Determinants of Long Study and High Dropout in Croatia's Universities

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University study in Croatia is characterized by a long average time to degree completion and a very high dropout rate. The first part of this thesis argues that, on the one hand, such poor university progress is a rational response to the prevailing economic and social conditions, while, on the other, the organization of university study, particularly the way courses are scheduled and the way exams are administered, hinder students in making on-time progress. The second part empirically examines this phenomenon using Labor Force Survey data, and finds that, while university students on average come from richer families and have more highly educated parents, their family background has relatively little to do with their progress in university. In addition, family income has little to do with the decision to drop out of university, while parents with a university degree greatly reduce the likelihood of dropout. Finally, while very few students work, many of those who drop out do so in order to take a job.

Table of Contents

1. Introduction

In Croatia, the average time to complete an undergraduate degree is very long. Traditionally, most study programs were designed to last four or five years, but on average students take between seven and eight years to finish. Even more remarkably, many students never finish their degree at all; as of 2004, the dropout rate was close to 70%. Relative to several other transition countries and most EU countries, initial enrollment in higher education in Croatia is already low (Polšek, 2004). These two trends combined mean that, overall, Croatia has a smaller share of persons who completed tertiary education[1]. Given the widely accepted importance of education to economic growth (Meier and Rauch, 1995), the poor progress through the university system means that Croatia is in a bad position to develop into a competitive and knowledge-based economy.

The long periods of study and low graduation rates have several other undesirable consequences. Firstly, they are a waste of a part of the public funds spent on subsidizing university education. While the number of students paying for some portion of their university education has been growing in Croatia, the government still covers all or part of the tuition for many. Furthermore, all students receive certain additional benefits, such as free access to public transportation, food subsidies, or residence in a student dormitory. In 2004, the estimated annual public expenditure per student was HRK 15,424, or approximately € 2000 (Babić, Matković and Šošić, 2006). While this figure does not distinguish among the costs for students in different stages of their studies, it is clear that a reduction in the number of years of schooling could provide significant savings for the government.

Secondly, since the majority of university students in Croatia do not work at all, the long periods of study mean a smaller labor force. This would be a problem anywhere in the world, but it is

1 The statistics bear this out: 12% of the population in Croatia finished some form of higher education, compared to 24% as the average of EU countries (MOSES, 2005; OECD, 2007).

particularly a problem in Croatia, which has negative population growth and university-age cohorts which are decreasing in size (Babić, Matković and Šošić, 2006). As of 2004, only 38% of the population aged 15-24 was active in the labor market, and an even smaller 24% was actually employed (Vehovec, 2004). The quality of human capital suffers also. Partly this has to do with the high numbers of students enrolled in low-prospect fields such as criminology and physical education (Babić, Matković and Šošić, 2006). However, it is also clear that a long period of effective unemployment and low achievement is not good preparation for the labor force.

There are several indirect paths by which poor progress through university lowers the overall quality of the higher education system. Long times to completion result in overcrowding at the university, and resources such as professors, classrooms, laboratories or computing equipment are often overused. This lowers the quality of education for all students, but also probably has a feedback effect of making student progress through the university system slower (Bound, Lovenheim and Turner, 2006). Similarly, in education there is evidence of a peer effect: students benefit if those around them are high achievers, and suffer if they are not.

Finally, as Polšek (2004) explains, high dropout rates and long terms of study tarnish the reputation of the university. This is not only a matter of prestige, but undoubtedly affects the actual performance of both students and professors. According to Polšek, students accept that long periods of study are the norm and that there is nothing disreputable or harmful about slow progress through university; therefore they inevitably put in lower amounts of effort. In turn, professors believe that quality teaching and curriculum improvements are lost on unmotivated and poorly achieving students. The conclusion is that poor university progress has a strong and negative feedback effect that leads both students and professors to underperform and compromises the learning environment.

Previous research on the possible causes of this phenomenon has mostly focused on the

effect that increased tuition has on reducing schooling time (Heineck, 2006; Garibaldi, 2007). Dolenec, Marušić and Puzić (2006) took this approach in Croatia by examining surveys of students and information collected by the universities at the beginning of each academic year and at the time of graduation. Because of the lack of detailed data that represents the entire university population (even those who drop out of university and are therefore not present in the above sources), the results were inconclusive, but they do suggest that minor changes in the level of fees, without other structural changes, are unlikely to bring about meaningful improvements.

This thesis further examines the causes of poor university progress in Croatia, both theoretically and by using Labor Force Survey (LFS) data from 2001 to 2006. The LFS data has a great deal of relevant information for the present study, particularly since it gives a cross section of the entire population, including students as well as those who attempted but never finished university. However, since the LFS is administered with other ends in mind, there are times when the structure or the integrity of the data is inappropriate for the questions in this theis. The paper takes pains to point out all such situations.

The rest of the thesis is organized as follows: chapter 2 gives a brief review of the relevant aspects of Croatian higher education, while chapter 3 examines previous research related to study progress. Chapter 3 covers the sources of data and the methodology used, and chapter 4 contains the empirical results obtained from the LFS data and interpretations of that data. Finally, chapter 5 tries to deduces general results from the data and presents a few concluding remarks.

2. Background on Croatia's higher education system

In spring of 1990, when the first democratic elections occurred in Croatia, the country had one large public university (the University of Zagreb, founded in 1669, and with around 50,000 students) and four smaller and newer public universities (the Universities of Split, Rijeka, Dubrovnik and Osijek, founded in the 1970s, and each with between 6,000 and 10,000 students). Students were traditionally admitted on the basis of high school grades and faculty-specific entrance exams, and the government paid the tuition costs of all enrolled students. The system of university funding, based on the number of enrollments, and the rigid remuneration system for professors, gave little incentive to graduate students on time.

In spite of the differences in quality and size, all the universities were nominally equal and their degrees equivalent**.** The structure and organization of these institutions were a combined result of almost 50 years of Communist rule and of the peculiar and particular tendency towards self-management that existed in Yugoslavia. The university was a “loose association of faculties, 'independent' research institutes, and other 'constituent parts' (e.g., student dormitories, libraries), linked by an agreement transferring certain, mostly formal and ceremonial, functions to the University Assembly, the Academic Council, and the rector” (Šunjić 2002). This meant that the university as an institution was weak and highly fragmented, and therefore, carrying out any set of centralized reforms was difficult. Students and professors belonged to a specific faculty, and there was little mobility between faculties. Developing a new branch of teaching and research required the creation of a new faculty or institute (research and teaching were divided among universities and institutes), exacerbating the university's fragmentation.

Over the next 15 years, Croatia saw a number of legal reforms intended to bring the higher

education system up to European standards as part of the general transition process. These reforms addressed the integration of faculties into the university as a means of resolving "financial and organizational irrationality" (Humboldt Club 2002). A binary system of polytechnics and universities was introduced to offer students more choice and to create a flexible form of professional education that would be directly relevant to the requirements of the labor market. Two more public universities (the Universities of Zadar and Pula) and several private universities were established. In addition to private universities, public institutions began semi-private activities, such as consultancy and admitting fee paying students enrolled above government-set quotas.

In 2004, Croatia began implementing Bologna Process reforms, and by 2006 all study programs conformed to the requirements of the Bologna Declaration. Student mobility between departments was improved with the introduction of the European Credit Transfer System, and a system of quality assurance was established. Education Quality Assurance. The OECD (2007) finds that participating in the Bologna process has had some positive impact on the measurement and assurance of quality in the Croatian higher education system. Student attendance is now required and monitored, and has improved; exam success rates are up; students are graded on ongoing assignments rather than just final exams; and, there have been curricula improvements.

Nonetheless, Croatia's higher education system still has problems, and there is a broad concern about the efficacy and value of the Bologna process. Bologna largely affects the structure of higher education, without saying much about the content. It appears that there is a kind of hope that with the right structure, invisible forces will push the content of education to what is best. Marijan Šunjić, a former rector of the University of Zagreb, claims that the Bologna reforms are one of several needed elements in the modernization of the university, and that they are not even the most important ones. He complains that, instead of being treated as such, the Bologna reforms are instead being used to

cover up the failure to carry out strategic reform in other fields (Šunjić 2005).

Finally, while there has been only scant research about the overall quality of the higher education system in Croatia, there is some information about whether the system is producing graduates to meet the demands of the economy. Lowther (2002) reports a survey of 300 Croatian employers who were asked to evaluate their employees in different categories, and to rate how important different qualities and skills are in a competitive employee. The survey found that the skills and qualities perceived by employers as most important were ethics, loyalty, reading capability, and basic knowledge. In all of these categories, Croatian employers were in general well satisfied with their employees. On the other hand, Croatian employers believed that the least important skills were knowledge of foreign languages, analytical ability, computer literacy, and teamwork. The managers surveyed evaluated their employees' skills to be low in these areas, particularly in computer literacy and knowledge of foreign languages. So, while employers in Croatia are satisfied with the quality of available candidates, they also rate them negatively on the skills which are generally thought to be the most important for the development of a knowledge economy.

3. Previous research

When examining poor university progress, the fundamental question is, why do students apparently choose to languish in university, rather than finishing on time or not enrolling at all? Clearly, a significant factor acting on student progress is the perceived value of being enrolled in university as opposed to being in the labor market (either employed or unemployed). On the one hand, this involves traditional economic calculations: benefits such as higher future wages and student perquisites weighed against forgone income and tuition costs. On the other hand, institutions such as informal hiring practices in the labor market, the lack of confidence in economic credentials, and the social and psychological benefits of student status are also present and undoubtedly enter into individual considerations of the perceived value of study.

Most immediately, each potential student considers the direct costs and benefits of being enrolled in university. Babić, Matković and Šošić (2006) give a breakdown of typical tuition costs in Croatia. The state covers the full tuition for approximately 40% of students. The remaining students are enrolled in either public universities, or in one of a growing number of private universities. In the public case, students pay 60% of the yearly tuition, which varies between HRK 5,500 (€ 730) for courses in the humanities and social sciences, to almost HRK 10,000 (€ 1,325) for medical school or natural sciences. In the private university case, students pay the full tuition amount, which can go upwards of HRK 30,000 (€ 4,000) . Furthermore, there are individual costs such as books and course materials, but also sizable individual benefits such as free public transportation, food and housing subsidies, and access to university resources such as libraries and job search services. At present, tuitions do not seem to have a major impact on the time to diploma. In one of the only studies on the topic of university progress conducted in Croatia, Dolenec, Marušić and Puzić (2006) found that, on average, both paying and nonpaying students take equally long to graduate.

Second, the value of a university diploma is necessarily a reflection of the economic realities in Croatia. Croatia follows international trends with respect to the value of higher education relative to that of primary and secondary education. Overall unemployment for those with a higher education degree is half that of those with only secondary school achievement. The higher-education wage premium in Croatia has been growing, and has reached 60% of wages for persons with secondary-school education over the last ten years (Babić, Matković and Šošić, 2006). Croatia's growth rate since 2000 has been strong, and with the prospects of entry into the EU, and the future development of a service-based knowledge economy, the value of a higher education degree will likely only increase.

Regardless of the positive statistical trends that might exist over the course of a lifetime among the population of the university educated, it is easy for university students to focus on less encouraging but more immediate facts. Even individuals with tertiary educational attainments have a difficult time obtaining employment – Babić, Matković and Šošić (2006) calculate that only half of the university graduates registered as seeking a job manage to find it within a year. According to Vehovec (2004), the youth unemployment rate in Croatia, although decreasing, is almost double the EU average, and is one of the highest even among transition countries.

Furthermore, there is an unfavorable profile of study for many students: the large numbers who graduate from departments with little practical value and scant chance of employment. Most of the growth in both the numbers of enrolled students as well as of newly opened institutions has been in the area of social sciences and humanities, which, not incidentally, are the ones which are most actively admitting paying students (Babić, Matković and Šošić, 2006). Little connection seems to exist between the number of people who are enrolled in programs and the labor market demand for graduates of such programs. For example, political science and journalism graduates have average job accession rates of 25% in the year after graduation; however, the number of first-year students enrolled in these programs

grew at a greater-than-average-rate in the period from 2000 to 2004 (Babić, Matković and Šošić, 2006). Even if such individuals find a job, it is likely that it will be outside their field of study. Babić, Matković and Šošić quote a study which shows that those forced to take a job outside their field have lower wages, worse promotion prospects and lower satisfaction with their job.

The previously discussed statistical data, while allowing that a university diploma is not a sure ticket to a secure and well paying job, nonetheless indicate that university graduates are in a much better position on average than those with secondary school or lower attainment. Therefore, traditional economic incentives seem to offer at best an equivocal explanation of the phenomenon of poor progress through the university system. A possible way to complement the purely economic picture is to consider the social institutions that also affect the perceived value of a university diploma.

The first such institution is the informal character of the labor market. Many individuals in Croatia, particularly young people, rely on relatives or connections as the main path to getting a job. According to Labor Force Survey data cited in Vehovec (2004), the largest share (35%) of employed people aged 20-24 stated that they are either employed in a family business or they came by their job directly through the help of family or friends[2]. The informal aspects of the labor market clearly lower the value of a university diploma for job seekers. A related institution is the lack of trust in government bodies. Using 2000 data from theEuropean Values Survey in an analysis of the social values of Croatian citizens, Rimac and Štulhofer (2004) find that trust in government institutions and the performance of the government in Croatia is lower than in other EU accession countries, and significantly lower than in EU countries. This lack of trust also clearly extends to government support for finding a job, considering that only about 3% of those who found a job in 2003 found it using the Croatian Employment Service (Vehovec, 2004). However, this lack of trust also possibly extends to the

2 Most of the remaining survey subjects responded that they either contacted the employer directly or were contacted by the employer, and while the survey does not provide data about the involvement of personal networks in these cases, it leaves room for the role of passive job search to be larger that the direct numbers.

value of educational credentials from public universities, particularly considering the previously discussed unfavorable profile of studies for many students.

Finally, there are the psychological and family benefits of university study. As Babić, Matković and Šošić put it, "the dilemma after completion of secondary education is often not: participate in the labour market or attend college, because the alternative to college is not employment but mostly a long period of unemployment" (2006). It is well documented that unemployment is a stressful and unenjoyable experience; on the other hand, university study is often looked on favorably and indulgently by one's family. The decision to enroll in university and to study for long periods of time is made easier by family support, and in Croatia family support seems to be abundant. As shown in the analysis of LFS data, over 90% of students aged 25 still live at home.

Given these social conditions, a clearer picture begins to emerge of the problem of poor university progress. Perhaps the most satisfying and complete model of the individual choices on university study length and rate of completion comes from Dornbusch, Gentilini and Giavazzi (2000), who attempt to explain the high dropout rates and long periods of study in Italy. The statistics in Italy are almost identical to those in Croatia: two thirds of students drop out of university, and those who graduate take over seven years on average to do so. The labor market also displays informal characteristics, and job search is often a passive and social activity, with individuals waiting for a job to come to them through a network of relatives or acquaintances. Student status looks good to both the student's family and to potential employers. Given the large rates of unemployment, students rationally choose university enrollment as a safe option. They enroll in university, and in this way, make themselves available to whatever wage premiums or better job opportunities they might get if they actually finish. However, they are actually waiting for a job, and if a good one comes along, they take it and drop out of university. Otherwise, they get a diploma, stay unemployed and keep waiting.

The foregoing discussion dealt with the role of the perceived value of university enrollment

in determining how long students study and whether they finish. While this is clearly a central component of poor student progress through higher education, it is based on the assumption that students have the ability to graduate whenever they choose. In reality, it is possible that some students are earnestly working towards their degree, but institutional aspects of the university hinder their progress. In particular, the university curriculum (what students learn, and how their learning is structured) and the conditions of university study also matter.

Using data from the Netherlands, Jansen (2002) gives empirical support for a number of factors contributing to study progress and academic success in university, and her classification and description is a useful reference for the present analysis. She specifies three categories of such factors: student-bound factors, effective instruction and curriculum organization. The first of these, student-bound factors, has to do with such issues as personal time-management and study methods, intelligence and talents, and individual motivation. Such individual characteristics can generally be excluded from from an analysis of aggregate trends, unless we believe that large portions of the population are either unmotivated, unintelligent or have bad study methods.

Under the second category, curriculum organization, Jansen includes several hypotheses about how the university process should be planned to maximize student progress. The essence of her argument is that classes that are taught over a long period, such as a semester or even the whole school year, encourage students to put off work. The situation gets worse if many such classes are scheduled in parallel, since in that case students are additionally distracted and unlikely to study effectively. Finally, the worst combination is when many such classes, scheduled in parallel, all have exams scheduled at roughly the same time, since the exams compete with each other and performance on each exam is compromised.

The situation in Croatian universities is almost exactly the one that Jansen describes. All courses are scheduled for at least a semester, and many are scheduled for the whole academic year.

Course loads are generally heavy – on average 30 hours per week – and it is common for students to have 8 or 10 courses scheduled simultaneously (Miclea, 2003). Typically, students make their first attempt at passing exams at the end of the school year after lectures have finished. It is not surprising then, that even after ignoring the students who have dropped out, a quarter of students have to retake their freshman year[3] (Babić, Matković and Šošić, 2006).

Jansen next discusses effective instruction, under which she includes most of the interaction between the instructor and student. Particularly, she emphasizes the importance of a good mechanism of student assessment and feedback. Again, the situation in this respect is unfavorable in Croatia, since student completion of a course is traditionally based only on a final exam. Furthermore, since courses mostly consist of a series of lectures, there is little opportunity for feedback on student learning and progress. An additional problem of the strongly lecture-centric teaching style inherited from the Austro-German education model is that students in many faculties are graded on rote memorization of the course material, which can become unrealistically large for a year-long course.

Next, research on increasing times to degree in the United States (Bound, Lovenheim and Turner, 2006) suggests that better resources lead to better performance and shorter study times. It is likely that inadequate resources are also part of the problem in Croatia. In the last ten years, there has been a large increase in the number of students enrolled in higher education. However, Babić, Matković and Šošić (2006) report that, even though there have been several instances of large hirings of teaching staff during the same period, the teacher numbers still lag behind the increases in student enrollment. A further problem is that adequate training of higher education teaching staff is a very lengthy process, so the current student/teaching staff ratios do not tell the whole story. In addition, it appears that there has also been inadequate growth in spatial capacity and technical and supporting infrastructure.

3 Not having to retake the year means satisfying certain minimal requirements about the classes passed successfully, but still leaves open the option that students failed certain classes or did not even attempt some exams.

The large increases in student enrollment that have been causing resource shortages have been the result of the new semi-private activities of public universities. The revenue-maximizing behavior of individual faculties is to be expected, and is positive in certain respects, but the current form is clearly harmful overall, considering the problems that result from overenrollment (Polšek, 2004). Since this growth is a recent phenomenon, it might be concluded that the problems of the curriculum and of the quality of university resources have also been a recent development. However, there is strong evidence that the present problems of higher education in Croatia are largely path-dependent. First, a country study by the Library of Congress (LOC, 1992) found that higher education in former Yugoslavia was also characterized by long periods of study and high dropout rates. The present situation still supports this view: other former Yugoslav republics currently face similarly unfavorable trends in study times and dropout rates[4]. There is at least one clear mechanism for the transmission of rigid, inefficient and outdated teaching and organization practices in higher education: the low influx of new professors, and the high average age of existing professors (Polšek, 2004). In addition, the university has been weak in contrast to individual faculties, making significant reform and coordination difficult (Šunjić, 2002).

A very useful analysis of the role of university and course organization on study times and dropout rates again comes from Italy. Michelotti (2004) traces the origins of poor university progress in Italy to new laws passed in the 1960s which made university access virtually universal. As Dornbusch, Gentilini and Giavazzi (2000) put it, "knowledge is a public good, the university certainly is not." Michelotti goes on to describe several other circumstances that contributed to the problem. The higher education system was mainly represented by universities. The system was excessively rigid and offered only four-year courses, and no ability to gain an intermediate diploma. Course loads were excessively

4 The Montenegrin newspaper "Vijesti" reports that obtaining an engineering degree at the University of Montenegro takes on average a full 9 years (the article is available online at http://www.mediaclub.cg.yu/zanimljivi/zanimljivi%202002/mart/09.htm).

large, courses were unconnected with the demands of the labor market, and the university provided weak support for those who had fallen behind in their study progress.

This description also closely matches the traditional situation in Croatia. The picture is changing somewhat because of the reforms of the Bologna Process. The ECTS credit system will make transfer between programs easier. The newly reorganized 3+2 year structure for most study programs will make it easier to obtain certification early. Nominal attention has been paid to the demands of the labor market, and, even though it is riddled with problems, a system of polytechnics has been introduced to complement the more academic university education. However, Polšek (2004) warns that it is very likely that there will be an implementation gap with the Bologna reforms: while the laws will be obeyed in letter, significant changes will be difficult to effect.

While all of the above arguments have some influence on the time that students take to graduate and on their decision whether or not to drop out, some are probably more important than others. Table 1 summarizes each argument and assesses its probable impact, while the following chapters examine the phenomenon of long university study empirically and shed some light on the relevance of these possible causes.

Table 1: Summary of previous research arguments

Argument	Probable impact	References
Costs of tuition, books, materials	Low. Tuitions are still relatively low and research finds that students take as long to graduate whether or not they pay tuition.	Babić, Matković and Šošić (2006); Dolenec, Marušić and Puzić (2006).
Improved job prospects and wage premium due to university diploma	Medium. It is still not commonly appreciated how valuable a university diploma is and will be.	Babić, Matković and Šošić (2006).
Youth unemployment	High. Youth unemployment is high, visible and a strong motivation to stay in university as a comfortable alternative.	Vehovec (2004); Babić, Matković and Šošić (2006).
Informal hiring practices (jobs come through family and friends)	High. Incidence of finding jobs through family is high, and student status looks good to potential employers.	Dornbusch, Gentilini and Giavazzi (2000).
Curriculum organization (heavy course loads, emphasis on rote memorization, infrequent examination periods)	High. The current organization of the curriculum makes it unlikely that an average student will proceed on time.	Jansen (2002); Michelotti (2004).
Insufficient resources (professors, facilities, computers)	Low. It isn't clear to what extent the current resources are being used, but they could be used more efficiently.	Polšek (2004); Bound, Lovenheim and Turner (2006).
Rigid program structure/Bologna Process reforms	Uncertain. The restructured curriculum (3+2 year programs) might reduce dropout by giving students an earlier option at a diploma.	Polšek (2004).
Social factors (prestige of university study; family support for students)	Medium. While family support is not a first level reason for long periods of study, it is unlikely that students could afford to remain students for as long without such support.	Dornbusch, Gentilini and Giavazzi (2000).
The university lends itself to the “game” because of the system of funding	Uncertain. It is unclear how much the financial interests of the university make it indifferent or opposed to graduating students on time.	Šunjić (2002); Dornbusch, Gentilini and Giavazzi (2000).

3. Data and Methodology

The Labor Force Survey in Croatia has been administered since 1996. Since 2000, the survey has been administered continuously, first using the data of the Croatian electrical utility, and then using census information. The pooled observations from the 6 years total 119, 093, or about 2.5% of the Croatian population. Table 2 shows the number of observations and of distinct households for the years 2001-2006:

Table 2: LFS dataset size for years 2001-2006

Year	***Observations***	***Households***
2001	20,044	7,062
2002	22592	8063
2003	20,402	7,281
2004	19,255	6,934
2005	18,723	6,838
2006	18,077	6,613
Total	11,9093	42,791

The present study infers results mostly from counting observations that fit certain criteria, and occasionally, from ordinary least squares (OLS) regressions. Since many of the statistics of interest are discrete and take on only a limited number of values, a Tobit regression might have been more appropriate. However, for all the results presented, Tobit regressions gave equivalent results as OLS; the OLS results are presented because they are simpler and more intuitive to interpret.

A few points need to be made about the use of LFS data for the present study. Firstly, the LFS generally does not cover institutionalized populations; in particular, this means that it does not involve persons serving military duty and those in student dormitories. The first of these omissions is probably relatively small, as Croatia has been moving away from mandatory military service and

towards civil service. The second is a more serious omission, since about 10% of the student population lives in student dormitories (for 2006, the Croatian Statistical Service lists 132,952 students enrolled in higher education, of which 11,475, or 8.6%, live in dormitories). Because of the lack of this data, the present thesis unfortunately does not deal with this potentially important demographic.

Secondly, in the LFS used, the day that the survey was conducted, and occasionally, even the period (the LFS divides the year into six periods) were missing. When the period was available, this was used as an approximation for the date, and when the period wasn't directly available, it was itself approximated, since the number of observations in each period is roughly equal and the data is structured in such a way to put earlier observations first. The consequence of this is that it is impossible to precisely determine such variables as the age of a person and the number of years since the time of graduation (relative to the time of the survey); therefore, the values obtained are reasonable approximations.

Finally, using the LFS data, it is only possible to collect useful information on family background if the person still lives at home (in the data, either as child or grandchild) and his or her information was collected in the same household sample. For examining those under student status, this is acceptable, since most still live at home well into their 20s. However, for the general population, after age 22, the number of persons living at home, while still large, drops off quickly. This means that analysis of impact of family background on the age at which a person graduated is likely to suffer from some form of sample selection bias. The table below gives the precise distributions for those aged 18-26.

Table 3: Percentage of persons aged 18-26 who live at home

	Living at home	
Age	***Student***	***General population***
18	98%	97%
19	96%	95%
20	93%	92%
21	94%	90%
22	90%	85%
23	92%	81%
24	92%	77.00%
25	90%	72%
26	93%	67%

4. Analysis

According to the LFS data, 11.2% of the Croatian population has some kind of higher education degree. Among these, 4.6% graduated from a polytechnic, 6.1% graduated from a university, and 0.4% graduated from master's and doctoral programs. The relevant question for the present theis is, when do people graduate from university? For the whole population, the answer is at about 25 years, while for those who graduated since 1996, the number is a slightly lower, 24.7 years (these data are not precise because the graduation date is known to the year only, and because students can graduate at different times; here, it was assumed that everybody graduates in June). For each individual year between 1996 and 2006, the average age at graduation fluctuates around 24.5 years, but in 2005 and 2006, it increased to over 25 years (25.4 and 25.7 years, respectively). Since most people are 18 or 19 when they enter university, this means that the average time to graduate is between 6 and 7 years.

What influences the age at which students graduate? Table 4 shows the results of the regression $dobDipl = cons + \beta_1 sex + \beta_2 phil + \beta_3 soc + \beta_4 nat + \beta_5 eng + \beta_6 parentHe + \beta_7 netto + \beta_8 hazpers$ run on the sample of persons living at home and at most 40 years of age, where dobDipl is the age at graduation, *sex* is 0 for females and 1 for males; *phil*, *soc*, *nat*, and *eng* are 1 if the person graduated from a humanities, social science, natural science or engineering faculty, respectively, and 0 otherwise; *parentHe* is 1 if at least one of the parents graduated from university, and 0 otherwise; *netto* is the net monthly household income in HRK; *hazpers* is the number of persons in the household; and *cons* is the intercept.

Table 4: Determinants of the age at graduation

dob_dipl	***Coef.***	***Std. Err.***	***t***	***P>|t|***
sex	0.41	0.21	-1.98	0.05
phil	-0.39	0.41	-0.95	0.34
soc	-0.21	0.24	-0.91	0.37
nat	-0.58	0.40	-1.43	0.15
eng	0.48	0.31	1.54	0.12
parentHe	0.58	0.21	2.79	0.01
netto	0.00	0.00	-4.65	0.00
hazpers	0.18	0.10	1.72	0.09
cons	23.94	0.56	44.39	0.00

The different fields of study aren't statistically significant, and the number of persons in the household is significant only at the 10% level. The effect of family income is statistically, though not practically, significant – after rounding, it isn't different from 0. The parents' education level is statistically and practically significant: those students who have at least one parent with a university degree graduate 0.6 years later on average. The gender is also statistically and practically significant, and women graduate on average about a semester sooner than men.

What about those former students who no longer live at home? The average age at graduation for persons under 40 is almost identical whether or not they live at home (23.93 versus 23.96 years, respectively). This can give us a small assurance that the two groups are not statistically very different and that we are not missing out on important information by not examining those who no longer live at home.

Using data from the LFS, there are two possible ways to classify a person as a university student. First, “practical” or “real” students are all those who attended university in the last 4 weeks (or the last 3 months, in the surveys prior to 2004). Second, “declared” students are all those who attended university, and additionally declared that their primary activity is “student”. The following table shows

the percentage of university students in the part of the population aged 18-29 according to the two classifications; the numbers are actually slightly higher than those published by the Croatian Statistical Service.

Table 5: Share of practical and declared students in the population from 18-29 years of age

Year	***Practical***	***Declared***
2001	15.84%	15.19%
2002	17.64%	16.73%
2003	17.12%	15.95%
2004	17.69%	16.73%
2005	18.43%	17.47%
2006	22.01%	20.94%
Total	18.12%	17.17%

About 7.6% of those who attended university don't classify themselves as student. Some possible reasons for this is that the person graduated in the meantime or that he is working; in the data, 80% were working, 16% were not working, and 2% were pensioners[5]. If we restrict to ages 18-29, only 3.7% are practical but not declared students, and about 80% of those are working. The conclusion is that among the population aged 18-29 that attended university in the recent past, only about 3% classify themselves as working.

However, it is possible that somebody holds a job but doesn't classify himself as working. Again restricting to persons aged 18-29, the share of practical students who worked at least 20 hours in the week previous to the survey rises to 5.9%, while the share of those who worked full time is 4.5%. While these numbers are higher than the previous figure of 3%, they are still very low, and indicate that very few persons who are attending university also hold jobs, particularly full-time jobs. Furthermore, when students who are not employed were asked whether they would like to start working provided that they could find an adequate job, only about 12% responded positively. This statistic casts some

5 There are only 4 observations of pensioners who are also attending university. Two of those are likely data entry errors, as they are persons aged 25 and 27. The other two are probably receiving invalidity pension, since they state their reason for not working is “own illness”.

doubt on the assertion that students enrolled in university as simply biding their time until a job comes along.

What is the age distribution of university students? Table 6 gives the share of practical students in their age cohort (ages above 30 have been omitted since the share was below 1%). The majority of students apparently enroll in university at age 19 or 20. A significant share (20%) are still students at age 24, but starting at age 25 the numbers begin to drop off rapidly, indicating that most students have either graduated or given up trying.

Table 6: Share of university students in age cohorts 18-26

Age	***Attended university***
18	3.96%
19	25.93%
20	32.28%
21	29.43%
22	27.99%
23	22.72%
24	20.28%
25	11.99%
26	7.03%
27	4.14%
28	3.20%
29	1.42%
30	0.89%

We can also get an insight into the family background of university students and compare them to other parts of the population. Table 6 gives the distribution of the highest level of education attained by the father of practical university students, practical polytechnic students, and the general population (the sample has been restricted to those living at home).

Table 7: Father's highest achieved education level for university students, polytechnic students, and general population

Father's education	***University***	***Polytechnic***	***General Population***
No school	0.09%	0.18%	0.39%
1-3 years of school	0.00%	0.00%	0.54%
4-7 years of school	1.23%	1.80%	4.41%
Elementary school	4.89%	10.81%	17.56%
Vocational school	31.05%	42.88%	38.64%
High school	24.26%	19.46%	21.97%
Gymnasium	4.13%	2.70%	1.96%
Polytechnic	12.35%	11.53%	5.88%
University	19.56%	10.45%	7.84%
Master's	1.57%	0.00%	0.55%
Phd	0.85%	0.18%	0.26%

In the general population, 17.6% had a father who finished only elementary school, while for university and polytechnic students, this was 4.9% and 10.8%, respectively. A similar distribution holds for fathers who finished a vocational school. The situation is reversed at the upper end of the education spectrum: almost 22% of those studying in university have a father who has a university degree; 10.5% of those in polytechnics also have university graduate for a father, while in the general population, this number is only about 8.7%. Furthermore, those attending universities had a mean family income of 7,402 HRK (€ 982)per month, those attending polytechnics 6,512 HRK (€ 864), while in the general population, the mean was 6,119 HRK (€ 812). Therefore, those enrolled in universities have significantly richer and more highly educated families than those studying in polytechnics, who in turn have families that are significantly richer and more highly educated than the general population.

In the surveys from 2004 onwards, data is available about the year during which a person completed his highest level of education. Since we know the number of successfully completed university years for students who graduated from 12-year high schools, we can estimate whether such students are on track (the number of university years equals the number of years since the time of high school graduation, adjusting for the fact that the high school students graduate in June) or whether they

have fallen behind in university (the number of years of high school education is less than the number of years since high school graduation). This is the best proxy we have for study time, since the actual age of enrollment is not available. Table 8 gives the distribution of years that practical students have fallen behind by age; the values are the row percentages, and the missing entries are 0.

Table 8: Distribution by age of university study debt (years at university less years completed)[6]

Age	***StudyDebt***										
	0	1	2	3	4	5	6	7	8	9	10
18	100										
19	66	34									
20	44	44	13								
21	35	39	18	8							
22	26	35	22	9	8						
23	16	30	24	11	11	8					
24	5	14	39	19	10	6	7				
25	3	6	22	27	20	6	11	4			
26	4	5	2	13	36	22	5	9	4		
27	0	2	7	5	16	30	20	7	11	2	
28	4					15	26	22	7	22	4
29						21	11	5	21	16	26

Again, it is possible that these values overestimate how far behind the students have fallen in their studies, since it treats a student who graduated at 18 and entered university at 18 the same as one who graduated at 18 and entered university at 20. Nonetheless, there is a clear pattern that students tend to fall behind in their studies early, and that their study "debt" increases on average as they age.

In examining possible causes of such study debt, as before, we need to distinguish between those students who live at home and those who do not. About 9% of practical students aged 18-29 do not live at home. Firstly, there is an interesting relationship between study debt and living at home for those practical students aged at most 29. Table 9 gives the results of the regression $studyDebt = cons + \beta_1 liveHaz + \beta_2 work20$, where *liveHaz* is 1 if the student lives at home and 0 otherwise; work*20* is 1 if the student works at least 20 hours per week; and *cons* is the intercept.

6 The table shows the number of observations in the LFS data, not the percentages.

Table 9: The effects of working and living at home on study debt

studyDebt	***Coef.***	***Std. Err.***	***t***	***P > |t|***
livehaz	-0.57	0.18	-3.2	0.00
work20	2.6	0.22	11.84	0.00
cons	2.14	0.17	12.44	0.00

All three variables are clearly statistically and practically significant. Living at home actually reduces the time spent studying by more than half a year. Predictably, students who work at the same time are further behind in their studies, by over 2 years.

We can now focus on students living at home. The regression

$$studyDebt = cons + \beta_1 sex + \beta_2 phil + \beta_3 soc + \beta_4 nat + \beta_5 eng + \beta_6 parentHe + \beta_7 netto + \beta_8 hazpers + \beta_9 work20$$

was conducted on the sample of students who live at home and are younger than 30. All the variables have the same meaning as in the regression of the age at university graduation presented in table 4, except that *work20* is again 1 if the student works more than 20 hours per week and 0 otherwise.

Table 10: Determinants of study debt

studyDebt	***Coef.***	***Std. Err.***	***t***	***P>|t|***
sex	0.16	0.10	1.48	0.14
phil	-0.13	0.19	-0.70	0.49
soc	0.15	0.13	1.13	0.26
nat	0.18	0.18	1.01	0.31
eng	-0.20	0.17	-1.21	0.23
parentHe	-0.08	0.11	-0.72	0.47
netto	0.00	0.00	0.39	0.70
hazpers	-0.24	0.05	-4.39	0.00
work20	2.19	0.25	8.62	0.00
cons	2.40	0.25	9.56	0.00

As before, the individual courses of study are statistically insignificant, and the net family income is both statistically and practically insignificant. Interestingly, the gender and whether at least one parent graduated from university are now also statistically insignificant. However, if the student works, he is

expected to be more than two years behind schedule than if he does not work. The number of persons in the household is also statistically and practically significant, but the real-world interpretation of this is not clear.

Importantly, we can also get an insight into the backgrounds of students who drop out from university. In the present analysis, we define dropouts as graduates of 4-year high schools (who therefore presumably had 12 years of education at the time of graduation), who have more than 12 years of education, but no higher degree, and who are not currently attending university. This will exclude the students who dropped out without completing a year of university. We can get an idea of the frequency of dropouts by looking at the number of years of completed education for university students, shown in table 11.

Table 11: Number of years of completed university years for current university students

Years of university	***Freq.***	***Percent***	***Cum.***
0	1187	37.3	37.3
1	548	17.22	54.53
2	551	17.32	71.84
3	686	21.56	93.4
4	188	5.91	99.31
5	21	0.69	100
Total	3182		100

If students didn't drop out and progressed through the system on time, the numbers for each year should be roughly constant, and would drop off at the end (from 4 completed years of university) only because few faculties last longer than 4 years. If students don't progress on time, the number of students from year to year will increase, as the inflow of new students is not matched by the outflow of old students. If students drop out, then the number of students will decrease from year to year. Therefore, if the numbers are increasing or decreasing, we can conclude that one of the two causes (not passing the year or dropping out) is dominating. The pattern we observe is that the number of students

from the first completed year to the second more than halves; therefore, even when accounting for the poor progress of some students during their first year, the dropout rate during the first year must be huge. From 1 to 3 years, the number of students in each year increases, indicating that the number of students who progress slowly but stay in university dominates the number who drop out. The large number of students who apparently drop out during the first year suggests problems of university organization: either admissions are to lax or the requirements made on students are not realistic or both.

The number of years of schooling finished by dropouts is another indicator of the dropout rate. 40% drop out after the first completed year, 33% after the first two, 20% after the first three, and the remainder (about 7%) after 4 or more. Again, those who drop out before completing even one year of university could not be counted. In other words, in each year following the first completed year of university, a relatively constant share of students drops out.

What are young university dropouts doing? Among those younger than 30, 77% classify themselves as working, 12% as not working but able to, and the remainder are unable to work or in some special situation such as military service or prison. The regression

$working = cons + \beta_1 age + \beta_2 urban$ presented in table 12 is very suggestive about what university dropouts are doing. It measures the effect among the population of young people (younger than 30) who are not students that being a dropout has on the probability of working.

Table 12: The connection between dropping out of university and employment

working	***Coef***	***Std. Err.***	***t***	***P > |t|***
dropout	0.17	0.03	5.83	0.00
age	0.05	0.00	51.55	0.00
urban	-0.03	0.01	-3.73	0.00
cons	-0.76	0.03	-29.90	0.00

Here, it is important to control for the level of urbanization since students who drop out might have access to jobs not available to those outside of cities. Also, the age is controlled for since the prospects

of working change significantly between early and late 20s. Even when those variables are controlled for, students who drop are still 17% more likely to be working than others of the same age (excluding students; the figure is considerably higher if students are also included).

The LFS also contains data for those who are working about their activity previous to getting their current job. For university dropouts younger than 30, about 40% report that they were previously working in some capacity; 46% report that they were studying; and about 10% were not working. 37% of those dropouts who are currently working either got their job through family or friend connections, or are actually employed in a family enterprise. Another 30% state that they contacted the employer directly or were contacted by the employer and it can be expected that in a large fraction of these cases, family and friend connections again had a role. The conclusion is that a large number of students who drop out of university do so to take a job, and that many of those jobs come through personal or family networks.

Finally, we can check for determinants of the decision to drop out of university. The analysis to those living at home and aged less than 30, and is further restricted only to those who graduated from a 4 year high school. The regression equation is

$$dropout = cons + \beta_1\, parentHe + \beta_2 netto + \beta_3 hazpers\, \beta_4 sex + \beta_5\, yearsUni$$

Table 13: Effects on the probability of dropout

dropout	***Coef.***	***Std. Err.***	***t***	***P>|t|***
parentHe	-0.02	0.01	-3.19	0.00
netto	0.00	0.00	2.71	0.01
hazpers	-0.01	0.00	-3.37	0.00
sex	0.01	0.00	1.69	0.09
yearsUni	0.02	0.00	13.07	0.00
cons	0.03	0.01	2.74	0.01

All the variables are as previously defined. Except for *sex*, which is significant only at the 10% level, each variable is significant at the 1% level. The effect of both household income and the number of persons in the household is negligible. A parent with a university diploma decreases the chances of

dropout significantly, as does the number of persons in the household (though to a lesser extent). An additional year at the university and being male increase the probability of dropout. The intercept is artificially low, because as we have seen, the largest number of students probably drop out before completing their first year, and they are not represented here.

5. Conclusion

The long average time to undergraduate degree completion and the high dropout rate in Croatia are most likely a complex combination of economic and social causes. First, the economic prospects of most high-school graduates are such that going to university, at least until a job comes along, is a rational choice. Even young university graduates face a difficult time finding a satisfactory job; therefore, staying in university and waiting for a job to filter through the social network is a safe option. It is made easier by family support and relatively low university fees;

Second, the university structure makes it easy for students to fall behind in their studies and to graduate late. Many simultaneously scheduled courses, large amounts of irrelevant material to be memorized by rote, and the lack of appropriate feedback make on-time student progress difficult. Furthermore, as Dornbusch, Gentilini and Giavazzi (2000) put it, the university "lends itself to the 'game'": there are no restrictions on how long students can be enrolled in university, nor on how many attempts a student can make at an an exam, nor over what period of time.

Looking at the particular data available for Croatia through the Labor Force Survey, it is clear that those who enroll in university come from higher-income families and better educated parents than those who attend polytechnics, who in turn come from richer families and more highly educated parents than the general population. The average age at graduation is about 25, which makes for an average 6-7 years to a university diploma. Students from different fields such as engineering and social sciences graduate at the same age on average, indicating that better job prospects do not produce very much incentive to progress through university quickly. Students who have at least one parent with a university diploma graduate a half year earlier than those who do not, while the level of family income is not a significant determinant of the age of graduation, perhaps because the population of university

students is already select and richer than average. Women graduate half a year sooner than men.

Very few students work at the same time that they study, and few say that they want a job. Those who live at home have lower study debt, or the difference between the number of years since they enrolled in university and the actual number of university years that they completed. Those who do work have significantly higher study debt, and are more than 2 years behind those students who don't work. The student's gender and his parents' education do not effect the level of study debt.

It appears that a very large number of students drop out of university before completing even their first year. Those students who drop out after completing at least one year of university have a significantly higher employment rate than others non-students of the same age. In addition, it seems that a large portion of those who drop out of university take a job directly. A parent who graduated from university has a strong effect on reducing the probability of dropout, while family income has almost none.

The picture that emerges is cautiously supportive of the Dornbusch, Gentilini and Giavazzi (2000) hypothesis. On average, students come from significantly richer and better educated families. Once students are in the university, their progress does not depend on the family income, and the way that it depends on the parents' education is unclear: university progress is unaffected, while the average graduation age and the dropout rate are lowered. Few current students say that they want a job, and even fewer are looking for one; however, many students who drop out do so to take a job, and university dropouts are generally employed more often than those of the same age. In addition, a large number of dropouts take jobs that come through their family and friends. Therefore, it is possible that at least some students really are treating the university as a “parking lot” until a good job arrives.

As has been described in Dolenec, Marušić and Puzić (2006), paying students do not finish earlier than non-paying students. Therefore, it appears that extending and increasing tuitions is not necessarily an effective way of improving university progress. Certainly, the results of this thesis

support the idea that structural changes are needed if students will graduate from school in the designated time. As the Croatian economy matures and grows, job prospects (both real and perceived) will improve, informal aspects of the labor market will likely diminish, and the value of a university diploma will increase. As awareness of this spreads (or is spread by the government or other bodies), more individuals will complete university within an appropriate time.

While an improving economic situation will likely act positively on university progress, the large number of students who seem to drop out during the first year and the history of long university study in the region of the former Yugoslavia clearly indicates that other factors are at play also. Very probably, the kinds of university curriculum and structure problems documented by Michelotti (2004) for Italy are relevant in Croatia also. Croatia is currently implementing higher education reforms as part of the Bologna Process. While these reforms might go some way in reducing the problem of poor university progress, it is worth pointing out the very modest improvements projected by the Ministry of Science (MOSES, 2005) to be achieved by the time the Bologna Process reforms will be complete in 2010: the length of university study is to decrease to six and a half years, while the dropout rate to 50%. Therefore, poor university progress will likely remain a feature of the Croatian higher education system, and future reforms should focus on more fundamental changes in teaching methodology, assessment of students, and the material that is taught.

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