Does Student Work Really Affect Educational Outcomes? A Review of the Literature

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Forthcoming in the *Journal of Economic Surveys*

Abstract

We review the theories put forward, methodological approaches used, and empirical conclusions found in the multidisciplinary literature on the relationship between student employment and educational outcomes. A systematic comparison of the empirical work yields new insights that go beyond the overall reported negative effect of more intensive working schemes and that are of high academic and policy relevance. One such insight uncovered by our review is that student employment seems to have a more adverse effect on educational decisions (continuing studies and enrolment in tertiary education) than on educational performance (test and exam scores).

Keywords: student employment, education, self-selection, review.

JEL: I21, J22, J24.

Citation: Brecht, N., Omey, E., Verhaest, D., & Baert, S. (2018). Does Student Work Really Affect Educational Outcomes? A Review of the Literature. *Journal of Economic Surveys*, forthcoming.

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1 Introduction

Student employment is the norm for a large number of youth in many OECD countries, both in secondary and tertiary education (Marsh & Kleitman, 2005; Beerkens, Mägi, & Lill, 2011). For instance, for students in tertiary education, the student employment rate is around 49% in the United States (US) and 47% in Europe (Beerkens et al., 2011). One important reason why many students combine study and work is that it provides them with an income, which may help them to satisfy their consumption aspirations (Watts & Pickering, 2000; Baert, Rotsaert, Verhaest, & Omey, 2016). However, research in multiple disciplines has shown that the effect of students' work decisions may go beyond the short term. For example, from the broad field of sociology, several studies show that student employment is correlated with problem behaviour among youth, such as alcohol use, delinquency, and drug use (Steinberg, Fegley, & Dornbusch, 1993; McMorris & Uggen, 2000; Safron, Schulenberg, & Bachman, 2001). In addition, from the field of psychology, Steinberg and Dornbusch (1991) find that combining study and work is associated with psychological and psychosomatic stress. Finally, studies in labour economics and the sociology of work have extensively investigated the impact of student employment on later labour market outcomes, finding mainly non-negative results (Ehrenberg & Sherman, 1987; Carr, Wright, & Brody, 1996; Ruhm, 1997; Hotz, Xu, Tienda, & Ahituv, 2002; Parent, 2006; Baert et al., 2016; Baert, Neyt, Omey, & Verhaest, 2017).

One aspect of student employment has been investigated across various disciplines in the social and behavioural sciences: its impact on educational behaviour and performance (Carr et al., 1996; Warren, LePore, & Mare, 2000; Stinebrickner & Stinebrickner, 2003; Bachman, Staff, O'Malley, Schulenberg, & Freedman-Doan, 2011). The central position of these outcomes in the academic literature on the impact of student labour supply decisions on later outcomes in youth is not surprising. First, it is highly relevant to examine the effect of student employment on educational attainment since the trade-off between starting a student job and using this time for studying is a decision every adolescent has to make (Bozick, 2007; Triventi, 2014). Second, if student employment affects

educational attainment, it indirectly affects all later outcomes in life that are (partly) determined by this attainment (e.g. labour market success, wealth, and happiness; Hartog & Oosterbeek, 1998; Blundell, Dearden, Meghir, & Sianesi, 1999; Chiswick, Lee, & Miller, 2003). For these reasons, the impact of student employment on educational attainment is also highly relevant from a policy point of view. Policymakers should take this potential impact into account when making decisions about whether to encourage (particular forms of) student employment.

This article summarises two decades of literature on the relationship between student employment and educational outcomes. In general, research on this subject has experienced a rapid growth in the past two decades, calling for a structured overview of the main findings of these studies. In particular, since previous studies adopt various approaches to account for the biggest methodological challenge when empirically investigating the relationship between student work and educational outcomes, i.e. the endogeneity problem, it is interesting to compare their results by method used. Nevertheless, to the best of our knowledge, the present study is the first to survey this body of research.

In general, i.e. when equally weighting all studies, we find that the effect of student work on educational outcomes is non-positive. In addition, we find that the consequence of combining study and work is more adverse for students in tertiary education than for students in secondary education. We argue that this is due to the more challenging nature of tertiary education and to the different effect of student work during secondary versus tertiary education with respect to attitudes towards school and intertemporal preferences. Additionally, whereas combining study and work has an especially detrimental effect on students' educational choices (continuing studies and enrolment in tertiary education), the effect of student work on students' educational performance (test and exam scores) is a lot less worrisome. When narrowing the focus of our review to studies that, in our opinion, used the most convincing approaches to control for the endogeneity problem inherent to estimating the effect of student work on educational outcomes, the contrast between the effect of student work on different outcome variables is even stronger.

The remainder of this article is structured as follows. In the next section, we briefly sketch out the main theories, cited in various disciplines, depicting the relationship between student employment and educational attainment. In Section 3, we describe the endogeneity of these outcomes and the different ways in which previous studies have tried to account for this problem. In Section 4, we present an overview of the empirical findings, with a focus on how the results converge and diverge by country and educational level, outcome variable, type of student job, and student characteristics. In this section, we also compare the results yielded by different statistical methods used to control for the endogeneity bias. Section 5 formulates the main takeaway messages from our review for scholars and policymakers.

2 Theoretical Mechanisms

In this section, we briefly introduce the main theories found in multiple disciplines, providing support for a relationship between student employment and later educational outcomes. These theories help explain the empirical findings in the literature, which we discuss extensively in Section 4. Studies that examine this relationship are primarily interested in whether working while studying is a complement to or a substitute for education, i.e. whether it improves or worsens educational attainment, respectively. In the following paragraphs, we consecutively present the leading theories that advocate both of these views.

On the one hand, according to Human Capital Theory (Becker, 1964), student employment can be a complement to education due to the additional skills and knowledge obtained while working. There are several reasons why student work may lead to such an increase in human capital. First, student employment enables the acquisition of new general and transferable skills such as work values, communication skills, and a sense of time management (Rothstein, 2007; Staff & Mortimer, 2007; Buscha, Maurel, Page, & Speckesser, 2012). As these non-academic

skills and achievements are increasingly important in college admissions and employers' hiring decisions (Bruggink & Gambhir, 1996; Rosenbaum, 2002; Ashworth, Hotz, Maurel, & Ransom, 2017; Baert & Vujić, 2017), combining study and work may substantially contribute to the accumulation of human capital necessary for post-secondary education success.[1] Second, combining study and work may offer students the opportunity to apply in practice what they have learned in school (Hotz et al., 2002; Geel & Backes-Gellner, 2012). Third, student employment may change students' intertemporal preferences and increase their future-orientedness, thereby motivating them to work harder in school in order to achieve a certain career goal (Oettinger, 1999; Rothstein, 2007).

On the other hand, building on the Theory of the Allocation of Time (Becker, 1965), Zero-Sum Theory suggests that student employment and education are substitutes. More formally, this theory states that students have fixed time resources and that student employment strongly constrains students' use of these resources. As a consequence, time resources used to work cannot be used for activities that enhance academic performance (e.g. studying, doing homework, and attending classes; Bozick, 2007; Kalenkoski & Pabilonia, 2009; 2012; Darolia, 2014). As the reduced time spent on these activities subsequently worsens academic performance (Stinebrickner & Stinebrickner, 2004; 2008; Arulampalam, Naylor, & Smith, 2012), student employment may have a detrimental effect on educational outcomes.

However, there are several reasons why student work may not substantially crowd out time spent on activities that enhance academic performance, and why this (potential) crowding out may not be as detrimental to academic achievement as Zero-Sum Theory suggests. First, previous time use studies show that spending one more hour on student work does not necessarily translate into spending one hour less on study activities (Triventi, 2014). In other words, student workers may cut back on leisure time without reducing the time they dedicate to school-related activities

[1] Therefore not surprisingly, schools are increasingly occupied with teaching students these competences by focussing on active learning (e.g. through group assignments, class discussions, and gamification; OECD, 2018).

(much). Indeed, Schoenhals, Tienda, and Schneider (1998), Warren (2002), and Kalenkoski and Pabilonia (2009; 2012), find that time spent working does not reduce the time spent on school-related activities in a one-to-one relationship. Working students also scale down the time spent on non-school-related activities (e.g. time spent with family or friends and time spent watching television or in front of a computer). Second, Babcock and Marks (2011) show that time allocated to attending classes and studying has decreased substantially over the past decades for students in US tertiary education. Consequently, time spent working may rather crowd out the increasing time spent outside (formal) education instead of the decreasing time spent inside (formal) education. Third, there may exist an interaction between Human Capital Theory and Zero-Sum Theory. That is, applying the law of diminishing returns to both learning by studying and learning by doing (Sen, 1966), the marginal benefits (marginal costs) of student work with respect to gaining human capital are the highest (lowest) for the first hours of employment. Indeed, on the one hand, these first hours may be the most essential ones with respect to gaining human capital through a student job. On the other hand, the first hours of student work may crowd out the least important hours with respect to gaining human capital through studying. This last point also exemplifies why there may be a nonlinear effect of student work on educational achievement, i.e. the effect may be positive up to a threshold of hours worked and turn negative when that threshold is exceeded.[2]

Another theory that supports a negative association between student work and educational success is Primary Orientation Theory (Warren, 2002; Bozick, 2007; Baert, Marx, Neyt, Van Belle, & Van Casteren, 2017), often cited in the field of sociology. This theory suggests that the worse academic performance of working students compared to non-working students is related to their primary orientation being toward work rather than toward school. In other words, it reflects a disengagement from school that existed before the decision to work was made,

[2] The three reasons mentioned here for why Zero-Sum Theory may be less valid in practice may differ in significance by type of student. For example, student work may not substantially crowd out time spent on study-related activities for part-time students (in tertiary education), as they have greater flexibility in their schedules (Darolia, 2014).

rather than a negative effect due to student employment itself. Therefore, instead of providing an explanation for a causal, negative effect of student work, this theory reveals a potential selection problem that one wants to control for in empirical analyses.[3] Indeed, Bozick (2007), Staff and Mortimer (2007), and Triventi (2014) hypothesise that when pre-existing differences between working and non-working students, such as their primary orientation, are properly controlled for, the difference in academic performance between these two groups disappears. We elaborate more generally on this selection problem in the next section.

In Section 4, where we discuss the empirical findings in the literature, we distinguish between studies focussing on the effect of student work during secondary education and those focussing on the effect of student work during tertiary education. Based on the aforementioned theories, there are several reasons why student employment is expected to be less of a substitute for education for students in tertiary education. First, as noted earlier, over the last decades students in (US) tertiary education have spent less and less time on study-related activities, potentially invalidating the application of Zero-Sum Theory here. However, this evolution was not found for students in secondary education (Zick, 2010). Therefore, the assumption that working crowds out time spent on activities that foster academic performance may be less valid for students in tertiary education. Additionally, as students in tertiary education have more flexibility in their schedules, the main assumption of Zero-Sum Theory may again be violated for them. Indeed, their classes are usually not compulsory, they often have flexibility in planning their academic workload by choosing between different courses (Triventi, 2014), and they can decide to spread their studies over more years than the default number in order to lighten the workload per year (Darolia, 2014). Second, a selection effect with respect to students' primary orientation may be less of an issue for students in tertiary education, since only more school-oriented students will choose to commence this form of non-compulsory education. More work-oriented students will not enter this type of education, but rather pursue labour market opportunities

[3] As mentioned above, student work may also cause a change in intertemporal preferences and future-orientedness. As a consequence, an indirect causal effect via primary orientation is also possible.

(Bozick, 2007). Third, most students in tertiary education have already combined study and work in secondary education, so they should be more adept at mixing these two activities (Bozick, 2007; Staff & Mortimer, 2007).

3 The Endogeneity of Student Work and Educational Outcomes

In this section, we discuss the substantial problem all researchers face when empirically investigating the impact of student employment on educational outcomes: the endogeneity of both variables. The importance of this problem originates from the fact that results can only be given a causal interpretation if endogeneity has been adequately controlled for (Stinebrickner & Stinebrickner, 2003; Marsh & Kleitman, 2005; Baert et al., 2016). We describe the cause of the endogeneity of student work and later educational outcomes in Subsection 3.1. Then, in Subsection 3.2, we present various methods that are employed to tackle the endogeneity problem.

3.1 Description of the Problem

Students who decide to combine study and work differ from those that do not combine these two activities in more than just their work status (Warren & Lee, 2003; Singh, Chang, & Dika, 2007). These pre-existing differences between working and non-working students may also affect educational outcomes (Rothstein, 2007). For the impact of student employment on educational outcomes to be given a causal interpretation, one should control for these common determinants. If not, variation in educational outcomes that should be attributed to the pre-existing differences between working and non-working students will mistakenly be attributed to the difference in work status (Stinebrickner & Stinebrickner, 2003; Baert et al., 2017).

The pre-existing differences between working and non-working students can

be both observable (e.g. gender, ethnicity, and parental education level) and unobservable (e.g. motivation and ability) to the researcher. Whereas it is fairly easy to account for the former category of pre-existing differences by including these factors as control variables in the estimation process, it is much harder to account for the latter category of pre-existing differences. However, not accounting for these factors biases coefficient estimates.

When estimating the effect of student employment on academic achievement, factors like motivation, ability, and students' financial constraints are cited as the most important factors that are usually not observed by researchers (Sabia, 2009; Bachmann et al., 2011; Scott-Clayton, 2012). Remarkably, for the first two of these, i.e. motivation and ability, different authors argue for opposing selection effects induced by these factors. On the one hand, several authors argue that highly motivated and able students are more frequently involved in student work (Stinebrickner & Stinebrickner, 2003; Tyler, 2003; Beffy, Fougère, & Maurel, 2010). Following this reasoning, student workers are a positive selection of the overall population. On the other hand, other authors argue for a negative selection, reasoning that students with lower motivation and lower ability are more likely to combine study and work (Rothstein, 2007; Bachmann et al., 2011; Buscha et al., 2012). With regard to financial constraints, Kalenkoski and Pabilonia (2010) and Behr and Theune (2016) have shown that the financial wealth of a family is negatively associated with the number of hours students work. As Sirin (2005) showed in his review of 58 studies that socioeconomic status (which is closely linked to financial wealth of the family) is positively related to academic achievement, one should also control for students' financial constraints to control for a (potentially) negative selection effect.

Consistent with Zero-Sum Theory (*supra*, Section 2), there may also be an issue of reverse causality. Indeed, academic achievement might influence students' time use, and therefore both whether and how much students work (or are allowed to work by their parents) (Sabia, 2009). Here too this endogeneity issue could lead to both positively and negatively biased estimates. On the one hand, students with higher marks may decide that they are capable of combining their studies with

student employment, resulting in a positive selection (Sabia, 2009). On the other hand, there may be a negative selection bias if students who perform badly in school become discouraged in seeking academic success and turn to student work as a more fruitful allocation of their time (Warren and Lee, 2003; Bozick, 2007).

In previous research, several methods have been developed to account for these sources of endogeneity. We discuss these methods in the next subsection. Additionally, in Subsection 4.2, we report empirical evidence on the direction of the endogeneity bias.

3.2 Methodological Approaches to Tackling the Problem

In this subsection, we sum up five categories of methods that are used to control for the endogeneity problem described in the previous subsection. Column (5) in Table 1 summarises the main methodological approaches of each of the articles included in the present review study—we return to the selection of these articles in Section 4.

As reviewed by Ruhm (1997), a first generation of studies treated student employment as (nearly) exogenous. They examined descriptive statistics and conducted simple regressions (controlling for a small set of observable factors besides student work). The contributions listed in Table 1 using ordinary least squares (OLS), linear probability models (LPM), and logit regression models are, from a methodological point of view, close to these first-generation studies as their primary strategy is to absorb as much observable heterogeneity influencing both student work decisions and later educational outcomes as possible (Baert et al., 2016). However, some pre-existing differences between working and non-working students are unobservable in survey and administrative data and, as a consequence, cannot be controlled for in these regressions. As mentioned in the previous subsection, this may lead to biased empirical evidence.

A second, more advanced way of controlling for observables is through matching. The studies included in this review that apply this method all use

propensity score matching (PSM). The objective of PSM is to compare each working student with a similar non-working student. This is achieved through a three-step procedure (Buscha et al., 2012; Behr & Theune, 2016; Scott-Clayton & Minaya, 2016). In the first step, for each individual in the sample the probability of working as a student is predicted based on various covariates, i.e. the propensity score. Frequently used covariates in this respect are gender, ethnicity, parental education level, socio-economic background, and previous academic performance. Next, working and non-working students are matched based on their propensity score, i.e. students with similar propensity scores are linked. In the final step, the educational outcomes of these linked students are compared to each other. The matching method assumes that selection of students into student work is random conditional on the covariates used to calculate the propensity score ("Conditional Independence Assumption"). However, similarly to what was argued in the previous paragraph, this assumption may not be satisfied in practice, due to unobservable differences between working and non-working students that cannot be used to calculate the propensity scores.

In a third approach, longitudinal data are exploited to also control for differences between student workers and non-workers that cannot be observed in the analysed data. Most studies in this category—especially those published in the field of economics—control for individual fixed effects (Sabia, 2009; Wenz & Yu, 2010; Darolia, 2014). By adding fixed effects (FE) to a regression model, time-invariant unobserved heterogeneity between working and non-working students can be controlled for. However, various authors state that it is doubtful that unobserved heterogeneity between working and non-working students is constant over time (Oettinger, 1999; Stinebrickner & Stinebrickner, 2003). For example, Oettinger (1999) argues that the timing of college admission decisions gives students in secondary education an incentive to increase their academic effort before these decisions are made and reduce it afterwards. This time-varying academic effort is a potential determinant of both student work and educational attainment for which FE models cannot control. In addition, in these models, the parameters of interest are identified only through the within-student dimension of the data, i.e. based on

students with variation in their work activities during the period of observation. A close alternative is the estimation of a random effects model, as in Staff, Schulenberg, and Bachman (2010). In this model, individuals' unobservables are integrated out as random draws from a restricted distribution instead of being conditioned upon as FE. Other methods exploiting longitudinal data to control for unobserved heterogeneity are event studies estimating Cox proportional hazard models (Moulin, Doray, Laplante, & Street, 2013; Theune, 2015) and difference-in-differences (DiD) estimations—Buscha et al. (2012) combine the latter method with matching. However, just as FE models, all these methods make assumptions about the time evolution of the unobserved differences between workers and non-workers.

A fourth approach to control for the endogeneity of student work and later educational outcomes is jointly modelling these outcomes and using exogenous variation in predictors of student work decisions to identify their causal effect on educational outcomes. A popular method in this respect—frequently used in the contributions of economists—is instrumental variable (IV) estimation. For this method, a two-stage least squares (2SLS) regression is estimated. In the first stage, student employment is predicted by regressing it on an IV (and other control variables). In the second stage, this prediction is used as the independent variable explaining the educational outcome of interest. An adequate instrumental variable for student employment is a variable that satisfies two conditions: (i) it is highly correlated with student employment and (ii) it does not directly correlate with educational outcomes. Frequently used instrumental variables when estimating the impact of student employment on educational attainment are local labour market conditions (Parent, 2006; Dustmann & van Soest, 2007; Rothstein, 2007; Beffy et al. 2010; Lee & Orazem, 2010) and interstate variation in prevailing labour laws (Tyler, 2003; Rothstein, 2007; Apel, Bushway, Paternoster, Brame, & Sweeten, 2008; Lee & Orazem, 2010). Condition (ii), in particular, cannot be easily guaranteed with respect to these instruments (Oettinger, 1999; Stinebrickner & Stinebrickner, 2003; Buscha et al., 2012). For instance, as discussed in Baert et al. (2016), local labour market conditions during secondary or tertiary education may affect students' decision on

whether or not to drop out. Moreover, IV estimates only isolate a local average treatment effect (LATE), i.e. they only capture the effect of student work for individuals who are affected by the chosen instrument (Angrist, Graddy, & Imbens, 2000). Another method in this fourth category that is widely used—across fields—is simultaneous equation modelling (SEM). In this method, student employment, educational outcomes, and other (potentially) related outcomes are modelled as a system of regression equations (Quirk, Keith, & Quirk, 2001; Kalenkoski & Pabilonia, 2009; 2010; 2012). Again, identification of causal relationships between these outcomes requires that variables can be found that only predict particular outcomes while being left out of the equations for other outcomes ("exclusion restrictions"). Again, local labour market conditions are often used as exclusive predictors of student work outcomes. Two final tools within this fourth category, both of which are closely related to SEM, are the bivariate probit model used by McVicar and McKee (2002) and the treatment model proposed by Triventi (2014), to which we return below.

A fifth and final approach is the dynamic discrete choice modelling outlined in Eckstein and Wolpin (1999), Montmarquette, Viennot-Briot, and Dagenais (2007), and Baert et al. (2017). Similarly to the fourth approach, within dynamic discrete choice models, all relevant school and work outcomes and decisions are jointly modelled (as discrete choices). However, the modelled outcomes are explicitly allowed to differ for a finite number of unobserved heterogeneity types in the data. Just as in random effects models, the distribution of these types is identified by the multiple outcomes observed for each individual. A crucial assumption in these models is the orthogonality of the unobserved and observed—and, therefore, included—determinants of the first modelled outcome. This is also a strong assumption.

Below, we discuss the effect of student work on educational outcomes as identified by clusters of studies with the same methodological approach.

4 Convergences and Divergences in the Empirical Findings

In this section, we summarise the findings of studies that were published, as a journal article or a discussion paper, between 1997 and 2017 and that empirically investigate the relationship between student employment and later educational outcomes. This review is the fruit of a systematic search. In a first step, the abstracts of all articles, indexed in Web of Science or Google Scholar, including the word groups "student work", "student job", or "student employment", were screened regarding their relevance. This provided us with an initial list of studies for our review. In a second step, we explored (i) the articles included in the references of these studies and (ii) the articles citing these studies in Web of Science or Google Scholar. This second step was re-iterated whenever an additional relevant article was found.

<Table 1 about here>

A schematic overview of these studies can be found in Table 1. In Subsection 4.1, we briefly discuss the overall non-positive impact of student work on educational behaviour and educational performance. Then, in Subsection 4.2, we elaborate on the extent to which different methods used within and between studies yield diverging results. This also gives an indication of the direction of the endogeneity bias discussed in Section 3. Additionally, we indicate which studies, in our opinion, are the most convincing in terms of identifying a causal effect and we discuss their results with extra attention. Finally, in Subsection 4.3, we discuss moderators—in a broad sense—of the effect of student work on educational outcomes. Therefore, in this subsection, we first discuss convergences within clusters of studies, as grouped by (i) the country where their data were gathered and by (ii) whether they focus on student work during secondary or during tertiary education. Then, we discuss heterogeneous effects of student employment on educational outcomes by (iii) (educational) outcome variable, (iv) type of student job, and (v) student characteristics. Here too we zoom in on the studies that applied

the most ambitious approaches to estimate causal effects.

4.1 Overview of the Main Findings

A first look at Table 1 reveals that mainly a non-positive relationship between student employment and academic outcomes is found in previous research. More specifically, 31 of the 50 studies (i.e. 62.00%) included in our review report a negative effect of student employment on educational outcomes. Five of them explicitly highlight, however, that this effect is rather small. In addition, 12 studies (i.e. 24.00%) report both negative and neutral effects, depending on the type of educational outcome (*infra*, Subsection 4.3.3), type of student job (*infra*, Subsection 4.3.4), or type of student (*infra*, Subsection 4.3.5) considered. So, in total, 43 studies (i.e. 86.00%) provide evidence of at least some negative association. Of the remaining seven studies, four find no significant effect and three report both negative and positive associations.

From this first look at the literature, it appears that student employment and education are substitutes rather than complements. However, this general picture may reflect effects driven by an endogeneity bias and it may conceal interesting convergences and divergences that can be observed when investigating the literature more carefully. Both of these concerns are addressed in the next two subsections.

4.2 Direction of the Endogeneity Bias

In this subsection, we explore the direction—and to some extent also the size—of the endogeneity bias by comparing results that are obtained by using different methods. In Subsection 4.2.1, we summarise relevant information in this respect from studies that present both elementary estimated results and results obtained using more sophisticated methods. Then, in Subsection 4.2.2, we compare the empirical findings for clusters of studies based on the (main) method they use—in this subsection, we follow the same structure as in Subsection 3.2.

4.2.1 Comparing Methods Within Studies

When examining studies that apply multiple methods (i.e. different methods are used to analyse the same data), the results of these different methods vary substantially. However, these studies provide no unambiguous conclusion on whether and to what extent more elementary models yield negatively or positively biased effects of student employment on educational attainment. In other words, based on this within-study evidence, it remains inconclusive whether student workers are a positively or negatively selected subpopulation of the population of students, respectively (*supra*, Subsection 3.1).

More specifically, on the one hand, some studies provide evidence of a positive selection effect, i.e. their results based on elementary approaches are less negative than those based on approaches controlling for unobserved heterogeneity (Triventi, 2014). For example, Stinebrickner and Stinebrickner (2003) report both positive and neutral effects of student work on educational attainment based on OLS models and a robustly negative effect when using an IV approach. Similarly, the OLS estimates of Tyler (2003) indicate that student work only slightly decreases students' math and reading scores, whereas estimates using an IV approach provide evidence of a substantial decrease in these outcomes. Finally, Sabia (2009) finds a positive relationship between student work and grade point average (GPA) based on OLS estimates, but does not find a significant relationship when estimating an FE regression model.

On the other hand, Rothstein (2007) and Buscha et al. (2012) report evidence of a negative selection into student work. In the former study, a negative impact found based on OLS regressions becomes negligible when estimating an FE regression model and even turns completely insignificant once an IV approach is used. The latter study reports a negative effect of part-time work on math scores when applying a matching strategy. However, when combining this approach with a difference-in-differences strategy, taking into account unobservable heterogeneity between working and non-working students, this negative effect disappears.

Throughout the other (sub)sections of this review (and in Table 1), for studies

that applied multiple methods, the outcome yielded by the most ambitious method with respect to controlling for the endogeneity problem is the one we take into account.

4.2.2 Comparing Methods Between Studies

Fifteen studies included in our review estimate elementary models (cross tabulations, variance analysis, OLS, LPM, and logit regressions) to analyse the impact of student employment on educational outcomes. All of them report non-positive effects. More specifically, nine studies report a consistently negative effect (Warren, 2002; Payne, 2003; Warren & Lee, 2003; Weller, Cooper, Basen-Engquist, Kelder, & Tortolero, 2003; Marsh & Kleitman, 2005; Bozick, 2007; Singh et al., 2007; Rochford, Connolly, & Drennan, 2009; Beerkens et al., 2011), while six studies report both negative and neutral effects (McNeal, 1997; Schoenhals et al., 1998; Staff & Mortimer, 2007; Derous & Ryan, 2008; Baum & Ruhm, 2016; Baert et al., 2017).

Next, five studies rely solely on a matching approach to control for the endogeneity of student work and educational outcomes. Four of them report a negative relationship between these variables (Lee & Staff, 2007; McCoy & Smyth, 2007; Bachman et al., 2011; Behr & Theune, 2016), while one study finds both negative and neutral effects depending on the outcome variable used (Scott-Clayton & Minaya, 2016).

Overall, these two approaches, which only control for differences between student workers and non-workers that are observable in their data (*supra*, Subsection 3.2), yield non-positive results. Thirteen of them report a consistently negative impact. This proportion does not substantially diverge from what was found for the total set of studies, as discussed in Subsection 4.1. So again, this exercise does not allow a firm conclusion to be drawn with respect to the direction of the selection effect in this context.

Further, ten studies exploit the longitudinal nature of their data to control for individual unobserved heterogeneity. Four of them rely on a purely FE approach. Among them, Oettinger (1999) and Wenz and Yu (2010) find a negative impact, while

Rothstein (2007) and Sabia (2009) find no significant impact. Two additional studies, Apel et al. (2008) and Darolia (2014), combine a FE approach with an IV approach and both find mixed effects, i.e. negative and neutral effects, depending on the outcome variable considered.[4] Staff et al. (2010) are the only authors who rely on a RE model and find a negative impact of hours worked per week as a student on GPA and study engagement. The two studies estimating Cox proportional hazards models report a negative effect (Moulin et al., 2013; Theune, 2015). As mentioned earlier, Buscha et al. (2012) combine PSM with DiD. Using this approach, no significant impact of student employment on educational attainment is found.

Fourth, 19 of the 50 studies in our review jointly model student work and later educational outcomes, thereby exploiting the adoption of exogenous predictors of the former outcome. Twelve of them rely for their estimation of the causal effect of student work on educational outcomes on an IV approach. Of the 10 studies not combining this approach with a control for FE, six report a negative effect (Stinebrickner & Stinebrickner, 2003; Tyler, 2003; Parent, 2006; DeSimone, 2008; Beffy et al., 2010; Body, Bonnal, & Giret, 2014), three report effects with diverging signs and significance (Dustmann & van Soest, 2007; Arano & Parker, 2008; Lee & Orazem, 2010), depending on the outcome variables under investigation and type of student work, and one reports no significant effect (Rothstein, 2007). Further, of the six studies relying on a SEM approach, two report a substantial negative effect (Kalenkoski & Pabilonia, 2009; 2012), two a small negative effect (Singh, 1998; Kalenkoski & Pabilonia, 2010), one negative and positive effects depending on the number of hours worked (Quirk et al., 2001), and one a neutral effect (Warren et al., 2000). Finally, McVicar and McKee (2002) estimate a bivariate probit model and Triventi (2014) estimates a treatment model in which the student work decision and later number of credits acquired are jointly explained, with the unemployment rate and age only determining the first variable and a latent factor determining both of them. They find a negative relationship between student employment and credits or qualifications achieved, respectively.

[4] Although Rothstein (2007) uses both a FE approach and an IV approach in her study, she does not *combine* these two approaches in a single econometric model.

Finally, three studies employ dynamic discrete choice modelling. Of these studies, only Eckstein and Wolpin (1999) find homogeneously adverse educational outcomes for students with more intensive working schemes, although they report the effect is rather small. In contrast, Baert et al. (2017) report a negative effect of student work during secondary education only in a very specific case, i.e. with respect to tertiary education enrolment for pupils who work both during the summer and the academic year. In addition, Montmarquette et al. (2007) report a negative effect with respect to continuing studies during secondary education for males only.

Nine studies used data and methodological approaches that convinced us of their ability to identify causal effects.[5] First, the two studies combining a FE approach with an IV approach, i.e. Apel et al. (2008) and Darolia (2014) are particularly convincing, as they do not only control for time-invariant unobserved heterogeneity between working and non-working students by using a FE approach, but also account for the potentially time-varying endogenous relationship between student work and educational outcomes by using instrumental variables.[6] In addition, as these authors provide formal statistics to support the predictive power of their instruments and as we are persuaded by their argumentation of why these instruments do not impact academic success, we regard their instrumental variable approach as convincing. Second, Buscha et al. (2012) combined PSM with a DiD approach, and were thus able to control in a flexible way for both observable (through a flexible PSM approach) and unobservable (through a persuasive DiD approach) heterogeneity between working and non-working students, allowing them to estimate causal effects. Third, among the studies that relied on instrumental variables (or exclusions restrictions) only to identify causal effects, Tyler (2003), Rothstein (2007), and Triventi (2014) are particularly convincing in our opinion,

[5] Stinebrickner and Stinebrickner (2003) applied a convincing IV approach in which they exploit quasi-experimental variation in hours worked by US students in a single college. However, we do not consider this study as persuasive because of the limited generalisability of its findings, which the authors themselves acknowledge. This is due to the very unique nature of the student work program they examined, in which students are obliged to work for at least 10 hours per week in exchange for full-tuition subsidies.

[6] Apel et al. (2008) use state child labour laws as an instrument. Darolia (2014) uses lagged outcome and student work variables, house prices, and credit scores as instruments.

because they too provide a thorough (and convincing) discussion concerning the strength and exogeneity of their instruments.[7] The other studies that relied on an instrumental variable approach only were less convincing in this respect.[8] Finally, we classify the three studies using dynamic discrete choice models, i.e. Eckstein and Wolpin (1999), Montmarquette et al. (2007), and Baert et al. (2017), as convincing because we believe these models' assumption that observable and unobservable determinants of academic success are uncorrelated at the moment of the first modelled outcome is reasonable.

Of these nine studies we perceive as most convincing, three (i.e. 33.33%) find evidence of a negative effect of student employment on educational outcomes, although one study reports the effect is rather small. Additionally, four (i.e. 44.44%) report both negative and neutral effects, depending on the type of educational outcome (*infra*, Subsection 4.3.3), type of student job (*infra*, Subsection 4.3.4), or type of student (*infra*, Subsection 4.3.5) considered. Finally, two studies report neutral effects. So, the findings of these studies are somewhat less negative than the overall findings in Subsection 4.1, providing evidence for a negative selection effect.[9] This contrasts with the results of the within-study evidence in Subsection 4.2.1, where the direction of the endogeneity bias was unclear.

[7] Tyler (2003) uses child labour laws as an instrument. Rothstein (2007) uses the county-level unemployment rate, the average wage rate for teens, and state laws regarding teen employment as instruments. Triventi (2014) uses local youth unemployment rate and age as instruments.

[8] Among them, Parent (2006), Dustmann and van Soest (2007), Beffy et al. (2010), and Lee and Orazem (2010) rely on first-generation instrumental variables related to regional labour market conditions (see Subsection 3.2), without integrating this approach into a broader, state-of-the art strategy, such as the one used by Triventi (2014). The other studies rely on state truancy laws, parental (financial) status, Jewish upbringing, and student financial status, date of birth, lifestyle, and/or nationality as instrumental variables, without a convincing discussion to support these instruments' adequacy (Dustmann & van Soest, 2007; Arano & Parker, 2008; DeSimone, 2008; Beffy et al., 2010; Lee & Orazem, 2010; Body et al., 2014).

[9] On the other hand, one could argue that this finding is not surprising given that studies with FE and IV approaches are overrepresented among these nine studies and that such approaches are less efficient in terms of standard errors than simpler approaches. However, also compared to the other studies relying on FE and IV approaches, the nine most convincing studies provide less negative evidence.

4.3 Heterogeneous Effects

In this section, we report on various dimensions of heterogeneity in the empirical evidence. First, we focus on dimensions that are fixed at the study level, i.e. country and education level of analysis. So, when breaking the results down by these factors, we focus on between-study differences. Next, we explore dimensions of heterogeneity in the relationship between student work and educational outcomes that vary both between and within studies: type of educational outcome, type of student work, and type of student (worker).

4.3.1 By Country of Analysis

About three-quarters of the studies included in this review are conducted in North America (37 studies), of which three are in Canada and the rest in the US. The 13 remaining studies are carried out in Europe: three in the United Kingdom (UK), two in Belgium, two in France, two in Germany, two in Ireland, one in Estonia, and one in Italy. The results are substantially more negative for studies based on European data than for studies based on North American data. All seven studies finding either no significant effect or both negative and positive associations are based on data for North America. In total, 21 of the 37 North American studies versus 10 of the 13 of the European studies report an overall negative effect. However, the differences in the results for these two regions of analysis are related to the findings in the next subsections, as studies conducted in North America examine more often the effect of student work during secondary education on students' test and exam scores (where results are less negative; *infra* Subsection 4.3.2 and Subsection 4.3.3), whereas European studies focus more on the effect of student work during tertiary education on outcomes such as graduating (where results are more negative; *infra* Subsection 4.3.2 and Subsection 4.3.3).

The number of more convincing studies (*supra*, Subsection 4.2.2) in North America and Europe is in line with the total number of studies in these regions. Indeed, seven of the nine most convincing studies in terms of estimating a causal effect—again, a clear majority–are studies based on North American data. When focussing solely on these nine studies, the finding that results are more negative for

studies based on European data is confirmed.

4.3.2 By Educational Level

A next comparison we make is between studies that examine students in secondary education (30 studies) and those that examine students in tertiary education (20 studies). Clearly, the evidence of a negative relationship between student work and later educational outcomes is more pronounced in the latter studies. For the studies on student work during secondary education, 16 report a negative effect. Further, five studies do not find a significant relationship between student employment and educational outcomes. Additionally, nine studies find mixed effects (including two reporting negative and positive results), depending on the educational outcome, particular student work engagement, or subset of students considered. For the studies conducted in tertiary education, 15 find a negative effect, while only four studies report both negative and zero effects, and only one both positive and negative effects.

This pattern of a more negative effect for students in tertiary education is also found when only considering the most convincing studies discussed in Subsection 4.2.2. Indeed, the two more ambitious studies that find neutral effects of student work examined student work in secondary education. In contrast, the convincing studies in tertiary education always find at least some negative relationship.

The finding that results are more adverse for students in tertiary education contrasts with our theoretical expectations discussed in Section 2. Moreover, we are not aware of any explanation for this pattern put forward in the literature. We believe, however, that this finding is sensible for two reasons. First, due to the more challenging nature of studies at college or university (compared to those in secondary school), combining study and work during tertiary education may be less feasible. Second, combining study and work in tertiary education may change students' attitudes toward school and intertemporal preferences. This may cause their present discounted value of continuing school to decrease and, as a consequence, the probability to quit tertiary education earlier than they anticipated before experiencing the student work to increase (*supra* footnote 3). This reasoning

is less valid for students in secondary education, as they are to a lesser extent confronted with choosing between continuing school and joining the labour market.

4.3.3 By Educational Outcome

In this subsection, we distinguish between four categories of outcome variables used as dependent variable in the studies included in Table 1: educational engagement, educational choices, test and exam scores, and educational attainment. While the first two categories measure students' behaviour, the last two categories measure students' performance. Both are interrelated: behaviour affects performance (Lillydahl, 1990) and *vice versa* (Triventi, 2014). Many studies combine outcomes from different categories so that summing the number of studies per category mentioned below yields a number higher than 50.

First, nine studies consider the impact of student employment on educational engagement.[10] Apart from one study finding a neutral effect, all these studies report a negative relationship between student work and study engagement. This is remarkable, as the effect of student employment on educational engagement is mostly examined for students in secondary education (where the effect is, in general, less adverse than in tertiary education, as mentioned in Subsection 4.3.2). This finding could be interpreted as evidence of the key idea behind Zero-Sum Theory, i.e. that time spent working crowds out time spent on activities that enhance academic performance. However, none of the nine studies we considered as the most convincing to estimate a causal relationship (in Subsection 4.2.2), examined the impact of student work on educational engagement. Therefore, the almost unambiguous negative effect found on study engagement could be due to these studies not properly controlling for (among other unobservables) students' primary orientation (*supra*, Section 2).

Second, 12 studies look at the effect of student work on educational decisions:

[10] This category consists of measures of students' time spent on homework, class attendance, class preparation, conduct at school, and tertiary education aspirations (see footnotes of Table 1 for more details).

nine focus on (not) dropping out of school[11]—in Table 1 consistently referred to as the "positive" continuing studies—and three on tertiary education enrolment. Eight of them report homogeneously negative findings for this outcome. Three other studies also find a negative relationship, but for males or particular student jobs only. One study reports a neutral effect. Four of the nine studies we perceive to use the most ambitious approach to estimate a causal relationship examine the effect of student work on educational choices. Consistent with the general picture, they all report a negative effect of student employment on this outcome, although one study finds this result only when students work both during the academic year and during the summer, and one reports this effect only for males who work more than 15 hours per week.

The third—and most popular—category of outcome variables used is the scores that students obtain for standardised tests or exams. Indeed, this kind of variable is used in 27 of the 50 studies in our review. In particular, GPA is used in 24 of the studies.[12] Only in 15 of the 27 studies within this category a homogeneously negative impact is found. Additionally, 10 studies find no significant effect of student work on test and exam scores. Two studies, Quirk et al. (2001) and Arano and Parker (2008), report both negative and positive effects, depending on the number of hours worked. When we focus on the studies that we labelled as most convincing, seven investigate the effect of student employment on students' scores. Only two of these seven studies report a negative effect (Eckstein & Wolpin, 1999; Tyler, 2003), of which one study qualifies this effect to be small in magnitude (Eckstein & Wolpin, 1999). This provides even stronger evidence for the finding that the negative effect of student work on test and exam scores is less pronounced than when looking at the general picture in Subsection 4.1. Weller et al. (2003) and Rothstein (2007) hypothesise that these less adverse outcomes with respect to test and exam scores

[11] For the eight studies in secondary education, this was measured by whether or not students chose to drop out of school at a certain age, varying between age 15 and age 18. For the one study in tertiary education, this was measured by whether students chose to drop out after the first year. Although this variable is closely related to graduating (as never dropping out of school leads to graduation), these two variables are not identical, as students may choose to drop out of school at a later age than examined by these studies.

[12] The three remaining studies use as their outcome variables math and reading scores (twice) and validated scales on course performance and grades achieved.

could be due to working students choosing less demanding courses or academic tracks. Likewise, Bachman et al. (2011) suggest that working intensively during high school may negatively affect the quality of post-secondary institutions attended. These adverse effects would not be reflected in the scores that students obtain.

Finally, 20 studies include outcome variables capturing educational attainment.[13] Fourteen of them report a robustly negative impact of student work on these variables, while three report a negative impact only for particular subsets of students, two report zero effects, and one reports a positive impact. This distribution does not deviate substantially from the overall pattern discussed in Subsection 4.1. However, when focussing on the eight studies that focus on secondary or tertiary education graduation without taking into account the delay in realising this outcome, only half of them report a robustly negative impact. The less adverse effects found on the probability of graduating unconditionally may again be due to students choosing less demanding courses or academic tracks (Weller et al., 2003; Rothstein, 2007; Bachman et al., 2011), which makes graduating easier and therefore more probable. Moreover, looking at the probability of graduating may conceal an additional detrimental effect of student work, namely that working students may take more years to graduate. That is why three studies consider the probability of graduating without schooling delay as an outcome. These studies unanimously find a negative impact of student work on this variable (Beerkens et al., 2011; Theune, 2015; Behr & Theune, 2016). Three of the nine studies we perceived to be the most convincing examine the effect of student work on educational attainment. One reports a neutral effect on graduating in secondary education (Baert et al., 2017), while two report a negative effect on credits achieved in tertiary education (Darolia, 2014; Triventi, 2014), of which one only for full-time students (Darolia, 2014). Although no convincing study directly examines whether student work leads to study delay, the lower number of credits obtained when combining study and work indicates that student workers may indeed prolong their time to

[13] Three (nine) studies look at the probability of graduating from secondary (tertiary) education. One (three) study (studies) investigate(s) the credits achieved in secondary (tertiary) education. Two (one) studies (study) look(s) (among other outcomes) at the qualifications obtained in secondary (tertiary) education. Two studies look at the time in college.

degree completion.

From the findings in this subsection, we conclude that the apparent highly heterogeneous effect of student work in Section 4.1 is more homogeneous within each category of outcome variables, especially when focussing on the most convincing studies.

4.3.4 By Student Job Characteristics

Many previous studies only find adverse effects of student employment on educational attainment when students work intensively. The threshold value of working intensively is not well defined: it ranges from working more than eight hours per week as a student (Body et al., 2014) to working more than 25 hours per week (Beerkens et al., 2011; Moulin et al., 2013). Oettinger (1999), McVicar and McKee (2002), Payne (2003), Warren and Lee (2003), Parent (2006), Bozick (2007), Lee and Staff (2007), Montmarquette et al. (2007), Bachman et al. (2011), Beerkens et al. (2011), Moulin et al. (2013), and Body et al. (2014) only find a negative impact on educational outcomes when students work more than a certain number of hours per week. Quirk et al. (2001) and Arano and Parker (2008) even find a positive effect on GPA when working less than a certain number of hours per week (while the effect reverses when working more than this number of hours per week). These results are clearly in line with Zero-Sum Theory. Somewhat in contrast, Staff and Mortimer (2007) find evidence of a nonlinear relationship. In their study, non-workers and steady workers have better outcomes than sporadic workers. From the most convincing studies, Montmarquette et al. (2007) only find a negative effect on continuing studies when students work more than 15 hours per week. The other studies do not examine (or do not report) the nonlinearity of the effect of student employment.

In addition, some other dimensions of heterogeneity in the effect of student work on educational outcomes by student job characteristics are explored in the literature. For instance, Baert et al. (2017) compare the effect of student employment during both the school holidays (in the summer) and the academic year with student employment during the school holidays only. They find a negative

effect of student work on tertiary education enrolment only when students are (also) employed during the academic year. Additionally, Darolia (2014) and Triventi (2014) show that the impact of student employment is more adverse for full-time students and students who work intensively, respectively. These results can be interpreted as support for Zero-Sum Theory, since there is only a negative effect when student employment substantially coincides with schoolwork. Next, Body et al. (2014) report less adverse effects on the probability of passing the academic year when students are employed in the public sector. They argue that this is due to more flexible working hours in this sector, allowing students to cut back on hours worked when work is demanding at school. Also this interpretation—if correct—can be seen as support for Zero-Sum Theory. Finally, McNeal (1997) reports heterogeneous effects of student employment depending on the particular type of job exercised. He finds that combining study and work has a negative impact on the probability of continuing studies only when students work in "less mundane and structured" (McNeal, 1997, p. 219) jobs such as farming, gardening, or babysitting—in line with Human Capital Theory, these jobs might be less complementary to what is learned in school.

4.3.5 By Student Characteristics

A final source of heterogeneity in the results is reported by authors who compare the impact of student work on educational outcomes for distinct groups of students (based on characteristics other than their student job). First, by measuring heterogeneous effects by gender, Dustmann and van Soest (2007) find a negative effect of student employment on exam performance and continuing studies only for males. The latter result is also reported by Montmarquette et al. (2007). In neither of these studies do the authors provide an explanation for why this heterogeneity between males and females might exist. Second—but related—Oettinger (1999) finds that student employment has a more adverse effect on GPA for (ethnic) minorities. The author does not formulate an explanation for this.

Third, Lee and Staff (2007) compare groups of students based on their predisposition for intensive work. They find a negative effect of student employment

on the probability of staying in secondary education only for students with low to middle propensities for working more than 20 hours per week. They argue that for students with these low propensities for intensive work, employment may detract from school and pull them out of school prematurely. Contrarily, this would not be the case for students with high propensities for student work, as these already feel the push out of school, and doing a student job may not pull them away from school any further.

Finally—but related to the former two dimensions of heterogeneity—Warren (2002) and Baert et al. (2017) measure and take into account students' primary orientation. More specifically, Warren (2002) confirms a key assumption underlying Primary Orientation Theory by showing that work-oriented students both work more hours as a student worker and have worse educational outcomes. Baert et al. (2017) directly explore the validity of Primary Orientation Theory by comparing the effect of hours of student work on the percentage of courses passed for students with a primary orientation toward school and students with a primary orientation toward work. They find only a negative association between student work and educational attainment for work-oriented students.

5 Conclusion

In this article, we have reviewed what has been written in the scientific literature on the impact of student work on educational outcomes since 1997. In this last section, we first formulate three takeaway messages from our review for researchers and then discuss the policy relevance of the convergences in the literature.

First, the empirical evidence summarised in this article is, to a substantial extent, in line with Zero-Sum Theory. Indeed, in general, we find that in previous studies mainly a non-positive effect of student employment on educational outcomes is found, and therefore that student work appears to be a substitute for education. In particular, studies report that more intensive working schemes yield

worse educational outcomes. Moreover, the finding that student work seems to have a more adverse effect on educational engagement than on educational performance and seems to be more adverse when being done during the academic year (compared to during the summer holidays) and in the private sector (compared to the public sector) can be linked to Zero-Sum Theory. Also, the observation that rather than affecting the overall probability of graduating, student work negatively affects graduation *without delay* is consistent with this theory. However, to test Zero-Sum Theory in a direct way—and therefore to test whether spending one hour more on student work translates into spending less time on study activities—data on students' time use need to be analysed. Several studies examined such data for students in secondary education (Warren et al., 2000; Weller et al., 2003; Kalenkoski & Pabilonia, 2009; 2012) and indeed report evidence in line with Zero-Sum Theory. However, so far no similar study on time use has been carried out for student workers and non-workers in tertiary education. Research on this subject could uncover the extent to which support can be found for Zero-Sum Theory for students in this type of education.

Second, as reviewed, multiple studies discussing zero (or positive) effects of student work on GPA and graduating hypothesise that the more modest evidence for these outcomes might be due to working students choosing less demanding tracks or attending lower-quality schools and colleges. However, as far as we know, no study to date has investigated thoroughly the impact of student employment on school and track choice. We believe this would be a perfect complement to the reviewed literature. Somewhat related, it could also be interesting to investigate whether, in line with Human Capital Theory, the association between student work and educational outcomes is more positive when students work in a job related to their field of study. In this respect, Beffy, Fougère, and Maurel (2009) and Geel and Backes-Gellner (2012) examined the impact of field-related student employment on later labour market success, and found a higher surplus of this kind of student work.

Third, with regard to empirical approach, we believe that this body of literature would greatly benefit from further attempts to control for the endogeneity problem inherent to estimating the effect of student work on (educational) outcomes. In

general, we advise researchers to build on the studies that we consider the most convincing in terms of estimating causal effects. More specifically, we believe using longitudinal data, potentially combined with an instrumental variable approach (e.g. by exploiting regional and/or temporal variation in (child) labour laws; *supra* Subsection 4.2.2), could help researchers to identify causal effects. Furthermore, authors relying on a structural model should weaken their assumption that observable and unobservable determinants of student work are uncorrelated at the start of their model. This can be done by estimating educational decisions and/or outcomes as early as possible in the observed students' lifetimes. In particular, future studies should make sure to control for students'—potentially time-varying—primary orientation. Indeed, the two studies that do take the primary orientation of students into account find suggestive evidence of a high correlation between primary orientation and both student work and educational outcomes. As a consequence, we encourage future contributors to this literature to exploit data in which students' primary orientation is documented. Somewhat related, causal relationships between student work and several crucial educational outcomes have not yet been convincingly estimated. More specifically, we recommend future research to examine the causal effect of student work on educational engagement and students' time to degree.

Besides their academic relevance, the empirical findings reviewed in this study also have implications for policy. Because previous studies mainly report negative effects of (substantial) student employment on educational engagement and educational choices, bluntly encouraging student work seems not to be justified. In general, it seems to be important that students supply labour to the extent that they do not prioritise their student job(s) over their studies. In particular, the risks of student work that directly interferes with their studies—such as intensive work schemes during the academic year, in particular in sectors that limit students' flexibility in adjusting their (study) schedule—should be made visible to students. Nevertheless, the impact of student work on educational outcomes should be considered together with its impact on other socio-economic outcomes, at the micro and macro level. For instance, as mentioned in our introduction, studies examining

the impact of student employment on later labour market outcomes mainly find non-negative effects (Ruhm, 1997; Parent, 2006; Baert et al., 2016). Therefore, more broadly, we advocate that authorities actively inform students about all assets and risks related to student work, including its trade-off with educational outcomes.

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Table 1. Summary of the literature

(1) Study	(2) Country	(3) Main outcome variable(s)	(4) Main explanatory variable(s)	(5) Main methodological approach	(6) Main result(s)
A. Studies using data on student work during secondary education					
Apel et al. (2008)	US (National Longitudinal Survey of Youth; 1997–2003).	GPA and continuing studies.	Any student work dummy and hours worked per week.	FE model combined with IV approach (instrument: state child labour laws).	Negative effect on continuing studies only.
Baert et al. (2017)	Belgian (Study Hive on Transition from School to Work Data; 1999–2009).	Graduating and tertiary education enrolment.	Student work (during the summer and academic year) dummies.	Dynamic discrete choice model with unobserved heterogeneity.	Negative effect on tertiary education enrolment when working during both the summer and the academic year only.
Baum and Ruhm (2016)	US (National Longitudinal Survey of Youth; 1979 and 1997)	Tertiary education enrolment and tertiary education graduation.	Hours worked per week.	LPM.	Negative effect on tertiary education graduation only.
Buscha et al. (2012)	US (National Education Longitudinal Study; 1988–1992).	Math and reading scores.	Student work (of different types) dummies and hours worked per week.	DiD/DiDiD approach combined with matching approach.	No effect.
Dustmann and van Soest (2007)	UK (National Child Development Study; 1974).	Credits achieved and continuing studies.	Hours worked per week.	IV approach (instruments: local unemployment rate and parental income).	Negative effect for males only.
Eckstein and Wolpin (1999)	US (National Longitudinal Survey of Youth; 1979–1991).	GPA and continuing studies.	Hours worked per week.	Dynamic discrete choice model with unobserved heterogeneity.	Negative effect, albeit small.
Kalenkoski and Pabilonia (2009)	US (American Time Use Survey; 2003–2006).	Minutes spent doing homework per day.	Minutes worked per day.	SEM.	Negative effect.
Kalenkoski and Pabilonia (2012)	US (American Time Use Survey; 2003–2008).	Minutes spent doing homework per day.	Any student work dummy.	SEM.	Negative effect.
Lee and Staff (2007)	US (National Education Longitudinal Study; 1988–1992).	Continuing studies.	Intensive student work dummy.	Matching approach.	Negative effect.
Lee and Orazem (2010)	US (National Longitudinal Survey of Youth; 1997–2002).	GPA, graduating, and tertiary education enrolment.	Hours worked during secondary education.	IV approach (instruments: individual date of birth, state truancy laws, and local demand for low-skill labour).	Negative effect on tertiary education enrolment. Positive effect on graduating.

Marsh and Kleitman (2005)	US (National Education Longitudinal Study; 1988–1992).	GPA, standardised test scores, highest degree, qualifications achieved, months of college, and study engagement variables.[a]	Hours worked per week.	OLS.	Negative effect.
McCoy and Smyth (2007)	Ireland (National Survey of Schools; 1994).	GPA and continuing studies.	Any student work dummy and hours worked per week.	Matching approach.	Negative effect.
McNeal (1997)	US (High School and Beyond Study; 1980–1982).	Continuing studies.	Student work (of different types) dummies and hours worked per week.	Logit model.	Negative effect when working in farming, doing gardening work, performing odd jobs, or working as a babysitter only.
Montmarquette et al. (2007)	Canada (Statistics Canada School Leavers Survey; 1991 and 1995).	GPA and continuing studies.	Hours worked per week.	Dynamic discrete choice model with unobserved heterogeneity.	Negative effect (when working more than 15 hours per week) on continuing studies for males only.
Oettinger (1999)	US (National Longitudinal Survey of Youth; 1979–1983).	GPA.	Weeks worked per year and hours worked per week.	FE model.	Negative effect. Less adverse for whites than for blacks.
Parent (2006)	Canada (Statistics Canada School Leavers Survey; 1991 and 1995).	Graduating.	Hours worked per week.	IV approach (instruments: local unemployment rate and provincial unemployment rate of 25–44-year-olds).	Negative effect (when working more than 10 hours per week).
Payne (2003)	UK (England and Wales Youth Cohort Study; 1998–2000).	Qualifications achieved.	Hours worked per week.	OLS and logit model.	Negative effect (when working more than 15 hours per week).
Quirk et al. (2001)	US (National Educational Longitudinal Study; 1988–1992).	GPA.	Hours worked per week.	SEM.	Negative effect when working more than 12 hours per week. Positive effect when working less than 12 hours per week.
Rothstein (2007)	US (National Longitudinal Survey of Youth; 1997).	GPA.	Hours worked per week.	FE model and IV approach (instruments: county-level unemployment rate, average wage rate for teens, and state laws regarding teen employment).	No effect.
Sabia (2009)	US (National Longitudinal Study of Adolescent Health; 1995–1996).	GPA and study engagement variables.[b]	Any student work dummy and hours worked per week.	FE model.	No effect.
Schoenhals et al. (1998)	US (National Education Longitudinal Study; 1988 and 1990).	GPA and study engagement variables.[c]	Student work categorical variable[h] and hours worked per week.	OLS.	Negative effect on attendance only.

Singh (1998)	US (National Educational Longitudinal Study; 1990).	GPA and standardised test scores.	Hours worked per week.	SEM.	Negative effect, albeit small.
Singh et al. (2007)	US (School and Social Experiences Questionnaire; 2002).	GPA.	Hours worked per week.	OLS.	Negative effect.
Staff and Mortimer (2007)	US (Youth Development Study; 1988–2003).	Graduating in tertiary education.	Student work categorical variable.[i]	Logit model.	Non-workers and steady workers have better outcomes than sporadic workers.
Staff et al. (2010)	US (Monitoring the Future Project; 1992–1997).	GPA and study engagement variables.[d]	Hours worked per week (actual and desired).	RE model.	Negative effect.
Tyler (2003)	US (National Educational Longitudinal Study; 1990 and 1992).	Math and reading scores.	Hours worked per week.	IV approach (instrument: child labour laws).	Negative effect.
Warren (2002)	US (self-administered pencil-and-paper questionnaire; 1999).	Study engagement variables.[e]	Student work categorical variable[j] and hours worked per week.	Cross tabulation.	Negative effect.
Warren and Lee (2003)	US (National Educational Longitudinal Study; US Census; 1990 and 1992).	Continuing studies.	Hours worked per week.	Nonlinear hierarchical model.	Negative effect (when working more than 20 hours per week).
Warren et al. (2000)	US (National Education Longitudinal Study; 1990 and 1992).	GPA.	Any student work dummy and hours worked per week.	SEM.	No effect.
Weller et al. (2003)	US (Safe and Drug-Free Schools Program; 1995).	GPA and study engagement variables.[f]	Hours worked per week.	MANCOVA, ANCOVA, and MANOVA.	Negative effect.
B. Studies using data on student work during tertiary education					
Arano and Parker (2008)	US (administrative college data and self-administered online questionnaire; 2005).	GPA.	Hours worked per week.	IV approach (instrument: students' financial resources).	Negative effect for freshmen and for sophomores (juniors) ((seniors)) when working more than 9 (19) ((15)) hours per week. Positive effect for sophomores (juniors) ((seniors)) when working less than 9 (19) ((15)) hours per week.
Bachman et al. (2011)	US (Monitoring The Future Project; 1976–2003).	Years of college.	Hours worked per week.	Matching approach.	Negative effect (when working more than 15 hours per week).
Baert et al. (2017)	Belgium (self-administered online questionnaire; 2017).	Credits achieved.	Hours worked per week.	OLS.	Negative effect when being work-oriented. No effect when being study-oriented.

Beerkens et al. (2011)	Estonia (Survey of Students' Socio-Economic Situation; 2008).	Graduating (without delay).	Hours worked per week.	Logit model.	Negative effect, albeit small (when working more than 25 hours per week).
Beffy et al. (2010)	France (French Labor Force Surveys; 1992–2002).	Graduating.	Any student work dummy and hours worked per week.	IV approach (instruments: local unemployment rate for low-skilled youth and father's social status).	Negative effect.
Behr and Theune (2016)	Germany (Absolventenpanel; 2001).	Graduating (without delay).	Any student work dummy.	Matching approach.	Negative effect.
Body et al. (2014)	France (self-administered online questionnaire; 2012).	Graduating.	Hours worked per week.	IV approach (instruments: students' lifestyle, social category of parents, financial support, and nationality).	Negative effect (when working more than 8 hours per week). Less adverse in the public sector than in the private sector.
Bozick (2007)	US (Beginning Post-secondary Students Longitudinal Study; 1996 and 1998).	Continuing studies.	Hours worked per week.	Logit model.	Negative effect (when working more than 20 hours per week).
Darolia (2014)	US (National Longitudinal Survey of Youth; 1997–2008).	GPA and credits achieved.	Hours worked per week.	FE model combined with IV approach (instruments: lagged outcome and student work variables, house prices, and credit scores).	Negative effect on credits achieved only, for full-time students only.
Derous and Ryan (2008)	US (self-administered online questionnaire; 2008).	GPA and study engagement variables.[g]	Hours worked per week.	OLS.	Negative effect on study engagement only.
DeSimone (2008)	US (College Alcohol Study; 1993–2001).	GPA.	Hours worked per week.	IV approach (instruments: paternal schooling and Jewish upbringing).	Negative effect.
Kalenkoski and Pabilonia (2010)	US (National Longitudinal Survey of Youth; 1997).	GPA.	Hours worked per week.	SEM.	Negative effect, albeit small.
McVicar and McKee (2002)	UK (Status Zero Survey; 1993–1998).	Qualifications achieved.	Any student work dummy.	Bivariate probit model.	Negative effect (when working more than 15 hours per week).
Moulin et al. (2013)	Canada (Youth in Transition Survey; 1999–2007).	Graduating.	Hours worked per week.	Cox proportional hazards model.	Negative effect (when working more than 25 hours per week).
Rochford et al. (2009)	Ireland (Paid Part-Time Employment Questionnaire; 2009).	Validated scales on course performance, personal and professional development, college experience, and grades achieved.	Hours worked per week.	OLS.	Negative effect.

Scott-Clayton and Minaya (2016)	US (Beginning Post-secondary Students Longitudinal Study; 2001–2009).	GPA and graduating.	Federal Work Study Program participation dummy.	Matching approach.	Negative effect on GPA only.
Stinebrickner and Stinebrickner (2003)	US (administrative college data; 1989–1997).	GPA.	Hours worked per week.	IV approach (instrument: job assignments).	Negative effect.
Theune (2015)	Germany (Absolventenpanel; 2001).	Graduating (without delay).	Student work categorical variable.[k]	Cox proportional hazards model.	Negative effect.
Triventi (2014)	Italy (Eurostudent Survey; 2004).	Credits achieved.	Student work categorical variable.[l]	Treatment model with a latent factor determining both variables and exclusion restrictions.	Negative effect.
Wenz and Yu (2010)	US (Winona State University Student Sample; 2004–2008).	GPA.	Hours worked per week.	FE model.	Negative effect, albeit small.

The following abbreviations are used: ANCOVA (analysis of covariance), DiD (difference-in-differences), DiDiD (difference-in-differences-in-differences), FE (fixed effects), GPA (grade point average), IV (instrumental variable), LPM (linear probability model), MANCOVA (multivariate analysis of covariance), MANOVA (multivariate analysis of variance), OLS (ordinary least squares), RE (random effects), SEM (structural equation modelling), UK (United Kingdom), and US (United States).

[a]Indicators of time spent on homework, frequency of absenteeism, school preparation, college preparations, and number of colleges applied to.

[b]Indicators of whether students pay attention in class, finish their homework on time, get along with fellow students, skip class, and expect to attend college.

[c]Indicators of school attendance, hours spent doing homework per week, and hours spent reading per week.

[d]Indicators of whether students expect to attend college, try their best, do not complete assignments, misbehave at school, skip class, and participate in school activities.

[e]Indicators of being late for school, skipping class, getting in trouble for not following school rules, going to class without a pencil, pen or paper, going to class without books, going to class without doing one's homework, and time spent on homework per week.

[f]Indicators of being late for school, skipping class, sleeping in class, cheating, and time spent on homework per week.

[g]Study attitude scale introduced by Weinstein, Palmer, and Schulte (1987).

[h]Categories: (1) Never been employed, (2) not currently employed but have been employed during the school year, (3) not employed this school year but have been employed during the summer, (4) employed prior to last summer, and (5) currently employed.

[i]Based on the total duration and average number of hours of student work, respondents are classified into five categories: (1) non-workers, (2) sporadic workers, (3) occasional workers, (4) steady workers, and (5) most invested workers.

[j]Categories: (1) Never been employed, (2) employed in the past, but not at the moment, and (3) currently employed.

[k]Categories: (1) Never been employed, (2) sometimes worked while studying, and (3) always worked while studying.

[l]Categories: (1) Never been employed, (2) low-intensity workers, and (3) high-intensity workers.