis confirms the expected negative impact of the SOC on the employment level of young non-student workers aged between 18 and 24 in the HORECA. This finding reinforces the suspected “crowding out effect” of students on the employment level of similarly aged non-student workers.

Figure 5.3 reports, by gender, the estimated impact of the reform in terms of reductions of full-time equivalent in 2017q3 (i.e. third quarter after the enforcement of the reform). The estimated impact refers to the magnitude of the difference between the observed and predicted value of the employment level in 2017q3. As expected and illustrated by the graphical representation of *figure 5.2*, the impact is negative for all age specifications (but for the men aged 20-21 – roughly no impact) in 2017q3. Although small in absolute value (we are talking about several tens of FTE) the impact is statistically significant at the 5% level for all age group (except for the men aged 20-21 and the women aged 22-24).

Figure 5.3 shows that the impact is the largest for non-student workers aged 18-19 of both genders. In 2017q3, the observed employment level of male (female) non-student workers aged 18-19 in the HORECA amounted to the equivalent of 822.22 FTE (576.14 FTE), while the predicted one was estimated to be equivalent to 855.66 FTE (610.57 FTE). The difference between these two values (i.e. measure of the impact of the SOC reform) amounts to a reduction of 33.44 FTE (34.43 FTE), which represents 3.9% (5.64%) of the predicted value of the level of employment expressed in FTE. It

suggests that the implementation of the reform brought about a reduction of 3.9% (5.64%) of the amount of FTE ordinarily held by male (female) non-student workers aged 18-19 in the HORECA in 2017q3.

At an aggregate level, in 2017q3, the reform is believed to have reduced by respectively 0.94% and 1.53% the amount of FTE ordinarily held by male and female non-student workers aged 18-24 in the HORECA. This reduction corresponds to a cut of 67.95 FTE for men and 84.88 FTE for women.

A rapid analysis carried out for the impact of the SOC reform in 2017q1 (i.e. the quarter of the implementation of the reform) confirms the negative impact for all age groups. However, such impact is not statistically significant at 5% for all of them. *Figure 5.4* shows that for the male non-student workers aged 20-21 and all female non-student workers (i.e. between 18-24 years old), the impact of the reform was not statistically significant at the 5% in 2017q1. It suggests that the crowding out of young non-student workers of the HORECA sector gets more likely in time (i.e. the time for the reform to become effective).

To sum up, both the graphical analysis and the point estimates suggest that the SOC reform had an overall negative impact on the employment level of non-student workers aged between 18 and 24 in the HORECA. This finding points to the existence of a “crowding out effect” of students on the employment level of young non-student workers in the HORECA.

Even though the model of equation (1) delivers a statistically significant impact (at the 5% level) for almost all gender and age-specific groups (two exceptions), it could still be foreseeable to improve the accuracy of the estimated impact (this is especially true for women in the present context).

Overall, the quality of the impact’s estimation depends on the quality of the forecasts, which in turn depends on the quality of the identification strategy for the employment level (R^2 and standard errors of the estimates). As shown by *figure 5.1*, the coefficients of the growth rate of the real Belgian GDP were not statistically significant. Therefore, improving the model specification for the identification of the gender and age-specific employment level of non-student workers in the HORECA could help in refining the evaluation of the impact of the SOC reform. Because of data limitations and potential endogeneity issues, the model of equation (1) remained simple. It follows that the measure of goodness of fit (R^2) reported in *figure 5.1* is relatively low (and systematically lower for women) and most of the coefficients are not statistically significant (at conventional levels of significance). The alternative identification strategy attempts to address this drawback.

5.2 Alternative specification

Figure 5.5 presents the OLS estimates, by gender, for the alternative identification strategy (HORECA turnover as determinant of the economic activity). The test of Engle and Granger for cointegration (1987) performed on the gender and age-specific employment level and the HORECA turnover consistently failed to reject the null hypothesis of no cointegration. Besides, for each gender and age specification, the Breusch-Godfrey test failed to reject the null hypothesis of no serial correlation at conventional significance levels. The model of equation (2) is thus suitable for the gender and age-specific employment level of non-student workers in the HORECA.

Contrasting with the results obtained from the general identification strategy, the contemporaneous value of the growth rate of the HORECA turnover appears to be statistically significant at the 10% level for each gender and age group (with the sole exception of the men aged 22-24). As expected,

an increase in the current (or past) HORECA turnover has a positive impact on the employment level in the HORECA. Moreover, the measure of the goodness of fit (R^2) increased for each gender and age group: the model of equation (2) better matches the gender and age-specific employment level observed in the HORECA over the period 2005q1-2016q4.

The estimated impact of the SOC reform under this alternative identification is given by *figure 5.6*. In the absence of the SOC reform, the employment level of each gender and age group would have increased as a consequence of the expansion of the HORECA turnover. Graphically, the slope of the predicted employment level in the HORECA is positive for each gender and age-group. This is different from what has been found with the general identification strategy. Indeed, the latter predicted a decline in the employment level of non-student workers aged 18-19 over the post reform period. Hence, it suggests that the negative impact of the SOC reform is stronger for the 18-19 years old under the alternative identification strategy. The same observation holds for the employment level of the aggregate group (i.e. 18-24 years old). So, overall, based on this graphical representation, the negative impact of the SOC reform is expected to be larger with this alternative identification strategy.

The point estimates presented in *figure 5.7* confirm this insight: a negative and statistically significant (at a 5% level) impact of the SOC reform is observed for each gender and age group. The impact in terms of reduction in FTE is larger for each gender and age group. During the third quarter of 2017, the SOC reform is believed to have reduced by 76.28 (82.5) the amount of FTE ordinarily held by male (female) non-student workers aged 18-19 occupied in the HORECA. This represents a reduction of 8.49% (12.53%) of the predicted value of the employment level expressed in FTE. At the aggregate level, the negative impact of the SOC reform is also recorded to be stronger. The point estimates suggest that, during 2017q3, the employment opportunities (expressed in terms of FTE) ordinarily accessible to male (female) non-student workers aged between 18 and 24 in the HORECA decreased by 2.77% (6.21%). Such reduction corresponds to a cut of 203.81 FTE for men and 361.29 FTE for women.

A rapid analysis carried out for the impact of the SOC reform in 2017q1 (i.e. the quarter of the implementation) confirms the negative impact for all age groups. However, such impact is not statistically significant at 5% for all of them. *Figure 5.8* shows that for the male non-student workers aged 20-21 and female non-student workers aged 20-21 and 22-24, the impact of the reform was not statistically significant at the 5% in 2017q1. It confirms the conclusion obtained with the general identification strategy: the crowding out of young non-student workers of the HORECA sector exists but gets more likely in time (i.e. the time for the reform to become effective).

The results obtained from this alternative identification strategy reinforce the conclusion previously drawn: since its implementation, the SOC reform negatively and significantly impacted the employment level of young non-student workers in the HORECA (i.e. non-student workers aged 18-24). Together, these findings appear to support the existence of a “crowding out effect” of students on the employment level of young non-student workers occupied in the HORECA: the increase in the occupation of students is made at the expense of the employment of young non-student workers.

6. Conclusion

The aim of this paper is to evaluate the causal impact of the student occupation contract reform (SOC reform) on the employment level of non-student workers aged between 18 and 24 years old occupied in the HORECA. By means of this evaluation I investigate a potential “crowding out effect” of students on the employment level of similarly aged non-student workers in the HORECA. The impact of the SOC reform is assessed (by gender and age group) using a counterfactual scenario analysis over the period 2017q1 – 2017q3 (the latest data available). The strategy consists in comparing the actual values of the gender and age-specific employment level of non-student workers occupied in the HORECA to their predicted values, namely the counterfactual scenario. The latter is built based on the estimates obtained from an equation of regression identifying the gender and age-specific employment level of non-student workers in the HORECA and estimated over the period preceding the enforcement of the SOC reform (i.e. 2000q1 – 2016q4). To appraise the significance of the estimated impact, I used the standard errors of the estimates and built a 90% and 95% confidence interval around the generated forecasts. An observed value of the gender and age-specific employment level of non-student workers in the HORECA that lies outside the confidence interval points to a statistically significant impact of the reform.

The quarterly gender and age-specific employment level of non-student workers in the HORECA is identified by the quarterly growth rate of the real Belgian GDP and the implementation of the Cash Register System. Nevertheless, I developed an alternative identification where the outcome variable is explained by the quarterly growth rate of the HORECA turnover and the implementation of the Cash Register System. To avoid a potential endogeneity bias, I purposefully excluded from the equation of identification the growth rate of both the labor costs and the number of hours worked in the HORECA. Besides, to capture the impact of the SOC reform only, I ascertained that no important shock other than the SOC reform occurred during the period of evaluation (i.e. 2017q1 – 2017q3).

The results point out to a negative impact of the SOC reform on the employment level of young non-student workers (i.e. 18-19; 20-21; 22-24 and 18-24) occupied in the HORECA in 2017q3. The specification using the HORECA turnover as indicator of the economic activity identifies a stronger negative impact. Although the population under study (i.e. non-student workers aged 18-24) represent less than 15% of the total non-student workforce, the impact is statistically significant at the 5% level of significance.

In the absence of the SOC reform, the employment level of each age-group (but the 18-19 years old) would have been increasing over the observation period (2017q1-2017q3). Yet, the actual values of the employment level of each age-group observed over that same period appear to be roughly constant, if not decreasing since 2017q1. The difference between both values represent the magnitude of the impact of the SOC reform. The results suggest an evidence of a “crowding out effect” of students on the employment level of non-student workers aged 18-24 in the HORECA. Consistent with the results of the two types of analysis carried out for both specifications (i.e. graphical analysis and point estimates), the youngest age group (i.e. 18-19 years old) appears to be, by far, the most seriously impacted by the SOC reform. Following the general specification, in 2017q3, the reform is believed to have reduced by 3.9% (5.64%) the amount of FTE ordinarily held by male (female) non-student workers aged 18-19 in the HORECA. It represents a reduction of 33.44 FTE (34.43 FTE). The measure of the negative impact following from the alternative specification is

even larger: during 2017q3, the reform is believed to have led to a decrease of 8.49% (12.53%) of the employment opportunities (expressed in terms of FTE) normally allocated to male (female) non-student workers aged 18-19 in the HORECA. It represents a reduction of 76.28 FTE (82.5 FTE).

Overall, the reform had an impact as soon as it came into force. The results support the existence of a “crowding out effect” of students on the employment level of young non-student workers occupied in the HORECA: the increase in the occupation of students is made at the expense of the employment of young non-student workers aged 18-24.

Although the research is conclusive, there are two major shortcomings that need to be highlighted and that are left for future research. Firstly, because of statistical limitations, the shock related to the implementation of the Cash Register System has been treated as immediate and lasting only up to one quarter. Nevertheless, it is possible that the implementation of the latter system produced its effects over a longer time period making it difficult to disentangle its effects from the impact of the SOC reform as from 2017q1. Secondly, because of data limitations, the conclusion of the negative impact of the SOC reform has been drawn based on observations from three quarters only. Increasing the sample size for the evaluation period would certainly provide more nuanced results. This is left for future research when the necessary data become available.

7. Bibliography

- * Basten C. and Siegenthaler M. (2013), "Do immigrants take or create residents' jobs? Quasi-experimental evidence from Switzerland", Annual Conference 2013 (Duesseldorf): Competition Policy and Regulation in a Global Economic Order 79780, Verein für Socialpolitik / German Economic Association. Available on <https://ideas.repec.org/p/zbw/vfsc13/79780.html> (Online, accessed on July 21, 2018)
- * Beblavy M. and Fabo B. (July 2015), "Students in Work and their Impact on the labour Market", *CEPS Working Document*, No. 410. Available on <https://www.ceps.eu/publications/students-work-and-their-impact-labour-market> (Online, accessed on April 26, 2018)
- * Bodart V., Ledent P. and Shadman F. (2009), "An employment equation for Belgium", *Discussion Papers* (IRES – Institut de Recherches Economiques et Sociales) 20009016, Université catholique de Louvain, Institut de Recherches Economiques et Sociales (IRES). Available on <https://sites.uclouvain.be/econ/DP/IRES/2009016.pdf> (Online, accessed on April 26, 2018)
- * Bonin H., (2005), "Wage and Employment Effects of Immigration to Germany: Evidence from a Skill Group Approach", *IZA*, Discussion Paper No. 1875, Available on <http://ftp.iza.org/dp1875.pdf> (Online, accessed on July 22, 2018)
- * Crépon B., Duflo E., Gurgand M., Rathelot R. and Zamora P. (2012), "Do Labor Market Policies Have displacement Effects? Evidence from a clustered Randomized Experiment", *The Quarterly Journal of Economics*, Oxford University Press, vol. 128(2), 531-580. Available on <http://www.nber.org/papers/w18597> (Online, accessed on April 26, 2018).
- * Curtis S. and Lucas R. (2001), "A coincidence of needs? Employers and full-time students", *Employee Relations*, Vol. 23. Issue: 1, 38-54. Available on <https://doi.org/10.1108/0142> (Online, accessed on May 13, 2018)
- * Dejemeppe M., Smith C. and Van der Linden B. (2015), "Did the Intergenerational Solidarity Pact increase the employment rate of older workers in Belgium? A macro-econometric evaluation", *IZA Journal of Labor Policy*, 4:17, Available on <https://link.springer.com/article/10.1186%2Fs40173-015-0040-y> (Online, accessed on April 25, 2018)
- * Docquier F., Ozden C. and Peri G. (December 2011), "The Labor Market Effects of Immigration and Emigration in OECD Countries", *IZA*, Discussion Paper No. 6258. Available on <http://ftp.iza.org/dp6258.pdf> (Online, accessed on April 26, 2018)
- * Foged M. and Peri G., (2015), "Immigrants' Effect on Native Workers: New Analysis on Longitudinal Data", *IZA*, Discussion Paper No. 8961, Available on <http://ftp.iza.org/dp8961.pdf> (Online, accessed July 22, 2018)
- * Friedberg R., (2001), "The Impact of Mass Migration on the Israeli Labor Market", *The Quarterly Journal of Economics*, Vol. 116, No. 4, 1373-1408, Available on https://www.jstor.org/stable/2696462?seq=1#page_scan_tab_contents (Online, accessed on July 21, 2018)

- * Hambije C. and Hertveldt B. (February 2011), "Analyse du secteur HORECA en Belgique", *Bureau fédéral du Plan*, Working Paper 1-11, Available on <https://www.plan.be/admin/uploaded/201102161031520.wp201101.pdf> (Online, accessed on May 13th, 2018)
- * Hofman, W.H.A & Steijn, A., (March 2003), "Students or Low-Skilled Workers? 'Displacement' at the Bottom of the Labour Market", *Higher Education*, Vol. 45, No. 2, 127-146, Available on <https://doi.org/10.1023/A:1022406706257> (Online, accessed on March 17, 2018).
- * Jousten, A., Lefèbvre, M., Perelman, S., & Pestieau, P. (2008). "The effects of early retirement on youth unemployment: The case of Belgium. In Social security programs and retirement around the world: The relationship to youth employment", *IMF*, Working Paper, WP/08/30, Available on <https://pdfs.semanticscholar.org/8040/9470b231263031b2901f0263e3f664ca23de.pdf> (Online, accessed on May 8, 2018)
- * Lucas, R. and Ralston L. (December 1997), "Youth, Gender and Part-time employment: A preliminary appraisal of student employment", *Employee Relations*, Vol. 19 Issue: 1, 51-66, Available on <https://doi.org/10.1108/0142> (Online, accessed on May 13, 2018)
- * Mytna Kureková L. (2015), "Low-Skilled Jobs and student Jobs: Employers' preferences in Slovakia and Czech Republic", *IZA Discussion Paper No. 9145*. Available on <https://www.econstor.eu/bitstream/10419/114023/1/dp9145.pdf> (Online, accessed on February 26, 2018)
- * Ortega J. and Verdugo G. (2014), "The impact of immigration on the French labor market: Why so different?", *Labour Economics*, Elsevier, 29, 14-27, Available on <https://pdfs.semanticscholar.org/b3bc/1cefde1dce8c11282afcafa3df1697c69c46.pdf> (Online, accessed on July 22, 2018)
- * Service Public Fédéral Emploi, Travail et Concertation Sociale, (2018), « Contrat d'occupation d'étudiants », Available on <http://www.emploi.belgique.be/defaultTab.aspx?id=41944> (Online, accessed on March 17, 2018)
- * UCM, (2018), "L'occupation des Etudiants".