

REASONS FOR STUDENT EMPLOYMENT: EDUCATION SIGNALING UPSIDE DOWN

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ABSTRACT. While classical Spence model predicts that diploma may serve as a signal at the labor market in the sense that more productive workers obtain diploma and less productive ones do not, at the Russian labor market for students and young graduates the situation is rather reverse. We present a model that explains why there exists such a widespread student employment in Russia with more able students being more active in seeking the job and

striving to work full-time. We take into account an endogeneity of education

ment) settled by universities, and demonstrate that alternative signaling by job experience may exist even if productivity increase from education is high

and to explain the features of equilibrium that emerge at Russian labor market for young labor force.

1. INTRODUCTION

Last decades many countries experienced considerable growth of student employment. While in 1970 about 34% of US students were employed part-time¹, now the share of employed students at the age 16-24 is over 50% (Riggert (2006)). In most European countries the situation is similar: Hakkinen (2004) reports, for example, that "the fraction of students in employment varies from 48% in France to 77 percent in the Netherlands"². No surprise in the UK either: according to Hodgson and Spours, studies in several UK universities report that 70% to 80% of 16-19 year olds in full-time education are now involved in paid employment (Hodgson and Spours

people to seek an employment during their studies.

Russian labor market also experiences a continuous growth of student part-time and full-time employment. According to Economics of Education Monitoring Sur-

While ratios of employed and their growth in Russia correspond to the world-wide trend, there are some distinct features as well. First, it is not possible to take for granted a primary and solitary role of income factor for student employment. Occupation of Russian student is often related to their future profession. Many students are employed as interns and earn very little, while employment opportunities in several "blue-collar" areas (such as barmen, waiters, drivers etc.) might

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¹Source: US Census Bureau

²Hakkinen (2004), P. 1

sation. One may say that part-time or even full-time employment during studies serve as a mean of school-to-work transition. Students are usually seeking part-time job as early as 3rd or even 2nd year of postsecondary education. Graduate years seek full-time employment, so that a graduate has on average 1-2 years of professional experience in addition to university diploma. Second, while the student's decision to be employed is negatively related to family income, there are students with sound family income that chose to work early. Third, students with better academic achievements start work earlier. Instead of investing in better education they prefer to devote a considerable amount of time to work. That, at least at

tion. Moreover, employers often appreciate diploma with distinction less than the working experience of their applicants. Fourth, for considerable fraction of recent

students. Unsurprisingly, given the state of the army, male high school graduates seek to enter the university at any cost not for the sake of higher education but to avoid being recruited into army service³.

We provide an explanation for these stylized facts based on the analysis of inter-related strategies of students, universities and employers. The paper is organized as follows. The second section reviews the existing studies of student employment and highlights open questions that still exist. The third section presents a model that takes actual reasons for student employment into account. The fourth section provides discussion, empirical evidence and some policy implications.

2. REVIEW OF EXISTING STUDIES

Recent years have seen a large buildup of literature on combining full-time education with part-time work. This problem attracts more and more attention as employed students' numbers grow. One may indicate four main issues that are addressed in the existing literature on the student employment:

2.1. Reasons for employment.

Financial needs.

ing studies, tuition fees and inadequate income are the primary factors of student employment. Most of them were done by British researchers. Such a growing interest of UK academic community could be explained by major institutional change in the education system: in early 1990s the system of state grant support for higher education studies has been replaced by education loans that created an additional burden on students and their households.

is mentioned in many studies (see Callender and Kempson (1996), Kelly (1996), Lucas and Lammont (1998)). Ford et al. (1995) undertook a large survey of over a thousand students from four UK universities to study reasons and impact of part-time work on education. The results show that inadequate income is the main reason for working, with social life being the second-best factor. Studies by Sorensen and Winn (Sorensen and Winn (1993)), Paton-Saltzberg and Lindsay

this behaviour, see for example Dauce and Sieca-Kozlowski(2006) and POF poll results on the problem.

(Paton-Saltzberg and Lindsay (1993)) support the same view: employed students more often have taken student loans, have overdrafts, or expect to have to borrow further during the course of their studies than those not seeking job.

Kalenkovski and Pabilonia (2004) present theoretical model that illustrate poor conduct fail to relate number of student working hours per week to the schooling-

Social factors. Social factors also appear to be important for students choosing to work part-time during studies. Thus, Lucas and Lammont (Lucas and Lammont (1998)) note that respondents of 1994-96 study of Manchester high school and university students often mention such factor as making friends and learning new skills for social life.

Results of the focus group at Manchester Metropolitan University, undertaken in than money - primarily work experience and corresponding social skills, according

earn money along with experience. Similar results are reported by Hodgson and Spours (2001). Apart from detailed literature overview on work-employment issue,

analyze three studies of 1999/2000 on combining work and education: South Gloucestershire study (1999), Essex study (2000), and the Further Education Development Agency (FEDA) Study (1999). The age range for all studies is 16-19 and the education level is higher secondary and postsecondary school. Authors indicate that

ple and making new friends and developing a CV to help to get a better job in the future ⁴.

2.2. Impact on academic performance.

A distinct research question is whether employment is harmful for student performance, and this question has received much attention recently.

Results of a survey taken at Manchester Metropolitan University at 2000 (see part-time work: both adverse (such as missed lectures, lower grades) and positive (development of skills, greater understanding of the world of business, increase

rather large. Sorensen and Winn (1993) and Paton-Saltzberg and Lindsay (1993) indicate that from two-thirds to three-quarters of undergraduates with term-time jobs report some associated negative academic consequence (such as reduced time for academic study, missing course work deadlines, to missing classes). However,

of dimensions, it was the negative impact on extra-curricular activities, typically social life, that attracted the largest percentage response.

Callender and Kempson (1996), Hesketh (1996) demonstrate that there is a

There exist a number of local studies that demonstrate such a negative impact. Hunt et al (2004) provide detailed literature overview on the negative evidence

⁴Hodgson & Spours (2001), p. 7 (Journal of Education and Work, p. 379)

of part-time employment on academic attainment. Paul (1982) uses data from his macroeconomic principles classes at Towson State University during seven academic semesters from Fall 1976 through Fall 1979 (over 800 students in total) to and

students work, the less time they could devote to their studies. Wetzel shows a

globally, Kalenkovski (2004) also study an impact of employment of achievements. He uses National Longitudinal Survey 1997 data and these results are applicable to general college population (while most of other studies are limited by particular universities).

Stinebrickner and Stinebrickner (2003) obtain that working is detrimental to academic performance in college. They, as well as Hakkinen (2004), attract attention

work has on academic performance arises largely because the number of hours that

returns to in-school work even though the returns should diminish as individuals get more experience in the graduate labor market (for example, Hood, Craig and Ferguson (1992) found that grade point averages are highest among students with moderate amounts of work). So, any policy suggestions should be done very carefully.

McInnis (2003) summarizes evidence from US, UK and Australia to conclude that while part-time employment provides discretionary income and certain social skills, it generally harms student performance. Consequently, the author points out a need to reform educational institutions, as a number of working students increases each year. He proposes several directions of reform to adapt universities to higher student employment while keeping student learning a primary goal.

2.3. Structure and working loads.

On average, European working students spend 11 hours per week in paid employment and receive between 31 and 54 percent of their total income from employment (Euro Student 2000). Majority of studies (e.g., Ford et al (1995), Neill (2004)) report that students are mostly employed as unskilled labour and the job often has nothing to do with their studies and future profession. These studies also provide information on working loads. Ford et al (1995) mention that a majority of UK students are employed as unskilled labour while there is little or no connection with the students' course of study. Hakim (1996), Myles et al (1993), Jacobs (1993) report similar data on Canada and US. In a study by Lucas and Lammont (1998), when asked which industry they are employed in, most part of respondents mentioned

(less than 50 workers) with 12-14 working hours per week on average. Curtis and Lucas (2001) also report that students tend to work in industries such as retailing, hotels and catering.

2.4. Future employment prospects and career.

Future employment prospects and career represent quite important direction the employment-study research. While previous studies were merely focused on the system of higher education itself, here researchers consider more broad perspective of education system and labor market.

Ruhm (1997) provides detailed overview of pros and contras on in-school employment. He found a positive impact of employment during high school studies on future earnings and employment prospects (based on US data). Ruhm mentions

are more conclusive and typically conclude that work in high school is associated with increased future earnings. However, these studies are subject to the same

Ruhm uses geographic characteristics to identify a model which controls for the endogeneity of work.

make active connections between their part-time work and their full-time course; However, this group of students is the smallest one in the sample. Harvey et al. (1998) suggest that part-time, term time employment enables students to develop employability skills which can be discussed positively in recruitment interviews. While there exists rather large amount of such studies they normally focus on such a positive consequences on part-time employment such as improving personal characteristics and abilities rather than on the position of graduates on the labor market in the future that is largely determined by employers' beliefs, an importance of formal work experience etc. Possible explanation for such a bias lies in the fact that most of the work that students take during their studies is not related to their future work. So the main things here appreciated by employers could be improved managerial skills, better interview skills etc. (see Nail (2004) for detailed discussion).

Post-socialist countries present another story. Higher education systems partly bear a past-dependence consequences of their past functioning (see Roberts (1998)) and also experience a huge impact of labor market transformations. As a result of the situation when higher education system cannot perfectly provide students with skill and knowledge that are demanded at new labor markets many students start their career long in advance their graduation. They combine studies and work (often full-time) choosing a job related to their future profession. In turn potential future employers might regard work experience as a signal for positive attributes, e.g. high motivation and ability, and labor market contacts improve employment opportunities after graduation. Citing Harkonen (2001), Hakkinen reports that in a survey on students of the University of Helsinki, labor market contacts were reported as the most important reason for working during the enrollment, and 42

Roshchin (2006) in a longitudinal analysis based on RLMS⁵ concludes that the work during higher education studies serves the purpose of a ford in a higher

⁵The Russia Longitudinal Monitoring Survey (RLMS) is a series of nationally representative surveys monitoring health and economic welfare of households and individuals in the Russia. Data have been collected thirteen times since 1992.

Roshchin, in a setup of impaired education signaling opportunities, work experience productivity and thus employment probability between work experience and higher education.

The literature on study-employment issues is rather numerous, and we cannot grasp it all in this review. However it is useful to make two important general notions, both expressed by Riggert and colleagues (see Riggert et al. (2006)) after

apart from numerous data and methodological inconsistencies, there is no one-size-

observation, and a more surprising one, is that overall, empirical literature on the subject has at best modest theoretical base: "there is almost no theoretical modeling regarding the impact of student work experiences. Given the importance of postsecondary education and the prevalence of working students, student employment merits close examination". (Riggert et al. (2006), P. 23 (86 in a journal)).

employment relationship in Russia. Empirical data challenge the existing theories: in Russia, students with better academic achievements start to work earlier, almost all high-school graduates are enrolled in university programs, for consider-

they choose. This explicitly contradicts both human capital theory (Becker (1964), Schultz (1961)) and signaling theory of education (Spence (1973), Spence (1974)). Thus, we need to devise theoretical framework to provide some plausible explanation to this widespread phenomenon. What we observe resembles a countersignaling phenomenon (see Feltovich, Harbaugh and To (2002), Harbaugh and To (2006)). Countersignalling occurs when the signal an agent sends is non-monotonic in its

considers a signalling setup with three types of agents. High-types economize on costly education signal but instead rely on noisy additional information (former employer recommendation) to separate themselves from the low-types, while medium-types have to obtain conventional education to send a separating signal. Using a similar framework, Harbaugh and To (2006) show that, while voluntary signal disclosure (e.g., academic degrees) is available, in equilibrium high-types prefer to be modest and not to boast of their achievements. The model developed below does not derive countersignaling result explicitly, but the idea is close. Signal in our model is monotonic in agent's ability, but it increases or decreases depending on the type of equilibrium. Such a framework helps to focus on the circumstances that force individuals to revert from signaling to countersignalling rather than on the phenomenon itself. We extend Spence model (Spence (1973)) allowing agents to combine education and employment.

3. MODEL

3.1. Basic setup: discrete choice. To model behavior of students and employers, we use a following framework. Fresh university entrants have two options. They can devote all their time to studies or combine her studies with part-time employment. In the former case student earns nothing during studies but gets a good diploma

for her future career. While working, the agent does not have time to study well, and she gets poor education and average grade diploma. Then she starts to seek full-time employment. Potential employer reviews graduate's academic and job

Formally, we consider a game with 3 types of players:

Students. There exist two types of agents (prospective students) $i \in \{l; h\}$ (high or low productivity) with respective probabilities $\{\pi_l; \pi_h\}$. i is private information of i with certainty⁶.

Universities. Universities provide 1-period education programs.

Employers. Employers compete in Bertrand setup.

Timing. The timing is as follows:

1. Agent realizes her type and enters the university⁷.
2. The agent decides whether to combine studies with job. If she chooses to work,

experience provides a given amount of learning-by-doing increase in productivity L agent the least L she will accept.

cation e is obtained at the cost c . At the end of the period, agent graduates and leaves current job in search for a full-time employment. 3. The agent meets new employer and either signals her education e or shows the type and work experience L and receives wage $w(e); w(L)$.

4. The agent accepts or rejects either contract and in the former case produces $F(\cdot)$.

Thus, agent receives $w(e) - c(\cdot)$ if she devotes all her time to studies and $w(0) + w(L)$ in case she combines part-time job and studies. Consider a separating

$$c(\quad_l) = c(\quad_h) \quad F(\quad) = F(\quad_h) = F(\quad_l). \quad c(\quad) \text{ as}$$

Proposition 1.

2) Separating equilibrium with high-type agents concentrating on education expenditure: $c(\frac{1}{2}) < F(\frac{1}{2})$; $c(\frac{1}{2}) < F(\frac{1}{2})$; $c(\frac{1}{2}) < F(\frac{1}{2})$.

$$F(\quad).$$

Proof. Let us start with type-2 equilibrium, i.e. let the employer have the following beliefs: $Pr\{e = 1\} = 1$

For a type-2 equilibrium to emerge, productive students should combine work

Like any other Nash equilibrium, this can exist if certain strategies yield higher-or-

⁷We do not consider an option for an agent not to enter university. As was mentioned in

decreases entrance barriers for most students: the number of high school graduates is somewhat lower than the number of university freshmen for a number of years in Russia.

⁸Here we should not be confused by the sign of $c(\cdot)$: it is positive, as the cost function decreases in \cdot ; this designation is often used later on.

$$(1) \quad \frac{F(\theta_h) - c(\theta_h)}{F(\theta_h) - c(\theta_l)} = \frac{F(0_l) + F(\theta_h)}{F(0_l) + F(\theta_l)}$$

Thus,

$$(2) \quad c(\theta_l) - c(\theta_h) = F(\theta_h) - F(\theta_l) \\ \text{or} \quad c(\theta_l) = F(\theta_l).$$

In type-3 equilibrium, only high-type agents work part-time. Corresponding conditions and employer beliefs are: $Pr\{\theta = \theta_h | e\} = 0$

$$(3) \quad \frac{F(\theta_l) - c(\theta_h)}{F(\theta_l) - c(\theta_l)} = \frac{F(0_h) + F(\theta_h)}{F(0_h) + F(\theta_l)}$$

This transforms into

$$(4) \quad c(\theta_l) - c(\theta_h) = F(\theta_h) - F(\theta_l) \\ \text{or} \quad c(\theta_l) = F(\theta_l).$$

$c(\theta_h) = F(\theta_h)$. Let us show that this corresponds to the pooling equilibrium with beliefs $Pr\{\theta = \theta_h | e\} = 1$

$$(5) \quad \frac{F(\theta_l) - c(\theta_h)}{F(\theta_l) - c(\theta_l)} = \frac{F(0_h) + F(\theta_h)}{F(0_h) + F(\theta_l)}$$

i.e.

$$(6) \quad c(\theta_l) - c(\theta_h) = F(\theta_h) - F(\theta_l)$$

or $c(\theta_h) = F(\theta_h)$ Conditions for existence of hybrid equilibria are the same as conditions for corresponding separating equilibria.

Remark. Proposed structure of the equilibria points out situations when the cum laude graduates with no working experience are straightforward incompetent when it comes to a workplace while graduates with average or lower-than-average

student education-employment strategy: high-types choose to abandon studies if the studies do not single them out as productive ones. It may occur either because the education provided is not demanding or because the labour demand is so high

4. EMPLOYERS' BELIEFS AND EDUCATIONAL POLICY

ment, which can also be perceived as educational standard. High standards help

grade changes little as ability increases. Till now we considered universities to be

dents trying to attract the most motivated ones or, on the contrary, may diminish considerably the requirements needed to get a degree being oriented toward those

choice change the structure of the equilibria? While a goals-setting for the university is a long-standing research issue (Gross and Grambsch (1968), Patterson (2001)), the structure of the equilibria indeed depends on goals the university pur-

objectives: commercial and reputation-driven.

Commercial objective

The logic of a commercial objective is another way to formulate an Intuitive Criterion of Cho and Kreps (1987) for this model: the rational behaviour of the

in the previous section. However, the assumptions of university behaviour one is ought to make to produce Intuitive Criterion results do not look that rational when

other probable objectives, a reputation-oriented university is considered.

gives the university unit income⁹ $c(\theta)$. Assume further that a devoted student $c(\theta) = 0$.

Proposition 2

0.5, optimal educational policy is $c(\theta) = 0$. If $\theta > 0.5$ then optimal educational policy is any $c(\theta) \leq F(\theta)$.

Proof

$c(\theta)$ so that the larger part of population devotes time to studies. If $\theta > 0.5$ then there are more low-type agents, those that will abandon part-time job under $c(\theta) \leq F(\theta)$. As the university solves its problem, it sets $c(\theta) = 0$. In the opposite case, i.e. when the share of high-type agents is considerable ($\theta < 0.5$), university can raise

In case of $\theta < 0.5$ there may exist either separating or hybrid equilibria. Thus, exact type of the equilibrium may be determined by employers' beliefs on the type

educational output e . Then the proposition 2a follows:

Proposition 2a

Let the university control e $c(\theta)$ be constant. Then, if $\theta < 0.5$, optimal educational policy is $e=0$. If $\theta > 0.5$ then optimal educational policy is any $e: c(\theta) \leq F(\theta)$.

Proof.

In the equilibrium university sets e so that the larger part of population devotes time to studies. If $\theta > 0.5$ then there are more low-type agents, those that will abandon part-time job under $c(\theta) \leq F(\theta)$. As the university solves its problem, it sets $c(\theta) = 0$. In the opposite case, i.e. when the share of high-type agents $\theta < 0.5$, university can lower education output, only to a certain limit $e: c(\theta) \leq F(\theta)$. In case of there exist equilibria of each type,

⁹Here we interpret probabilities as shares in a unit student body. This income can be thought of as additional tuition fees. If we reverse the case and declare that any working student gives university income, the income can be thought of as bribes in some legal form.

be it separating, pooling or hybrid. Thus, exact type of the equilibrium may be determined by employers' beliefs on the type of student received high GPA. "

Reputation objective

who studied hard. The results of Propositions 2 and 2a apply here with a change in a condition: $\frac{1}{2} \geq 0$ instead of $\frac{1}{2} \geq 0.5$.

Proposition 3 $c(\frac{1}{2})$, e be constant. Then, if $\frac{1}{2} \geq F(\frac{1}{2}) - F(\frac{1}{2}) = 0$, optimal educational policy is $c(\frac{1}{2}) = 0$. If $\frac{1}{2} \geq F(\frac{1}{2}) - F(\frac{1}{2}) = 0$ then optimal educational policy is any $c(\frac{1}{2})$ $F(\frac{1}{2})$.

Proof. Expected wage of alumni who studied hard depends on the equilibria $c(\frac{1}{2})$. If low-type ones study hard in the equilibria, $(\frac{1}{2})$. For them to do this, university should set $c(\frac{1}{2}) = 0$. If low-types work (which is the case under $c(\frac{1}{2})$ $F(\frac{1}{2})$), then income of those who study hard in the equilibrium is $1 - (\frac{1}{2}) \frac{1}{2} \geq 0$. In a pooling

equilibrium of any type this condition realizes as equality.

Proposition 3a. Let the university control $e = c(\frac{1}{2})$ be constant. Then, if $\frac{1}{2} \geq F(\frac{1}{2}) - F(\frac{1}{2}) = 0$, optimal educational policy is $e=0$. If $\frac{1}{2} \geq F(\frac{1}{2}) - F(\frac{1}{2}) = 0$ then optimal educational policy is $e : c(\frac{1}{2}) = F(\frac{1}{2})$.

Proof. See Proposition 3.

This condition is also in favor of high-type agents studying under $\frac{1}{2} \geq 0.5$, but also allows for these equilibria for some $\frac{1}{2} \geq 0.5$, dependent on production function. Assume the market is in state when only low-types are working part-time. Universities have an option to induce high-type agents to work part-time in the equilibrium and use it as long as the costs for supporting high-type studying all

policy? Let employers treat alumni without work experience as low-types ones. Adequate response from universities is to lower $c(\frac{1}{2})$ (or e in case of a dual setup) to support this equilibrium. The opposite is also true.

Discussion. This model illustrates corresponding mechanism for Russian market for education. Employers need educated workers for competences still not provided or the quality is not satisfactory, while universities cut costs, and high-type agent loses the opportunity to signal its type. In this case high-type starts seeking job to reveal its type. In turn this stresses view of employers on educated workers as a low-types. Thus, the model allows to explain why talented students start working early. In developed countries, however, there is alternate educational setup -

and higher education is never regarded as a signal of low productivity. What's the

over , developed countries have a hybrid equilibria with high-types studying and employers perceiving high grade as a signal of high type. This corresponds to (6) or $c(\frac{1}{2}) = F(\frac{1}{2})$.

There are several factors preventing universities from such opportunistic behaviour that are not embedded into the model:

$$c(\frac{1}{2})$$

$c(\cdot)$ from decreasing $c(\cdot)$. In resulting equilibrium alumni signal their type by university rather than by GPA, $c(\cdot)$ have bad reputation.

$c(\cdot)$ and e . Then decreasing lowers wage premium for education (apart from type-signaling premium), and it becomes less attractive to receive higher education at all. This argument is

$c(\cdot)$ lowers e , this in turn shapes employers' beliefs and resent the taxpayers, and in response $c(\cdot)$ is raised back.

5. A PEER EFFECT APPROACH

Student receives education by means of communication with other talented students as well as by attending lectures. In other words, each student shares competences and experience with the others, and the better is the environment, the better education students receive. Of course, to share competences, a student needs suf-

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Assume the discrete choice model without educational policy. Assume a relation between amount of education a student may receive and an average productivity of students studying intensively:

$$e = E[\text{students not working part-time}]$$

Corresponding proposition follows:

Proposition 4.

- 1) Separating equilibrium with high-type agents concentrating on education ex-
 $c(\cdot)$ $F(\cdot)$;
- 2) Separating equilibrium with high-type agents concentrating on education ex-
 $c(\cdot)$ $F(\cdot)$;

$c(\cdot)$

$F(\cdot)$.

Proof. See Proposition 1.

$$c'_e(\cdot)$$

$F(\cdot)$ that both equilibria of types

$$F(\cdot) \in [c(\cdot_l), c(\cdot_h)]$$

equilibrium may be determined by employer's beliefs.

5.1. Continuous type. Now let us consider continuous $Q(\cdot)$ on $[\cdot_l; \cdot_h]$. The setup and timing remains the same, however, now there is capacity to model countersignalling (see Feltovich, Harbaugh and To (2002) phenomenon in this model. As before, students choose between combining education and work and devoting

j is

$$EF(\cdot_j | e) - c(\cdot_j) \vee EF(0) + F(\cdot_j),$$

or

$$EF(\cdot_j | e) + EF(0) \vee c(\cdot_j) + F(\cdot_j)$$

Here, for a given set of beliefs left-hand side of the equation (LHS) is constant in j i.e. the same for all agents. What about the left-hand side (RHS)? It is a sum of

be monotononic in j and then just a question of equilibrium threshold remains, or it can have a peak (or trough) to indicate two equilibrium behaviour shifts in j . The latter case is consistent with countersignalling phenomenon.

$$\exists j_1, j_2 : j_1 \leq j_2 \in [\ell; h] : c'(\ell_j i) + F'(\ell_j i) = 0 \text{ for } i = 1, 2$$

and

$$\begin{aligned} \max (c(\ell_j) + F(\ell_j)) &= EF(\ell_j | e) + EF(0) \text{ in case of a peak or} \\ \min (c(\ell_j) + F(\ell_j)) &= EF(\ell_j | e) + EF(0) \text{ in case of a trough.} \end{aligned}$$

$EF(\ell_j | e)$ as $\int_{RHS} Q(\ell_j)$ and $EF(0) = \int_{RHS} Q(\ell_j)$. Of course, these also depend on solutions to $EF(\ell_j | e) + EF(0) = c(\ell_j) + F(\ell_j)$. Existence of at least two solutions follows from continuity of both RHS and LHS and functional form satisfying countersignalling conditions (and Cauchy theorem, of course).

Discussion

What could we get from using continuous ℓ_j in describing this situation?

First, we now can explicitly model countersignalling phenomenon as a consequence of low educational standards. If $c'(\ell_j)$ does not decline in ℓ_j fast enough, more productive agents could abandon education for the sake of work experience signalling.

Second, in case of inverted U-shaped RHS "medium-types" also could behave

stay in the university. This case, for instance, corresponds to the situation when educational costs decline sharply for highest-productivity agents, being roughly the same both for lowest- and medium-productivity workers.

All in all, introduction of continuous ℓ_j gives further inside into the model.

Remark: other shapes of RHS. Is it natural to assume non-monotonic RHS derivative, $c'(\ell_j) + F'(\ell_j)$? For the sake of clear exposition, this was not considered. However, as long as RHS stays continuous, the main results concerning existence and uniqueness of equilibrium are unchanged.

6. EMPIRICAL EVIDENCE

Almost 50% of students involved in full-time university programs at Russian universities work on part-time of full-time basis. Table 1 presents time spent on paid work by students according to their majors from the same city they study in.

	Avg Work Load per week	Observations
Social sciences (Economics, law, management, sociology)	22.98	45
Foreign languages	11.25	4
philosophy, history, philology etc.	22.22	9
Math, programming	17.60	10
Natural sciences (physics, chemistry, biology etc.)	29.42	7
Technical sciences (engineering, construction, technology)	20.11	27
Medicine	27.70	17
Pedagogies	12.00	5
Culturology, Arts, Architecture	12.16	43

Employers believe that an experience is more important than grades and the list of the courses taken by the applicant. In 2006 Economics of Education Survey of employers the respondents were asked to rate on a scale 0 to 5 the importance of various factors they consider while recruiting new young specialists. Table 2 provides their mean answers along with a standard deviation across the sample of 1035 observations:

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Factor	Mean	Std. Deviation
University reputation/rating	3.584	1.219
The courses the applicant have taken	2.852	1.316
Grades	2.758	1.333
Recommendations/references	3.929	1.144
Previous work experience by the work-book	4.220	0.969

Here, the reference and previous work experience are graded highest with least variance, while the grades got least in mean and most varied importance.

And it should not surprise us that the students appear have similar beliefs: those that ever were employed apparently shift their perception of a university diploma. In a student survey, the respondents were asked to express relative agreement on a scale of 1 to 5 with one of the assertions: "I'd rather receive a diploma with high grades" (marked 1 for complete agreement) against "I'd rather study that interests me and is important for my subsequent studies" (marked 5 for complete agreement). Table 3 below compares the results among those who had an employment and those that never worked:

Table 3. Students' preferences and beliefs about importance of diploma

Status	Observations	Mean	Std. Deviation
Never had an employment	1067	3.626	1.266
Had a previous employment	1019	3.368	1.307

Here students who worked assess having high grades as having apparently lower

bias. However, those who did not work apparently should include those who are still seeking (and in so, valuing their grades lower) and thus absence of selection

¹¹In Russia, like many other countries, labour law requires to mark permanent employment in a work record card (a work-book)

Average workload in the sample is 21.17 working hours per week which is by somewhat harder, retention rate is higher and students are less valuable to the

of study (Table 4).

Table 4. Workloads and employment-major relationship

		Overall
Whole sample	18.26	21.17
First three years of study	16.20	17.10

Table 5. Lecture attendance and employment

Non-working students		Overall	
Whole sample	28.65	25.32	27.92
First three years of study	28.63	26.17	28.21

Non-working students		Overall	
Whole sample	13.42	13.64	12.77
First three years of study	13.35	14.76	13.16

There is apparent relationship between employment and academic performance in a student survey sample, though it might seem that there is another factor to the performance. Correlation between grades and hours spent on a paid work is listed in a following table 7:

Table 7. Employment and academic performance

Sample	Observations	Correlation value
All students with employment	281	-0.188
Students of 3rd year or lower	147	-0.161
Students of 4th year or higher	134	-0.262
Students of 3rd year or lower, less than 15 work hours per week	72	-0.084
Students of 3rd year or lower, more than 15 work hours per week	71	-0.117
Students of 4th year or higher, less than 15 work hours per week	36	-0.087
Students of 4th year or higher, more than 15 work hours per week	91	-0.194

This table leads us to the conclusion that grades (subjectively scaled by respon-

and we test it explicitly by running the ordered logit model on grades variable (28 observations):

Variable	Mean	Std. Deviation	z-stat	P-value
Year	.156	.087	1.80	0.071
Work hours per week	-.0248	.007	-3.38	0.001
Log likelihood = -358.95553	Pseudo $R^2 = 0.017$			

While if we include dummy indicating whether the work is connected to the

observations):

Variable	Mean	Std. Deviation	z-stat	P-value
Year	.146	.092	1.59	0.112
Work hours per week	-.0249	.008	-3.10	0.002
	-.573	.241	-2.37	0.018

7. CONCLUSION

Russian labor market experiences a continuous growth of student part-time and full-time employment. While ratios of employed correspond to the worldwide trend, there are some distinct features as well. The most important one is that while-at-university employment might be considered as a signal of productivity for perspective employers. This idea is supported by the fact that students with better academic achievements start work earlier. In considerable number of cases an employment is related to their future profession. Many students are employed as interns and earn very little, while employment opportunities hospitality and retail

diplomas less than the working experience of their applicants. University diploma is not any more a signal of high productivity, as costs are low, quality of education is low and employers do not believe in diplomas so much as in the work experience. To sum up, the results obtained from models and propositions above suggest several

Lack of funding of higher education creates incentives for universities to economize on education which makes early employment more attractive for the sake of signalling.

Talented students combining job and studies support low quality of education hypothesis. Employers believe in ability of talented students to combine successful studies with job.

Employers' beliefs are more than just an element of the equilibrium in the model. In case of multiple equilibria a shift in employers' beliefs can change equilibrium and thus amount of education each type will obtain.

This suggests that employer beliefs are a powerful educational policy tool.

This analysis also suggests the more employers know about quality of education provided, the better. Consequently, the situation might be improved if employers

in the form of trustees of the university's endowment or co-ownership. This should increase amount of information an education provides to employer. Educational

change the equilibrium to set the signaling role of the education superior of that to job experience. Unfortunately, this tool is not without very high transaction cost, and is very hard to implement and monitor.

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