DIFFERENTIATING BETWEEN EARLY AND POST-GRADUATION WORK EXPERIENCE: THE EFFECT OF WORKING WHILE STUDYING AT UNIVERSITY ON FUTURE LABOR MARKET PRODUCTIVITY IN RUSSIA

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Abstract

This study examines the effect of early work experience on future labor market outcomes in Russia, taking into account the work intensity. The paper aims to identify the wage returns associated with working while studying at university in recent years and analyze the effect of differentiating between early and post-graduation work experiences on the returns to other wage determinants. The study relies on the Mincerian specification for the earnings function and uses Heckman's 2-step selection to account for possible selection bias. The results suggest that having early work experience positively affects post-graduation labor market outcomes. The regression output shows that working full-time while studying at university yields the highest returns compared to the effects of part-time early work experience and working over breaks. Additionally, including early work experience in the standard model for estimating the wage determinants may show that the effects of education and experience may be overstated when the model does not control for having work experience before graduation.

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Introduction

Policymakers, educational institutions, and families implement various strategies for attaining the highest level of productivity of human capital in the labor market. Education is often considered as an important long-term investment yielding relatively high returns in the future. Various research studies find that the returns on investing in higher education increase with the degrees obtained, whereas the marginal returns decrease (McMahon, 2018, Card, 1999, Yubilianto, 2020). However, investment in education can be perceived as risky because the returns are uninsurable and vary across different subgroups depending on the quality of schooling, personal characteristics, different labor market conditions, etc. (Card, 1999). As a result, the uncertainty about future payoff discourages some people from investing in tertiary education. The decision of these agents can be motivated by the fact that the skills obtained during the time spent studying at university as a work experience can yield higher returns in the future: having a longer work experience is usually associated with higher productivity, and, consequently, with a higher wage premium (Mincer, 1974). Therefore, the decision of each individual about investing in higher education depends on the expectation about the future payoffs based on the expected returns. The tendency to invest in education may vary across countries, depending on the rates of return on risk-free assets (such as government bonds) and country-specific trends. Thus, studying the case of each country in particular is important for making the decision about the investment.

The amount of work experience obtained can also be considered as an important wage determinant. Mincer (1974) presents empirical evidence showing a positive relationship between the amount of time invested in obtaining work experience and hourly/weekly earnings. The findings can be attributed to the effectiveness of "learning-by-doing" in attaining higher levels of productivity. Experience contributes to the accumulation of specific skills that university programs are not intended to teach. Mincer shows that skills play a dominant role in career advancement compared to education. Also, it appears that with a certain amount of accumulated experience, the correlation between the level of education and wage rate decreases. Moreover, according to the Bureau of Labor Statistics data, seniority appears to be more important than the level of education for career advancement. Additionally, while deciding whether to invest in tertiary education, one considers that it can take about 16-33 years to get back the cost of attending a college (Card, 1999). Therefore, some individuals may abstain from investing in subsequent education and enter the labor market.

To obtain the specific skills crucial for working in the industry, some people choose to invest in education and enter the labor market simultaneously. Working while studying remains an option for students enrolled

in higher education. According to OECD statistics (2012), 39% of students choose to work while studying on average. The percentage varies across countries: in Italy, 15% of the students choose to work, while in the Netherlands, the share reaches 60%. This variation may signal that some countries encourage students to work, while others try to prevent this. The variations may show that the results of empirical studies focusing on the effect of working while studying on students' performance after graduation may vary across countries. Some studies do not find the relationship, but it does not mean that there is no correlation in other countries. Also, some universities' policies do not allow students to work while studying. OECD data lacks information about Russia on this matter. Thus, studying the case of Russia may be beneficial not only for Russian students but also for students from countries with similar wage determinants (for example, some post-soviet countries).

Some students pursue work for monetary reasons (to cover living expenses), while the desire of others to enter the job market is motivated by other factors such as getting experience before graduation (Maseviciute et al., 2018). Having early working experience may shorten and ease the transition from studying at the university to working in the industry. However, empirical evidence suggests that substituting study hours to work may worsen education outcomes (Stinebrickner and Stinebrickner, 2003). Accordingly, the students might be dropped out of the universities because of poor performance, which results from working (Hovdhaugen, 2012). As a result, some students may abstain from work because of the possibility of lowering their future earnings. However, others find out that moderate amounts of work while studying can be associated with better education outcomes or do not affect academic performance at all (Baum & Ruhm, 2016). Therefore, the trade-off between dedicating all time to study and obtaining work experience remains open.

Work intensity may also have an impact. Working students have some options: some choose to work full-time, while others prefer part-time options. Hovdhaugen (2012) claims that students working full-time are more likely to drop out of the university than those who work part-time. As a result, the outcomes of dedicating different amounts of time to work may be different.

The ratio of students pursuing work while studying may have increased during the pandemic times. Many students were left without housing support from universities (dormitories), whereas others were willing to help their families during the stressful times of the pandemic. Also, studying online might allow students to work full-time. These suggestions being true may result in an increased number of working students. Also, a rise in the number of working students may result in an increasing number of drop-outs. Alternatively, some working students might lose their job because of the pandemic (Aristovnik et al., 2020). Both groups

might be interested in how this change may influence their performance in the workplace in the future.

The Mincerian equation, a widely-used methodological tool for many research studies, estimates the returns on the years of completed education and the years spent working in general. However, early work experience and the experience accumulated after finishing the studies may have different effects. Thus, it may be important to differentiate between them while analyzing the returns on work experience. As gaining experience is perceived as a source of learning new labor market-specific skills, the skills obtained while studying and after finishing the studies may differ. Gaining early work experience may be associated with overcoming higher stress levels, multitasking, better time management, etc. Also, those who study and work simultaneously have a chance to apply the obtained knowledge in the workplace. Thus, they better understand the material, ending up with a better educational background. The work experience obtained after finishing the studies may be characterized by higher levels of involvement in general. These suggestions being true may result in different returns. Otherwise, ignoring the effect of the work experience obtained while studying may result in the overstatement of the returns on either education or experience. The question of whether there is a significant difference between these types of experiences is one of the main research questions motivating the analysis presented in this paper.

There is a decreasing trend of working full-time among Russian youth. According to the Russian Longitudinal Survey results, the ratio of students working while studying remains relatively constant: about 60% of university students work while studying. However, considering the intensity of work, with each year, fewer students choose to work full-time. In 2013, the share of students who worked during breaks/holidays was about 1%, and in 2019, the percentage raised to 4.5%. The trends in the labor market may vary over time: at a certain period, early work experience may be valued more, but next period, non-working students may be more successful while entering the workforce. Studying the returns on schooling, early work experience, and post-graduation experience may help to identify the recent trends in the wage premium and recognize the motivation of working students to enter the job market before graduation.

This paper addresses the following questions. Firstly, what are the wage returns associated with education, early work experience, and post-graduation work experience in recent years in Russia? Then, does considering early work experience in the model change the magnitude and significance of other wage determinants? To answer these questions, the analysis will be based on the extended version of the Mincerian model, differentiating the two types of accumulated experience. Also, the model will account for the quality of obtained education, parental education, labor market conditions in the year of graduation, and personal characteristics. Previous research studies have found these variations to be crucial for individuals to decide

whether to invest in subsequent stages of education or enter the labor market.

Related Literature

The importance of studying the main determinants of human capital productivity can be explained by the rising role of human capital in explaining the cross-country variations in income. Erosa et al. (2010) claim that the accumulation of human capital stock leads to an increase in physical capital because of the increase in the marginal product of labor. Still, the main drivers of the accumulation of human capital may vary across countries. For instance, van Hoorn (2019) attributes this variation to cultural differences across countries: societies value knowledge differently, and academic advancement rewards vary across countries. An appropriate empirical study should be conducted to estimate the key features of human capital accumulation for a particular country.

The related literature studying the determinants for improving human capital productivity goes back to the human capital models introduced by Becker (1975) and Mincer (1974). The Mincerian model implies that the differences in earnings can be primarily attributed to the differences in self-investment in education and work experience. Mincer argues that experience has a higher explanatory power than age while estimating the returns on wage: considering the wage profiles of two agents at a certain age, a more educated individual may have a lower wage than a less-educated one. The reason is that a less-educated person might be on a higher stage of career advancement than the individual who just entered the labor market after completing education. Thus, after re-examining the schooling model, the Mincerian equation predicts that the remuneration to labor increases as an agent invests more in education and spends more time working. Also, Mincer (1974) claims that individuals invest more during the early stages of their lives: the accumulated payoff on investment decreases with age, the marginal costs increase, and the benefits decrease. Therefore, considering the sample of relatively young individuals for this research will still capture the major part of investments in education. Also, as other empirical studies intended to analyze the efficiency of human capital, the empirical model of this paper will be based on the Mincerian equation.

Later studies intended to examine the model presented by Mincer proposed some modifications to increase the explanatory power of the model. Heckman et al. (2003) find that Mincer's model can produce inconsistent results while using the data collected from later cohorts. One of the proposed modifications is related to the linearity assumption in schooling. A "sheepskin effect" introduced by scholars is motivated by the nonlinearity in schooling. The scholars claim that the linearity of returns assumed by Mincer is no longer valid, and estimating the returns on completing certain stages of education (graduating) better explains the variation in wages. As a result, many contemporary studies of the returns on human capital investments

consider this modification while conducting empirical analysis. Additionally, one of the major contributions of Heckman (1979) is the 2-stage selection procedure that is widely used to correct the selection bias arising as a result of the non-randomness of selected observations. As wage regressions are often subject to selection bias, this approach is widely used to correct the non-randomness of selected workers (Hotz et al., 2002; Chen, 2001). Thus, this statistical technique will be used while conducting an empirical analysis for the purposes of this paper.

Most empirical papers studying the returns to schooling conclude that investing in education yields significantly positive returns, and education is underinvested across countries. Some studies find that investing in education appears to be more significant for future earnings than the accumulation of work experience. The empirical analysis of Chen (2001) is aimed to explain why some academically successful US students abstain from investing in higher education. To answer this question, the scholar estimates the riskiness of investing in tertiary education. Chen uses a fixed-effects model and applies Heckman's 2-stage scheme to estimate the average risk differential. The empirical results show that investing in a 4-years tertiary education may be risky while choosing to study in a 2-years program is not that risky. Thus, risk-averse individuals may choose not to invest in education at all and enter the industry just after high school graduation, even if they were relatively successful in school. Also, the study shows that compared to education, work experience appears to be not that significant in explaining the variations in wages. The research conducted using the data collected from Thai students shows that both education and experience yield significantly positive returns (Wannakrairoj, 2013). The empirical paper written by Selz et al. (2004) concludes that both education and experience are significant determinants of earnings in France, but the returns to education are substantially higher. Therefore, there is evidence that education and experience may yield different returns in terms of significance and magnitude for different countries. Overstatement of the returns on either education or experience may be attributed to not accounting for the early work experience gained while studying at university.

There are several studies analyzing the education outcomes of working students. Some studies find that the majority of working students do not experience the negative effect of having a paid job on university performance. The empirical research of Manthei and Gilmore (2005) shows that only 10% of students reported that they did not have enough time to study. About 80% of students had a paid job before graduation. More than 60% of working students reported that having a job helped them use their time effectively and gain time-management skills. The authors claim that they found similar results in analogous studies. The specific note about this study is that 76% of students had a huge student loan. Thus, the student's choice to work can be perceived as a necessity rather than a choice. The scholars found that one

of the main problems related to work while studying was not the lack of time to study but constant stress about loans. Therefore, this research paper shows that a standard view that working while studying harms student performance may not apply to all the cases. Also, the results of students' surveys support the idea that combining work and studies may result in gaining specific skills that might be different from those obtained by post-graduation workers. Having a job may benefit students' performance, such as gaining time management skills. These benefits can be used to explain the positive effect of having work experience before graduation on future earnings in this paper.

An empirical study by Hakkinen (2006) titled "Working while enrolled in a university: does it pay?" shows a positive effect of having a job while studying on the earnings. The study was conducted among Finnish students who graduated from a university 1-3 years ago. Also, the results show that working students find a job faster than those who did not have a job. In the model for earnings, the scholars modify the Mincer equation following the data available. The paper shows that the length of the schooling period is one of the crucial determinants of earnings. The author finds positive returns on having a job while studying in the short-run. Unlike the research study of Hakkinen, this paper will check the long-run outcomes of having a job before graduation.

Hotz et al. (2002) research the effect of working while studying at school on future earnings. The results of the study show that those who worked while in school have higher wages than those who did not. It is important to note that the estimations reveal that the positive effect of working while in school appears to be larger than the returns on work experience obtained by young individuals. Also, the scholars claim that the effect of having a job while studying at school is positive and significant even after ten years after finishing school. Thus, the results of this paper are consistent with my hypothesis that early work experience may have a positive and significant effect on wages not only after finishing studies but for a relatively long period.

Background: Development of the Russian Education System

Going back to the USSR times, the education system was subject to central planning. The programs were mostly oriented toward technology and science development, meaning that limited attention was given to humanities tracks (Luchinskaya and Ovchynnikova, 2011). In Soviet times, USSR university students graduated with a Specialist's degree, which might take up to five years to obtain. The main difference between the Specialist's program and Bachelor's studies is that studying the former implies more emphasis on practice and may apply to a narrow labor market industry while obtaining the latter degree is more associated with getting background knowledge in a particular field to be able to engage in research. The USSR government provided specialists with jobs just after graduation. Accepting such a job offer might

imply moving to another city or even another Soviet Republic. Being certain about having a job after graduation might impact school graduates' decision to invest in their higher education.

The collapse of the USSR and the subsequent transition to a market economy brought some changes to the Russian educational system. Luchinskaya and Ovchynnikova (2011) report that there was a severe decrease in government expenditure on higher education in Russia in 1992. The authors claim that the quality of Russian higher education was low in the majority of universities. The government encouraged the establishment of private universities and introduced some changes to university programs because of the change in the political regime.

In 2003, Russia joined the Bologna process. One of the aims of the Bologna reforms is to set up the European Higher Education Area. Once being a part of this area, the participating countries should facilitate international cooperation, assure high quality of higher education, provide education that is organized in a three-cycled structure (Bachelor, Master, Ph.D.), etc. Gänzle et al. (2009) claim that the process of implementation of the Bologna reforms was relatively slow in Russia, partially because of the resistance of the educational institutions, i.e. some universities resisted moving from "specialist" degree provision to the three-cycled structure. Bologna reforms shortened the period of obtaining the minimum degree in higher education in Russia by one year: there was a transition from providing a specialist's degree (up to 5 years) to a bachelor's degree (4 years). To be more precise, in 2011, the Bologna reform forcing the shortening of the university study period was introduced. The universities needed time to adjust their study plans. Additionally, the labor market might need some time to adjust to these changes. Luchinskaya and Ovchynnikova (2011) report that initially, Russian labor markets perceived bachelor degrees as "incomplete". After some time, the labor markets might get adjusted to the new higher education system. Therefore, for the purposes of this study, a panel dataset collected in 2015-2019 was used. This period is chosen to minimize the possible effect of the transition period in Russian higher education institutions and the labor market.

Data

For quantitative analysis, the data collected as a result of the Russian Longitudinal Monitoring Survey (RLMS) was used. The data is provided by the Higher School of Economics. Registration was required to access the data. The data contains information on households and individuals with separate questionnaires for adults and children. The questionnaires may vary across years. The Russian Longitudinal Monitoring Survey is conducted annually to monitor the effects of Russian reforms. For the purposes of this study, a panel dataset will be used. To keep the education conditions fixed, I will use the data collected in 2015-2019. By dropping the data collected earlier, I minimize the possible effect of the transition period after the

Bologna reforms on the Russian education system and labor market.

The sample consists of 4305 observations. Regression analyses for a wage as a dependent variable are often subject to selection bias: the sample usually consists of only those who currently participate in the labor market because only they report a positive wage. Therefore, to avoid the possibility of biased estimates, the Heckman 2-step selection technique will be used. After applying the Heckman selection, some observations were censored. Therefore, the final dataset contains 4, 067 observations: 238 observations were censored due to Heckman selection.

The sample consists only of those who decided to continue their studies at university after finishing school. Those who decided to study at vocational school were dropped. The respondents who have never worked were excluded from the sample. The individuals older than 45 were dropped to minimize the effect of being in the advanced stage of the career on wages. Also, former medical students were dropped because they were engaged in compulsory work as a part of their studies. In addition, those who engage in entrepreneurial activity and self-employed were excluded from the sample. These individuals may have different wage determinants compared with employees. Therefore, the sample consists of employees only.

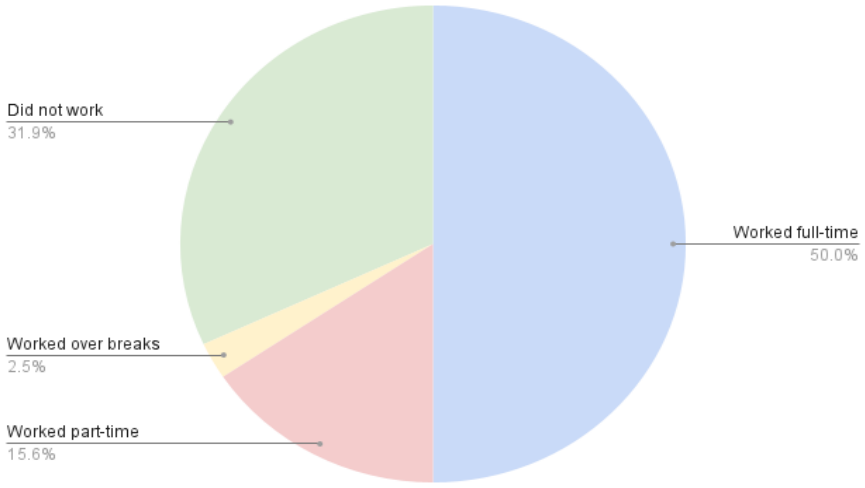

Figure 1: Students' pattern of working while studying

As can be seen from Figure 1, 50% of the respondents reported working full-time while studying at university. The percentage of part-time working students is lower, 15.6%. The share of those who worked only over breaks/weekends/holidays is the smallest and equals 2.5%. Summing up, 66.6% of the Russian students in the sample worked while studying.

Table 2 presents the relationship between working while studying at university and different variables.

The variable of the main interest is the monthly wage. As the table reveals, the mean difference between the wages of individuals who worked while studying at the university and those who did not work is positive and statistically significant. To be more precise, the mean difference in wages between these two groups is equal to 2976 Russian rubles. This result is consistent with some research studies discussed earlier in this paper (Hakkinen, 2006; Hotz et al., 2002, Baum & Ruhm, 2016). The difference in wages remains to be positive and statistically significant until the age of 36. On average, the sample of adults aged 41-45 who worked while studying at the university earn higher wages than those who did not work; however, this difference is not statistically significant.

The mean difference between work experience (*Experience*) obtained by the individuals who worked while studied and those who did not work is positive and statistically significant. It is important to mention that the relationship between early work experience (working while studying) and experience is not linear. The *experience* variable reflects the work experience obtained after graduation. Thus, those who worked while studying at the university tend to work more after graduation.

The indicator variable *Bachelor* indicates those individuals who finished their formal education after obtaining a Bachelor's degree. The next statistically significant mean difference shows that there are more individuals with a Bachelor's degree among those who have early work experience compared to the respondents who did not work while studying. On average, among those who worked during their studies, 10% are bachelor studies graduates.

Also, among those who have early work experience, 15% live in a large city (Moscow or Saint Petersburg). The percentage is lower for those who did not work: 11.7% of individuals who do not have early work experience live in a large city. The difference is statistically significant.

The differences between means of other variables are not statistically significant. These variables are i) specialist (equals 1 if an individual did not continue his/her formal education after finishing undergraduate studies, 0 otherwise), ii) master (takes 1 if the highest degree obtained is a master's degree, 0 otherwise), iii) Ph.D. (equals 1 if a respondent is a Ph.D. degree holder, 0 otherwise), iv) age (measures the effect of individual's age on wage), v) woman (takes 1 if a respondent is female, 0 otherwise). A more detailed description of the variables will be presented in the "Methodology" section.

Table 1: Wage and other variables by Working-while-Studying Status

	Worked	Did not work	Mean Difference
Wage (all ages)	36241.38	33265.23	2976.149 ***
18 − 25	30523.1	27700.06	2823.035**
26 − 30	34718.08	28422.45	6295.625***
31 − 35	37725.59	32484.66	5240.935 ***
36 − 40	38374.77	39347.67	-972.8994
41 − 45	38725.09	37266.85	1458.239
Experience	11.85004	10.09768	1.752364 ***
Age	33.21745	33.44391	-.2264602
Bachelor	.1026241	.0851536	.0174705***
Specialist	.6715694	.7837838	-.1122143
Master	.0387765	.0373936	.001383
PhD	.0093599	.0081451	.0012147
Woman	.6087247	.6071825	.0015422
Moscow/St.Petersburg	1515962	.1169937	.0346025 ***

Note: $***p < .01, **p < .05, *p < .1$

The summary statistics for the variables is presented in Table 2 below.

Looking at the summary statistics, the average monthly wage is 35, 268 Russian rubles ($530). The wages were deflated by the price level (CPI) to account for inflation. To control for the intensity of work, the indicator variable *workpt* is used. The variable takes 1 if an individual works less than 40 hours per week, and 0 otherwise. The survey does not contain a question asking about hourly wage. Calculating hourly wage by dividing earnings by the number of hours worked per month may result in inadequate estimates because the reported hours of work per month tend to be imprecise. On average, 17% of the respondents work part-time.

The mean age of the respondents is 33. On average, the sample consists of relatively equal proportions of the respondents participating in the five waves of the survey (2015, 2016, 2017, 2018, 2019): there are about 20% of the respondents for each year.

From now on, the individuals who worked while studying will be differentiated by the intensity of work: 1) full-time working, 2) part-time working, and 3) those who worked only during breaks/holidays. 50% of the respondents worked full-time while studying, and the proportions of part-time working students and those who worked only on holidays are equal to 16% and 2.5% respectively.

Table 2: Summary Statistics

	Mean	St. Error	Min.	Max
Wage (in Russian rubles)	35268.36	29004.64	0	500000
Worked full-time	.502252	.5000238	0	1
Worked part-time	.161335	.3678609	0	1
Worked over breaks	.0251761	.1566688	0	1
Bachelor	.0974708	.296615	0	1
Masters	.0382261	.1917528	0	1
PhD	.009008	.0944873	0	1
Experience	11.30464	6.709994	0	28
Age	33.25834	6.420031	18	45
Female	.6087308	.4880626	0	1
Married	.612114	.4872973	0	1
Works in a large city	.1405474	.3475741	0	1
Part-time work	.1718443	.3772669	0	1
Population	1870026	3800161	16	1,250,000
High-quality school	.1059014	.3077291	0	1
Foreign language	.4570967	.4981847	0	1
Did not pay for education	.3584337	.479596	0	1
Father's education	5.02	1.97665	1	9
Mother's education	5.25	1.897	1	9
Graduated during recession	.2261231	.4183439	0	1
Y2015	.1978288	.3983854	0	1
Y2016	.2057974	.4043065	0	1
Y2017	.2002541	.4002135	0	1
Y2018	.2039496	.4029553	0	1
Y2019	.19217	.3940287	0	1

The pattern of highest education obtained indicates that the maximum number of the respondents are Specialist's degree holders. About 10% of the respondents have a bachelor's degree. 4.5% of the respondents have completed graduate studies, and only 2.5% of the survey's participants are Ph.D. degree holders. This pattern can be attributed to the fact that the 3-cycled education structure (bachelor/master/Ph.D.) was introduced with the Bologna process which started relatively recently.

The empirical analysis will account for parental education. The variables $fathereduc$ and $mothereduc$ take values from 1 to 9, where 1 indicates completing middle school or less, and 9 means having a Ph.D. degree. On average, the maximum level of education completed by fathers is equal to 5, which means that an average father has completed a vocational school. For mothers, the average value is 5.25, which means that an average mother has completed a vocational school as well. Thus, fathers and mothers of those who have a university degree have completed a vocational education on average.

One of the main limitations of this study is the inability to directly control for GPA. To control for academic excellence, I check the effect of studying on a paid basis. The reasons for including this variable will be explained in the "Methodology" section.

Other variables presented in the tables for summary statistics are i) experience (continuous variable, measures the effect of post-graduation work experience), ii) married (dummy variable, takes 1 if married, 0 otherwise), iii) works in a large city (indicator variable, takes 1 if a respondent works in Moscow or Saint Petersburg), iv) high-quality school (indicator variable, takes 1 if a respondent studied in high-quality school, i.e. gymnasium or lyceum, 0 otherwise), v) foreign language (indicator variable, equals 1 if a respondent speaks a foreign language), vi) population (equals to the number of people living in the city where a respondent lives), vii) paid for education (dummy variable, equals 1 if a respondent paid for his/her education), viii) father's education and mother's education (a vector of 18 indicator variables: 9 for father's education, 9 for mother's education (e.g., $FEduc1, FEduc2$, etc.; $MEduc1, MEduc2$, etc.), where $FEduc1$ and $MEduc1$ stand for the lowest level of parental education (middle school or lower), and $FEduc9$ and $MEduc9$ stand for the highest level of obtained education, Ph.D.), ix) graduated during a recession (a vector of five indicator variables to account for the effects of being graduated in one of the five recessions periods: 1989-1991, 1992-1996, 1998, 2008-2009, 2014-2016; the variables take 1 if a respondent graduated from university when the Russian economy was in one of the listed recession). A detailed description of the variables is presented in the "Methodology" section.

Methodology

To estimate the model, Heckman's 2-stage selection technique is used to avoid possible selection bias. The first-stage selection equation is a probit model that will predict the individuals' probability of being employed. The equation for the first stage is as follows:

$$Employed_{it} = \beta_{0i} + \beta_1 X_{it} + \beta_2 U_{ut} + \beta_3 D_i + \beta_4 EXP_i + \epsilon_{it},$$

where X_{it} is a vector of personal characteristics, U_{ut} is unemployment rate, vector D_i controls for the effect of education and recent training, and EXP_i accounts for the accumulated work experience.

The vector of personal characteristics, X_{it}, consists of four variables: *married*, $female$, *age*, and *age*2. *married* is an indicator variable, taking 1 if an individual considers herself married, and 0 otherwise. In a household, a person with a greater comparative advantage in household production may decide to focus on housework and not participate in the labor market (Becker, 1991). All married people usually live in a household consisting of more than one individual, and thus, being married may reduce the probability of labor market participation because one of the household members may focus on household production. The variable $female$ captures the effect of being a woman on the probability of being employed. According to World Bank data, the LFPR for women was lower than for men in the Russian Federation from 2000 to 2021 (World Bank, 2021). Therefore, the coefficient for $female$ is expected to be negative. Regarding the variable capturing the effect of age on being employed, younger individuals are more likely to be unemployed or out of the labor force than adults. It may be problematic to find the first job for young individuals. Also, younger people are more likely to be fired because older employees may have more seniority and more industry-specific skills (Furlong, 2012). According to World Bank data, LFPR for young individuals aged 15-24 is significantly lower than for the total working population in Russia (World Bank, 2021). Therefore, age is expected to have a positive impact on being employed.

The national unemployment rate has a direct negative effect on the probability of being employed in a particular year: the higher the unemployment rate, the lower the probability. In 2015, the unemployment rate in Russia was equal to 5.57, in 2016, 5.56; in 2017, 5.21; in 2018, 4.85; and in 2019, the unemployment rate was 4.5.

Vector D_i consists of four variables: *specialist*, *bachelor*, *master*, and *training*. The first three variables will control for the effect of having a particular academic degree on the probability of being employed. The variable *training* will check the effect of participating in a professional training program in the last 12 months

on the probability of being employed. Those who are interested in these courses might have a higher chance of being employed: either they took these courses to increase their productivity in the current workplace or they are planning to get employed soon. Also, these training programs might be funded by employers. Thus, participation in the recent training may have a positive effect on being employed.

EXP_i is a vector of two variables controlling for the effect of work experience: exp and $exp2$. More experienced individuals are less likely to be laid off. Also, more experienced workers tend to have shorter unemployment spells. Eriksson and Rooth (2014) claim that employers may discriminate job-seekers according to the duration of their work experience: more experienced individuals are more likely to be hired. Thus, having a longer work experience may result in a higher probability of being employed.

The Mincerian model has been widely applied to estimate the effects of education and experience on wages. To account for the early work experience, I use the Mincerian equation applying some modifications proposed by Heckman et al. (2003). For instance, Hotz et al. (2002) applied a similar econometric strategy and Heckman selection technique to estimate the effect of working while studying at secondary school on future earnings. The model will control for: 1) work experience, 2) the highest degree obtained, 3) personal characteristics, 4) current job conditions, 6) skills and ability, 7) the effect of the business cycle conditions, and 9) parental education. A detailed description of the variables and the reasons for including them in the model are presented below.

The 2-stage equation is as follows:

$$lnwage_{it} = \beta_{0i} + \beta_1 fulltime_i + \beta_2 parttime_i + \beta_3 wbreaks_i + \beta_4 bachelor_{it} + \beta_5 master_{it} + \beta_6 phd_{it} + \beta_7 exp_{it} + \beta_8 P_{it} + \beta_9 J_{it} + \beta_{10} S_{it} + \beta_{11} BC_{it} + \beta_{12} I_{it} + \beta_{13} PE_{it} + \beta_{14} Y_t + \epsilon_{it}$$

where:

$lnwage$ denotes the natural logarithm of monthly wage the respondent earns;

$fulltime$ is a dummy variable which is equal to 1 if a respondent worked full-time while studying after school, 0 otherwise;

$parttime$ is a dummy variable which is equal to 1 if a respondent worked part-time while studying after school, 0 otherwise;

$wbreaks$ is a dummy variable which is equal to 1 if a respondent reports working only over breaks/holidays/weekends while studying after school, 0 otherwise;

bachelor is a dummy variable which is equal to 1 if the highest degree a respondent obtained is a bachelor degree, 0 otherwise;

master is an indicator variable which is equal to 1 if the highest degree a respondent obtained is a master degree, 0 otherwise;

phd is a dummy variable which is equal to 1 if the highest degree a respondent obtained is phd, 0 otherwise;

exp denotes years of work experience accumulated;

P_i is a vector of variables that control for personal characteristics;

J_i is a vector of variables that measure the effects of current job conditions on wage;

S_i is a vector of observable personal skills and ability;

BC_i is a vector of variables that control for the effect of business cycle conditions;

I_i is a vector of interaction terms that measure the cohort level differences;

PE_i is a vector of variables that measures the effect of parental education on individual's wage;

Y_i is a vector of year dummies that control for unobservable year-specific conditions.

The dependent variable is a natural logarithm of monthly wage ($lnwage$). The observations include the wage of employees. The estimation result will show the effect of explanatory variables on a percentage change in their earnings.

The intensity of work while studying at university is measured by the following variables: $fulltime, parttime$, $wbreaks$. The variable for not working at all was not included to avoid multicollinearity, as a respondent had only four options for the answer (full-time, part-time, worked over breaks, did not work).

The main variables of the Mincerian model are years of obtained education and years of accumulated work experience. To account for the effect of education, this model measures the impact of credentials rather than the years of obtained education. As Heckman et al. (2003) found, the linearity assumption is no longer valid for measuring the effect of education on wages. In this model, education is measured by the following variables: $bachelor, master, phd$. As the sample consists of only those who worked while studying after finishing school, there are four options for the highest degree obtained: 1) a specialist degree (this option is

mainly chosen by those who obtained their education prior to the introduction of the Bologna reforms and those who want to get a specific qualification in recent years; to obtain this diploma, a student may study up to 5 years, depending on a chosen profession); 2) a bachelor degree; 3) a master's degree; 4) a doctoral degree (PhD.). To account for the experience, this model measures the effect of each additional year of work experience on wage, as it was done by Mincer.

Moving to personal characteristics, the vector P_i includes the following variables: age, gender, and marital status. The explanatory variable $female$ takes 1 if the respondent is female, 0 - male. It was found that there is a huge gender gap between men's and women's earnings in Russia (Atencio and Posadas, 2015). The researchers found that women, especially those who are at the lower levels of the earnings distribution, earn considerably less than men at the same level of the distribution. As women advance in their careers, the gap may shrink, but still, there is a glass ceiling for them. The empirical study suggests that if the glass ceiling is broken, the gender gap may disappear at the highest level of the earnings distribution. Thus, gender should be accounted for while considering the determinants of earnings in Russia. Age also plays an important role in the determination of labor market premiums. Mincer (1974) reports a positive relationship between age and earnings. However, the relationship is concave. Contemporary studies (Van Ours and Stoeldraijer (2010)) confirm these findings. The productivity of labor and wage decline after 35-55. Thus, I included a squared age term ($agesq$) for more precise estimation. Marital status ($married$) is a dummy variable equal to 1 if married and 0 otherwise. Schoeni (1995) found that there is a significant gap between married and single individuals. Loughran and Julie M. Zissimopoulos (2009) confirm this finding. The authors found that the wage of women falls in the first year of marriage, and the wage growth in subsequent years of being married falls as well. The wage growth rate of married men falls as well. Thus, marital status may be a significant predictor of earnings.

Vector J_i accounts for current job conditions and includes three dummy variables that control for whether a respondent reports working less than 40 hours per week, whether individual works in a large city (Moscow or Saint Petersburg) and another variable *population* which controls for the effect of the size of the city/village of residence. Having part-time work directly affects monthly earnings. To control for regional variations, I used the natural logarithm of population. Echeverri-Carroll and Ayala (2011) found that there is a significant positive effect of city size on earnings due to the knowledge spillover effect on productivity. However, the effect of living in Moscow or Saint-Petersburg may be disproportional to the estimated effect of living in a larger city: these two cities are more economically developed than others. Moscow and Saint-Petersburg are the cities of federal importance that do not belong to any region ($oblast'$). I expect the magnitude of the effect of living in these cities to be larger than the effect of city size.

Concerning skills and ability, S_i includes three dummy variables, $freeeduc$, $schoolquality$, and $language$. The explanatory variable $freeeduc$ is included to control for academic excellence and ability. $freeeduc$ is an indicator variable which is equal to 1 if a respondent studied at university for free (got a scholarship/grant/funding, etc.), and 0 if a respondent self-financed his education. After finishing school, Russian students have to pass a Unified National Testing exam (UNT). This exam affects the grades posted to the final transcripts. Most importantly, according to the results of this exam, Russian students are accepted to universities. The more points a student gets, the higher the probability of being accepted on the basis of a state grant. The maximum number of points is 400. The passing scores may vary across universities: average-quality universities require at least 150 to apply for the state grant and scholarship, but high-quality universities may require to get 330 points and higher to apply ("Universities in Russia", 2021). High-quality universities are usually located in Moscow and Saint Petersburg. After the application, each university chooses a certain number of students who get a state grant. Usually, admissions committees accept those applicants who have relatively higher scores for the UNT. Also, those students whose academic performance during their studies is relatively better than the performance of others usually get funding during their studies. Alternatively, the students with a relatively low GPA may lose their scholarship and be transferred to paid studies. Thus, if a respondent reports that s/he did not pay for university studies, then, his academic performance is relatively good, and the GPA is in a range of A's and B's. Also, it may signal that the respondent's score for UNT is high enough to get into university and study for free. Therefore, I use this variable to control for academic performance.

Schoolquality equals 1 if a respondent studied in a gymnasium or a lyceum, 0 otherwise. In the Russian schooling system, gymnasiums and lyceums are considered to provide a relatively higher-quality education compared to the general education school. To study at these schools, applicants usually should pass ability tests and have a relatively high GPA. Thus, studying at a high-quality school is expected to have a positive effect on productivity. *Language* is a dummy variable that takes the value of 1 if an individual can speak any foreign language other than a former Soviet Union country's language. Liwinski (2019) finds that Polish graduates who speak foreign languages earn 11% more. Thus, speaking a foreign language may have a positive effect on earnings.

Vector BC_i accounts for business cycle conditions that may affect monthly earnings. The empirical study of Kahn (2006) results in a negative effect of being graduated during a recession on future wages. Kahn finds that the students who graduate in a recession tend to occupy lower-level job positions, even though they usually have a relatively higher level of education. The variables control for the effect of graduating in a period of economic recession. However, the effects of being graduated in a particular recession

may vary: for example, the 1992-1996 recession period was caused by a transition to a market economy, while the recession in 1998 was a consequence of the Southeastern Asian economic crisis (Smirnov, 2015). Thus, the different conditions which affected the Russian economy during each of the recessions may cause variations in the magnitude of the effect on the wages of graduates. The vector contains five dummy variables: $gradrec(1989-91), gradrec(1992-1996), gradrec(1998), gradrec(2008-2009)$, and $gradrec(2014-16)$. Each of the variables takes 1 if an individual had graduated during a recession period (1989-1991, 1992-1996, 1998, 2008-2009, or 2014-2016), and 0 otherwise. The coefficient is expected to be negative.

I_i includes interaction terms: $age*fulltime, age*parttime$, and $age*wbreaks$. The coefficients for these terms will explain the differences in the wage premium for working while studying across different cohorts. Possibly, the effect of having early work experience will diminish with age.

PE_i accounts for the father's and mother's education. Parents' academic background can be a determinant of children's education, and consequently, may have an effect on wages (McMahon (2018), Card (1999), Chen (2001), Erosa et al. (2010)). The vector contains 18 indicator variables: 9 for father's education, 9 for mother's education, where the lowest level of obtained education for parents is a middle school or lower ($FEduc1$ for fathers and $MEduc1$ for mothers), and having a Ph.D. degree is the highest level of parental education ($FEduc9$ for fathers and $MEduc9$ for mothers). In total, there were nine options to choose the level of parental education for the respondents: 1 if the highest level of education of a parent is a middle school or lower; 2 - high school; 3 - professional courses; 4 - vocational school (did not reach to graduate); 5 - vocational school (reached to graduate); 6 - college; 7 - bachelor/specialist degree; 8 - master's degree; 9 - Ph.D. The estimates for the coefficients will allow to compare the effects of both parents' education on offspring earnings.

The vector Y_i contains five indicator variables: $y2015$, $y2016$, $y2017$, $y2018$, and $y2019$. Including the year dummies in the regression analysis allows one to account for the year-specific conditions that might affect the labor returns. For instance, the Russian economy was in a recession stage of the business cycle in 2015 and 2016. Bils (1985) estimates the effect of business cycles on real wages. The research study concludes that real wages are procyclical, meaning that recessions are associated with lower levels of real wages. This effect is expected to be captured by the year dummies for these two years. Also, some year-specific effects may be unobservable: controlling for the years of participation in the survey may help to capture these effects.

Results

The regression output for the first-stage selection model is presented in Table 3 below.

Table 3: Regression output (1-stage)

	$Employed_i$
Married	-.497***
	(.0815)
Female	-.507***
	(.081)
Specialist	.7519***
	(.093)
Bachelor	1.02***
	(.153)
Master	.778***
	(.185)
Age	.045
	(.077)
*age*2	-.0006
	(.0011)
Experience	.098***
	(.024)
*exp*2	-.0019**
	(.00097)
Unemployment rate	-.0343
	(.086)
Recent training	.359***
	(.146)
Constant	.205
	(1.29)
Observations	4346

Note: $***p < .01, **p < .05, *p < .1$

Marriage and female gender negatively affect the predicted probability of being employed. Precisely, other parameters held constant at zero, being married yields a 19.6% decrease in the probability of employment. Age has a positive effect on the predicted probability of employment, but the coefficient is not statistically significant.

Academic degrees have a positive effect on the predicted probability. For example, a Bachelor's degree holder aged 24 has a 1.1% higher chance of being employed than a Specialist's degree holder of the same age (other characteristics are held constant at 0). All the coefficients for academic degrees are statistically significant. Participation in a recent training program has a positive effect on the predicted probability.

Having a longer work experience is associated with a higher probability of being employed: probability of employment for a 20 years old individual having one year of work experience is 2.5% higher than the probability for an individual of the same age without any work experience (other parameters are held constant at zero).

Table 4 presents estimation results for the analysis equation (second-stage equation). To check how the estimates change if the coefficients for having early work experience are not included in the model, I run another regression not accounting for $fulltime$, $parttime$, $wbreaks$, and the interaction terms.

Considering the first regression, the coefficients for the variables of the main interest, i.e. $fulltime, parttime$, $wbreaks$ are positive. However, the effect of working over breaks is not statistically significant. To calculate the effect, it is necessary to consider the coefficients for the interaction terms ($age * fulltime, age * parttime, age * wbreaks$). For instance, comparing the wages of individuals aged 25, the wages of those who worked full-time during their studies are 15% higher than the wages of those who did not work. The monthly earnings of the individuals aged 25 who worked part-time during their university studies are 12% higher, indicating that the positive effect of working full-time is higher in magnitude. The effects of full-time and part-time early work experiences are significant at a 1% significance level. The wages of the individuals who worked only over breaks/weekends/holidays are lower than the wages of other groups. However, the effect is not statistically significant.

The coefficients for interaction terms are negative, which indicates that the positive effect of having early work experience diminishes with age.

The returns on academic degrees increase with each additional degree obtained. The individuals who finished formal education with a master's degree earn 6.9% more than those with a specialist's degree. The wage of Ph.D. graduates is 8.2% higher than the wage of specialist degree holders, but the effect is not statistically significant.

Comparing the coefficients of the two models presented in Table 4, the effect of education may be overstated when the model does not control for the early work experience: the coefficients for educational attainment for all academic degrees are higher in the second model. Thus, if the model does not control for working while studying, the effect of early work experience may be partially captured by education.

Table 4: Regression output

	(1) *lnwage*	(2) *lnwage*
$Full-time$	.4065***	
	(.111)	
$Part-time$	.387***	
	(.1368)	
Worked over breaks	.0895	
	(.31)	
Bachelor	.063**	.064**
	(.0298)	(.0297)
$Masters$	.069*	.072*
	(.04)	(.04)
PhD	.082	.087
	(.0819)	(.0818)
Experience	.035***	.0449***
	(.0076)	(.0071)
$Exp2$	-.00064**	-.0009***
	(.0002)	(.0002)
Age	.0114	.0086
	(.0221)	(0.217)
Age^2	-.000068	-.00009
	(.00032)	(.0003)
$Female$	-.252***	-.252***
	(.019)	(.019)
$Married$	-.1227***	-.12***
	(.019)	(.02)
Part-time work	-.059***	-.057***
	(.0209)	(.0209)
$Moscow/St.Petersburg$	.3235***	.3234***
	(.0297)	(.0295)
$ln(population)$	.018***	.018***
	(.0039)	(.0039)
High quality school	.027	.029
	(.0269)	(.027)
Foreign language	.1512***	.154***
	(.016)	(.016)
Did not pay for educ	.122***	.12***
	(.016)	(.0177)
*age*fulltime*	-.0103***	
	(.003)	
*age*parttime*	-.0106***	
	(.004)	
*age*wbreaks*	-.0024	
	(.009)	
FEduc1	-.2756***	.0273***
	(.0905)	(.0904)
FEduc2	-.407***	-.4***
	(.087)	(.087)
FEduc3	-.33***	-.33***
	(.089)	(.089)
FEduc4	-.36***	-.36***
	(.0904)	(.0904)

FEduc5	-.41***	-.41***
	(.085)	(.085)
FEduc6	-.353***	-.357***
	(.084)	(.084)
FEduc7	-.324***	-.322***
	(.082)	(.083)
FEduc8	-.24*	-.25*
	(.149)	(.146)
MEduc1	-.26	-.26
	(.204)	(.204)
MEduc2	-.19	-.203
	(.201)	(.202)
MEduc3	-.15	-.16
	(.204)	(.204)
MEduc4	-14	-.14
	(.206)	(.206)
MEduc5	.-187	-198
	(.201)	(.201)
MEduc6	-.18	-.19
	(.199)	(.199)
MEduc7	-.18	-.196
	(.1999)	(.200
MEduc8	-.39	-.39
	(.24)	(.24)
Grad in rec(1989-1991)	-.289	-.023
	(.203)	(.202)
Grad in rec(1992-1996)	-.017	.00005
	(.0422)	(.04)
Grad in rec(1998)	-.103**	-.10**
	(.052)	(.0522)
Grad in rec(2008-2009)	.046*	.04*
	(.024)	(.024)
Grad in rec(2014-2016)	-.0556**	-.045
	(.029)	(.0283)
Y2016	.0619***	.06***
	(.024)	(.024)
Y2017	.117***	.113***
	(.024)	(.024)
Y2018	.0997***	-.101***
	(.025)	(.0245)
Y2019	.173***	.17***
	(.025)	(.025)
Constant	9.98***	10.4***
	(.427)	(.412)
Observations	4067	4067

Note: $***p < .01, **p < .05, *p < .1$

The effect of work experience after graduation is statistically significant at a 1% level. With each additional year of experience, the wage increases by 3.5%. Without controlling for early work experience, the return to experience increases by 1%. Thus, the effect of post-graduation work experience may be overstated while not controlling for early work experience.

Considering the effect of skills and ability, the effect of studying at university for free has an expected sign. Not paying for university studies is associated with a 12.2% increase in earnings. The effect is statistically significant at a 1% significance level. Speaking a foreign language yields a 15% increase in monthly wages, and the effect is statistically significant. An individual who studied at a high-quality school now earns 2.7% more than those who studied at ordinary schools. However, the effect of studying in a gymnasium/lyceum is not statistically significant.

Considering the effect of parental education, the coefficients for the father's education are statistically significant, whereas the effect of the mother's education is not significant. In numerical terms, for example, children of fathers with a Bachelor's degree earn 8% less than the children of fathers with a Master's degree. The magnitude of the effect varies: being a child of a father with a Master's degree yields a 24% decrease in earnings compared to the effect of having a father with a Ph.D. degree. The effect of maternal education has the same direction, but the coefficients are not statistically significant. To sum up, higher stages of parental education are associated with higher children's earnings.

The estimated coefficients for the variables accounting for the effect of work conditions have the expected signs. Working part-time decreases earnings by 5.9% on average. Also, a 1% increase in population is associated with a 1.8% increase in monthly wages. On top of this, considering the effect of working in the cities of federal importance, living in Moscow or St. Petersburg yields a 32% increase in earnings. All the variables are statistically significant. The magnitude of the coefficients does not change if the model does not account for early work experience.

The coefficients for the majority of the variables capturing the effect of business cycle conditions have the expected negative effect. On average, those who graduated in recessions earn less than others. For instance, those who graduated during the recession in 1998 earn 10% less. The effect is statistically significant at a 5% significance level. The magnitude of the effects varies across the years, which may signal that the reasons behind the recessions may have different effects on the labor market outcomes of graduates.

The coefficients for personal characteristics have expected signs, women and married individuals earn relatively less. Also, the regression results confirm that the effect of age on earnings is concave: the coefficient

for age^2 is negative. The magnitude of the effects does not change when the model does not control for the effect of early work experience.

The year dummies are positive and statistically significant: the monthly wages increased after 2015.

Discussion

Obtaining work experience during university studies predicts positive returns to labor productivity. The intensity of work while studying appears to be important. In general, the positive effects persist up until the age of 40. Working full-time during studying predicts a positive effect on wages until an individual reaches 40, while the effect of working part-time persists until the age of 36.5. Working over breaks/holidays positively affects the earnings throughout the lifetime. However, the coefficient for working over breaks is not statistically significant. Those who work full-time and part-time during university studies may have a chance to apply their knowledge in practice, and thus better understand the learning material. The data used in this study does not allow to control for the economic sector/industry where students worked while studying, but this analysis may be extended for further research. Also, the positive returns to having a full-time or part-time job while studying can be attributed to obtaining specific labor-market skills. Moreover, working with these levels of intensity may considerably shorten the transition/adaptation period after graduation. Working over breaks may not have this effect because a working student may not invest enough effort into work: s/he knows that s/he will not continue working there when the next academic year begins.

There is another trend that deserves mention. If the model does not control for early work experience, the coefficients for academic degrees tend to be overstated. If the variables for working while studying are included in the model, the effects of academic attainment slightly decrease. This may be explained by the fact that those who work while studying at the university have an opportunity to apply their knowledge in practice, and thus, better understand the processes studied in class. Consequently, these individuals may be more productive at the workplace after entering the labor market. If the model does not control for early work experience, this effect may be captured by academic degrees. Therefore, differentiating between early and post-graduation work experiences may yield more precise estimates of the effects of education. Also, the coefficient for post-graduation work experience increases when the variables accounting for early work experience are excluded from the model. The increase shows that differentiating between these two types of experience may be important for estimating the effect of experience as well.

Conclusion

This paper has estimated the effect of early work experience on future labor market productivity. The results show that those who worked while studied earn relatively more than others. This finding may explain why the share of working students has increased in recent years. Working full-time while studying at university yields the highest returns, part-time working students earn 2% less than those who worked full-time. The effect of working over breaks is the lowest in magnitude, and it is not statistically significant. This can be explained by the fact that full-time and part-time working students spend relatively more time participating in the labor market prior to graduation and thus obtain more skills valuable for future transition to work. Also, those students who work only on breaks may not take the job seriously because they know that they will leave the labor market as the academic year begins. Therefore, having early work experience may signal that this individual can be more productive than those who did not work prior to graduation.

Including early work experience in the standard model for estimating the wage determinants may show that the effects of education and experience may be overstated when the variables for working while studying are not included. Therefore, it is important to differentiate between early and post-secondary work experiences to get more precise predictors for future earnings.

Limitations

The data used in this study does not allow to control for the economic sector/industry where students worked while studying. Controlling for the type of work the student engaged in may lead to a deeper understanding of the topic and result in more precise estimates. Also, the data does not allow to directly control for parental earnings at the time of children's studies. Additionally, it might be of interest to analyze the determinants of students' self-selection to work. The data does not allow to control for the specific personal skills and characteristics that may also affect students' decisions to enter the labor force while studying and labor market outcomes.

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