**Incidence of Over-education in Iran**

**(An Analysis of Supply and Demand for University Graduates (2001-2012))**

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Abstract

In this study we use the Household Income and Expenditure Survey of Iran (HIES) database to investigate the incidence of overeducation. Our descriptive analysis shows that during 2001-2012 the ratio of workers with more than 12 years of education (one year or more of higher education) has steadily increased in many low skill jobs that require less than or equal to twelve years of schooling. Our econometric analysis showed that the odds of overeducation for women were higher than men. We also observed that likelihood of overeducation had a strong negative correlation with a worker’s experience and a positive correlation with employment in the pubic sector. Additional econometric tests revealed that overeducation had a negative impact on a worker’s wage in private sector jobs but the opposite was true for the public sector jobs.

**Introduction**

In recent years the rate of unemployment among university graduates in Islamic Republic of Iran has sharply increased. Labor market surveys have revealed that high unemployment rates are found not only among graduates in humanities and social sciences, but also among job seekers with engineering and science degrees. This development is mainly a result of a rapid increase in university enrollment during the last two decades. Iran has one of the largest ratios of university students to total population in the Middle East.

Furthermore, high unemployment rates among undergraduates have led to a sharp increase in demand for graduate degrees at Masters and PhD level. Evidence suggests that many individuals who cannot find a suitable job with an undergraduate degree return to university for advanced degrees to improve their chances of employment. This behavior has led to a sharp growth in supply of Masters and PhD graduates in the more recent years. At the same time there is no evidence that economy can create productive jobs for all of these graduates. Overall, evidence suggests that Iran is experiencing a condition that is described as overeducation in the labor economics literature and is observed in many developing countries.

In this study we use the annual Household Income and Expenditure Survey (HIES) data of Iran for the 1990-2012 interval to analyze the labor market conditions of university graduates. We apply statistical and econometric analysis to investigate the following hypotheses:

H1: The number of overeducated employees has steadily increased in many low and medium skill job categories during 1990-2012. *(An overeducated worker is an individual whose current employment does not utilize the skills associated with his/her university degree.)*

H2: While return to higher education remains positive, return to overeducation in many job categories is not positive.

H3: Both private and public employers are resorting to educational upgrading[[1]](#endnote-1) to take advantage of the large supply of college graduates. As a result the average years of schooling in many low skill job categories has steadily increased.

We investigate the above hypotheses by conducting statistical and econometric analysis on micro-data from annual Household Income and Expenditure Survey (HIES). The HIES survey is conducted annually by Iran Statistics Center on a optimized sample of approximately 50,000 rural and urban households that is optimized each year based on the most recent population and demographic data. Our analysis is based on four annual surveys spanning a 12-year interval. The survey years that we have selected are 2001, 2005, 2009 and 2012.

**Review of Literature**

Scientific surveys about labor market performance of college graduates have revealed that overeducation is a global issue, which has emerged in many developed and developing countries. Economists and other social scientists have published numerous academic articles on overeducation ever since 1970s. The leading publication that significantly increased the academic and general interest in issue of overeducation was Richard Freeman’s 1976 book Overeducated American. During 1970s and 1980s American social scientists showed more interest in overeducation than Europeans. Buchel (2011) offers a review of this early US literature on overeducation. In more recent decades, however, European academic research on this topic has become more numerous. Kucel (2011) offers a review of this more recent literature. In recent decades a large number of publications have also investigated the growing incidence of overeducation in the developing and emerging market countries.

Wu (2008) uses an Over-education, Required-education and Under-education model (ORU) to measure the rate of return to over-education in China. His econometric analysis shows that the returns to over-education are lower or insignificant for those working in competitive but lower paid industries and areas. Mehta et.al. (2010) investigate the evidence of over-education in unskilled jobs in several countries. They find evidence of over-education in Philippines and Mexico but no strong evidence in India or Thailand.

Several scholars have investigated the incidents of high unemployment among college graduates in the Middle Eastern countries. Some studies such as Abdel-Wahid (2009) and Kabbani and Salloun (2009) have documented the rapid increase in university enrollment in MENA countries. Social scientists have offered several explanations for the rapid increase in demand for higher education in MENA and many believe that the standard human capital investment theory does not offer a full picture. Salehi-Esfahani and Dhillon (2008) argue that the emphasis of public employees on college degree as criteria for government jobs has created a strong incentive for college education in the region. Elbadawy (2009) has argued that attending university improves the marriage market conditions for young women and increases their chances for finding better husbands. She uses the 1998 Labor market survey data for Egypt to support this argument. In a related analysis of parental opinions about higher education Mensch etal.(2003) find that Egyptian parents view college attendance for their daughters in this marriage market context.

So far there has not been a formal analysis of over-education in Iran but several government officials have expressed concerns about excess supply of college graduates to media. Nemati (2011, farsi) uses the 2007 unemployment rate statistics to show that unemployment rate among college graduates with two-year degrees and four-year degrees, is higher than high school graduates. In December 2010, the director of the higher education planning office, Reza Ameri, warned that according to the long-term educational plans only 37 of students in tertiary education must be studying in four-year degrees (and the rest must be in two-year degrees) but 64 are studying at this level. At the same time the percent of college students in two-year degrees is below optimal and the result will be an excess supply of university graduates with four-year degrees.

 The minister of education also announced in 2014 that the primary and secondary education system has 58,000 excess teaching personnel, which imposes a heavy fiscal burden on the government (Iraneconomist, 2014). In a more analytical study, Saidi-Rezvani et al. (2010) track the labor market performance of a sample of university graduates with degrees in education and psychology. Their interview responses reveal that only 64 of these college graduates were employed and nearly all of the employed graduates were working for government agencies. Other studies have tracked the job performance of university graduates in other fields. Mohamadzadeh (2006) found that nearly 40 of university graduates in agriculture related fields were unemployed while another 32 were working part-time. In another study Salehi-Omran (2006) found that only 57 of the female graduates of Mazandaran University (a university in Northern Iran) were working while the rest were unable to find unemployment. The study also found that 62 of those that had a job were government employees. Furthermore, only 3 of the employed females in this survey study reported that their college education was relevant for the tasks that they were performing.

**Descriptive Analysis**

Enrollment in institutions of higher education in Iran was relatively small before the 1979 Islamic revolution but grew rapidly after the first decade of the Islamic Republic as demonstrated in Figures 1 and 2 below. In 1970 67,286 students were enrolled in domestic universities of which 84 attended public universities. Total enrolment grew by eight fold to 514 thousand students in 1991 and in that year enrollment in public universities accounted for only 40 of total.[[2]](#endnote-2)The rapid enrollment growth has continued without interruption and the latest official statistics put the figure in 2014 at 4,367,901 students[[3]](#endnote-3). The growth of enrollment in private universities is mostly due to the growth of one institution the Azad University.

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| **Figure 1.** University Enrollment in Iran, (1970-2008)  |
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| Source of Data: Al-Agha et al. 2009, chart generated by authors.  |

The Islamic government that emerged after the revolution initially shut down all the universities for three years in the name of a cultural revolution and in order to gain political control over universities. When the existing universities were reopened the government responded to the huge demand for higher education by establishing the Islamic Azad University in 1984 as a non-profit private university. Over time the Azad University expanded its capacity rapidly and opened branches in many towns and even large villages. The Azad University was established by one of President Hashemi Rafsanjani’s allies (Mehdi Jaasbi) and enjoyed considerable financial and political support while Hashemi Rafsanjani was president.

Another important step for expansion of higher education capacity in Iran was the establishment of Payam Nur University in 1988[[4]](#endnote-4). Payam Nur was a government-owned open university for provision of higher education opportunities in remote and less developed regions of the country through long distant learning programs. Initially Azad University received more indirect government support than Payam Nur and other universities.

Political rivalries between Hashemi Rafsanjani and Ahmadinejad during the latter’s presidency, however, led to a reduction of government support for Azad University.

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| **Figure 2.** Growth of Public and Private Universities in Iran (1975-2008)  |
|  |
| Source of Data: Al-Agha et al. 2009, chart generated by authors.  |

 Unable to shut down the Azad University, Ahmadinejad offered financial and government support for PayamNur. He also offered government and banking credit to investors who wanted to establish independent private universities. These investors, however, turned out to be mostly individuals closely affiliated with Ahmadinejad’s inner circle and the Revolutionary Guards. Under Ahmadinejad the admission capacity of these universities grew rapidly. As shown in Figure 2 while initially there were more public than private universities, the order has been reversed in the past decade and there are now more private universities (including branches) than public universities. Figure 2 also reveals that there has also been a sharp increase in overall number of universities in Iran.

 As a result of this rapid expansion of higher education, the percent of Iran’s population with tertiary education has increased faster than all other Middle Eastern countries in the past three decades. In 1970 only 0.77 of Iran’s adult population (25 years or older) had completed tertiary education. By 2010 this ratio increased to 12.85, which was the second highest ratio in the Middle East after Israel (Figure 3). Consequently the percentage of Iran’s labor force with university education has also increased substantially in recent years as demonstrated in Figure 4.

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| Figure 3. Percent of population age 25+ with Tertiary Schooling (Completed Tertiary)  | Figure 4. Labor force with tertiary education ( of total)  |
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| Source of Data: EDUSTAT, World Bank, Barro-Lee DatasetSource of Data: EDUSTAT, World Bank |

The increase in number of Iran’s university graduates, however, has exceeded the number of available jobs that require college education and as a result college graduates in many fields are suffering from high unemployment rate. The unemployment rate for university graduates was only 0.44 in 1976 but it rose to 19.4 in 2011 (Table 1). Similar to Turkey and Egypt, Iran also has a higher unemployment rate for university graduates in comparison to less educated job seekers. The labor force participation of university graduates grew by an average of 8.2 per year during 1976-2011. This high unemployment rate is even more alarming when we notice that in 2011 only 46 of the university graduates were active in the labor force while a majority of graduates (many of them women) were not working or seeking employment (see Table 1).

Table 1. Labor Force Participation and Unemployment Rate for University Graduates in Iran

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| --- | --- | --- | --- |
| Year | Total Population\* | Labor Force Participants  | Unemployment Rate  |
| Working | Unemployed | Total  |
| 1976 | 433391 | 286315 | 11365 | 297680 | 0.40 |
| 2011 | 10011676 | 3741999 | 901619 | 4643618 | 19.40 |
| Average Annual Growth Rate | 9.40 | 7.6 | 13.3 | 8.2 |   |
| Source of data: The 1976 (1355) National Census Data and 2011 Labor Force Survey.  |
| \* Working plus Non-working University Graduates.  |  |  |

The unemployment rate among university graduates varies from one field to the other. In most countries the unemployed graduates are primarily those that graduate with degrees in humanities and social sciences. In Iran, however, we find high unemployment rates even among those with degrees in science and engineering. As shown in Figure 5 the high unemployment rates (in 2011) were reported for graduates in engineering (22), biological sciences (26) and computer sciences (30). In contrast the unemployment rate for holders of degrees in humanities and education were 15 or less. It is likely that unemployment rates for some of science and engineering degrees increased in 2012 as poor economic policy and international sanctions led to a further reduction in industrial activity.

The rapid increase in supply of university graduates in the past two decades has had an adverse effect on their relative income advantage over high school graduates. As demonstrated in figure 5 the net income ratio of university graduates with undergraduate degrees (bachelors degree) to high school graduates has remained stable since 1995 while the net income advantage of Masters degree holders has suffered a gradual decline. The income advantage of PhD holders increased during 1996-2004 but remained stagnant afterwards. These results are compatible with the increased supply of Masters and PhD. Graduates in the past ten years[[5]](#endnote-5).

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| Figure 5. Unemployment Rate for University graduates in the Labor Force (2011)  |
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| Source of data: FaslnamehAmariBahar91 , Graph generated by Authors. http://www.amarkar.ir/asp/pdf/faslname/faslbahar91.pdf |

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| Figure 6. The Ratios of Real Net Incomes of University Graduates and High School Graduates |
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| Source of data: Annual HIES Survey, 1991-2011 |

**Average years of schooling in low-skill jobs**

Greater access to all levels of education has increased the average educational attainment of the labor force. In this section we look at the educational background of workers in various job categories to see if lack of professional jobs for university graduates have forced some of them to accept low-skill jobs that do not require university degrees. In the United States this type of underemployment is well documented and Vedder(2010) has shown that during past two decades the share of college graduates in many non-technical jobs has steadily increased[[6]](#endnote-6). Do we observe a similar trend in Iran? One cultural factor that might make a difference is that in the United States the attitude of job seekers toward blue color jobs such as retail sale associates or construction workers is less negative whereas in Iran, similar to many developing countries, these jobs are considered low status and undesirable. Hence many college graduates in urban areas might be reluctant to accept such jobs even if they have no other alternatives. Furthermore, in Iran (similar to most Middle Eastern countries) it is not uncommon for young men and women to live with their parents (and enjoy material support) even in their late 20s and early 30s. These cultural values reduce the pressure on young college graduates to accept low-skill (“low status”) jobs.

 In order to investigate the prevalence of college graduates in low skill jobs in the Iranian labor force we used the HIES survey data for the 2001-2012 interval as reported in Table two. The low-skill and semi-skill job categories, which do not require a college degree, are reported in the lower segment of table two. As we can see the average years of schooling for the samples of workers in these categories, were all less than 12 years in 2001. We observe that for all of these categories, with the exception of carpet weavers, the average years of schooling increased during 2001-2012. The largest growths during this interval are observed for the precision tools workers (up 45%) and unskilled workers in mining, construction and industry (up 39%).

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| --- | --- | --- | --- |
| ISCO Job Codes | Job Categories | Percent of employees with more than 12 years of education | Average Years of Schooling |
|  |  | 2001  | 2005  | 2009  | 2012  | 2001  | 2005  | 2009  | 2012  |
| 1400 | Managers | 64.8 | 71.6 | 68.7 | 76.5 | 14.02 | 14.11 | 13.85 | 14.60 |
| 2100 | Specialists, physical scientists, mathematics and engineering | 92.1 | 87.1 | 91.7 | 93.1 | 15.62 | 15.39 | 15.08 | 15.39 |
| 2200 | Biological and medical scientists | 98.4 | 97.8 | 92.5 | 97.7 | 18.32 | 18.02 | 16.15 | 16.54 |
| 2300 | Teaching professionals | 72.7 | 75.9 | 91.0 | 93.4 | 14.20 | 14.36 | 15.00 | 15.42 |
| 2400 | Other professionals | 64.3 | 67.5 | 74.7 | 78.8 | 13.94 | 14.20 | 14.30 | 14.66 |
| 3100 | Physical science technicians and assistants | 32.1 | 40.3 | 44.0 | 53.5 | 11.68 | 11.98 | 11.82 | 12.54 |
| 3200 | Life sciences and health technicians and assistants | 32.7 | 32.5 | 41.2 | 47.2 | 11.54 | 11.48 | 12.32 | 12.27 |
| 3400 | Technicians and Assistants | 22.2 | 28.4 | 38.3 | 37.9 | 10.58 | 10.92 | 11.32 | 11.45 |
| 4100 | Office workers | 17.0 | 24.8 | 40.1 | 44.9 | 10.87 | 11.38 | 11.91 | 12.27 |
| 4200 | Customer service staff | 9.5 | 21.3 | 30.1 | 41.6 | 10.09 | 10.56 | 11.50 | 12.61 |
| 5100 | Personal services and security personnel | 8.3 | 9.8 | 11.5 | 18.2 | 7.52 | 7.96 | 8.13 | 9.09 |
| 5200 | Sales associates and sales representatives | 4.3 | 5.0 | 8.6 | 11.8 | 7.90 | 8.14 | 8.48 | 9.08 |
| 6100 | Agr. Fishery & Forestry workers | 0.8 | 0.9 | 0.7 | 1.8 | 3.75 | 4.60 | 4.64 | 5.25 |
| 7100 | Mine workers | 1.5 | 1.5 | 2.9 | 4.2 | 5.42 | 5.73 | 6.49 | 6.76 |
| 7200 | Skilled Industrial Workers | 3.2 | 3.9 | 4.8 | 6.4 | 7.36 | 7.49 | 7.73 | 8.45 |
| 7300 | Precision tools workers | 2.5 | 1.8 | 6.2 | 8.3 | 5.74 | 5.72 | 7.42 | 8.34 |
| 7400 | Industrial workers (others ) | 0.9 | 2.0 | 1.7 | 4.6 | 5.76 | 6.12 | 6.65 | 7.15 |
| 7500 | Carpet weavers | 0.8 | 0.3 | 0.5 | 1.7 | 4.77 | 4.32 | 4.47 | 4.59 |
| 8100 | Food processing plant operators | 5.4 | 6.6 | 7.2 | 12.4 | 6.61 | 7.40 | 7.71 | 8.69 |
| 8200 | Heavy machine operators and assembling line | 0.6 | 3.6 | 6.4 | 5.7 | 6.72 | 7.12 | 8.01 | 7.96 |
| 8300 | Vehicle drivers | 0.8 | 1.4 | 2.4 | 3.6 | 6.09 | 6.39 | 6.90 | 7.28 |
| 9100 | Unskilled service sector workers | 0.7 | 1.5 | 2.6 | 4.8 | 5.26 | 5.54 | 6.03 | 6.49 |
| 9200 | Unskilled workers in agriculture and forestry and fishing | 0.4 | 0.7 | 0.8 | 1.2 | 3.50 | 3.92 | 4.42 | 4.47 |
| 9300 | Unskilled workers in mining, construction and industry | 0.4 | 0.8 | 1.7 | 2.6 | 4.17 | 4.73 | 5.42 | 5.80 |
| Source of Data: HIES databases 2001, 2005, 2009 and 2012, (Iran Statistics Center).  |  |  |
| **Sample for each year is limited to workers and employees with positive wages. It excludes self employed individuals and those workers reporting zero or very low annual wages.**  |  |

Table 2. Overeducation Ratio in Various Job Categories

More significantly, the results in Table 2 reveal a notable increase in percent of employees with more than 12 years of schooling in low and semi-skill job categories. The categories with largest ratios of college graduates are both in services sector. They are the office workers (45 in 2012) and customer services staff (42 in 2012). The share of workers with more than 12 years of schooling in both of these categories was less than 20 in 2001. Overall, we observe a steady increase in share of workers with more than high school education, in all of these job categories. Even in the unskilled service sector category (ISCO 9100) we see that nearly 4.8 of workers have more than 12 years of education. Furthermore, looking at job categories with largest share of overeducated workers in Table two reveals that most of these job categories belong to the service and retail sector. This is partly due to the prevalent cultural bias against low skill jobs in agriculture and construction despite the fact that these jobs might offer higher wages in comparison to comparable service and retail jobs.

The educational status of self-employed individuals in Iran HIES surveys is reported in Table 3. An uptrend in average years of schooling is visible for all reported job categories. We observe that the increase in average years of schooling between 2001 and 2012 for self-employed individuals (Table 3), is smaller than the comparable increase for workers (Table 2) in all categories. Similarly, figures in Table 3 show that ratio of self-employed with more than 12 years of education has increased in all categories with the exception of unskilled individuals in the service sector. However, the growth of this ratio for the self-employed is also smaller than the comparable ratio for workers (Table 2).

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| Table 3: Self-employed in Low-skill and Semi-skilled Activity Categories |
| ISCO Job Code  | Low-skill and Semi-skilled Activity Categories  | Percent of self-employed with more than 12 years of education  | Average Years of Schooling (self-employed) |
|   |   | 2001  | 2005 | 2009  | 2012  | 2001 | 2005  | 2009  | 2012  |
| 3400 | Technicians and Assistants  | 7.2 | 8.7 | 8.2 | 14.8 | 6.23 | 6.55 | 6.87 | 7.80 |
| 5100 | Personal services and security personnel  | 2.3 | 2.8 | 2.0 | 5.7 | 7.05 | 7.58 | 7.58 | 7.78 |
| 5200 | Sales associates and sales representatives | 3.9 | 6.1 | 6.0 | 7.9 | 6.34 | 6.92 | 6.85 | 7.08 |
| 6100 | Agr. Fishery & Forestry workers  | 1.2 | 1.6 | 2.1 | 2.6 | 3.24 | 3.48 | 3.82 | 3.88 |
| 7100 | Mine workers \* | 1.8 | 3.3 | 3.3 | 3.9 | 6.05 | 6.37 | 6.94 | 6.99 |
| 7200 | Skilled Industrial Workers  | 3.3 | 2.7 | 4.3 | 5.1 | 6.75 | 6.71 | 7.27 | 7.55 |
| 7300 | Precision tools workers  | 3.3 | 8.8 | 5.9 | n/a | 5.95 | 6.66 | 7.16 | n/a |
| 7400 | Industrial workers (others )  | 1.8 | 2.1 | 4.5 | 3.6 | 5.21 | 5.58 | 6.56 | 6.66 |
| 7500 | Carpet weavers  | 0.6 | 0.4 | 1.9 | 3.2 | 4.54 | 4.81 | 4.81 | 4.73 |
| 8300 | Vehicle drivers  | 2.6 | 2.5 | 4.2 | 3.8 | 6.19 | 6.37 | 6.75 | 6.95 |
| 9100 | Unskilled service sector workers  | 1.2 | 1.7 | 1.6 | 0.9 | 4.05 | 4.75 | 4.93 | 4.83 |
| 9200 | Unskilled workers in agriculture and forestry and fishing  | 0.3 | 0.7 | 3.1 | 4.9 | 3.91 | 4.49 | 4.98 | 5.85 |
| 9300 | Unskilled workers in mining, construction and industry  | 0.0 | 1.4 | 1.0 | 3.7 | 3.83 | 4.23 | 4.77 | 5.70 |
| Source of data: HIES database 2001, 2005, 2009, 2012, (Iran Statistics Center), author’s calculations.  |
| Sample for each year includes self-employed individuals. It excludes workers and persons reporting zero or very low annual wages.  |  |  |

**Econometric Estimation Method**

In this model we will first run a regression model to identify the factors that correlate with a higher probability of both over-education and under-education. For this purpose we first measure the average years of schooling for employees in each job category. Then for each observation we calculate over-education and under-education as the gap between this average and the individual’s actual years of education.

We will then use these constructed variables in a Multinomial Logit model (equations 1 and 2) to identify the social and economic characteristics that are associated with over-education and under-education.

To this end we identify 3 categories for education status of an individual in the labor market:

|  |  |
| --- | --- |
|  | If the individual is adequately educated |
| If the individual is over educated |
| If the individual is under educated |

Using a multinomial logit, in which one is interested in the probability of education status, the  is defined as:

 (1)



And is a vector of parameters and  is the vector of variables which drive the individual’s decision toward his education status. Since the response probability must sum to unity,

 (2)

The Equations (1) and (2) show that the probability of education status of an individual does not have a linear relationship with elements of the vector . A simple way to interpret the parameters of the model is given by log-odd ration:

|  |  |
| --- | --- |
|  | (3) |

P1, P2, P3 are probabilities that a worker is adequately educated, overeducated and undereducated respectively.

: is a vector of dummy variables for gender, occupation type and employment sector.

:is a vector of dummy variables for level of education and job experience.

The second objective of our econometric analysis is to estimate the return to education in Iran’s labor market for workers with adequate education and educational mismatch (overeducated or undereducated for current occupation.) The population of interest in this study is all the wage and salary earners in the years 2001, 2005, 2009 and 2012. Our source of data for this analysis is the Household Income and Expenditure Survey (HIES) annual database, which includes monthly and temporary earnings for all workers age 10 years and older. The HIES database also includes each working individual’s daily work hours and number of working days per week. The HIES also includes detailed records on the demographic characteristics, labor market status, marital status, work hours and the sources of individual’s wage and non-wage. The sample size in this annual survey is optimal for household expenditures, but since the sample size is large enough it is also used extensively for labor participation assessment and earning equation estimation.

Using the reported values of years of schooling completed, we construct new variables for under, adequate and over education. We use three alternative methods for measurement of these variables. All three methods measure these parameters for 4-digit occupational categories as defined by ISCO international standards. In the first method we define adequate education as a range of one standard deviation around the average years of schooling for the job categories (Figure 5). In the second method adequate education is defined as one standard deviation around the mode of the years of schooling instead of the mean. In the third method we assume that 12 years of education is the adequate level of education for all low-skill job categories.

Figure 5.Criteria for Defining Under-education and Overeducation Based on Average Years of Education.



We define as attained and adequate education. Based on these two concepts one can define under and over education. Accordingly one may defined for under-education and for overeducation. In the third method we define overeducation as years of education above 12 year (high school).

Moreover, HIES does not record any information about work experience of household’s members. In the underlying literature, the potential experience is used as a proxy for actual experience. This proxy is defined as: . We include two sets of dummy variables to capture the industry and activity affiliation of workers. The first set of binary choice covariates is constructed by ISIC codes, which include agricultural and fishing, industry, mining, construction and services. Here the reference industry is mining. The second group of dummy variables is defined for 9 activities according ISCO coding. Since we focus on the simple workers to control for profession mismatching (A college graduate doing professional jobs in a field unrelated to his college degree), activities with ISCO codes less than 4000,which represent more skilled and professional jobs are excluded. Therefore we are left with six rather low-skill and semi-skill activity groups, where the simple workers are selected as reference.

The key concern of this paper is whether overeducation has an impact on wages. Following the incidence analysis, we use a wage equation based on a standard Mincerian model, which was originally developed by Duncan and Hoffman (1981). The attained schooling years can be simply decomposed into three components, under, adequate and over education. In the log form the wage equation for individual *i* is specified as:

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| --- | --- |
|  | (4)  |

The base wage equation is enhanced by adding the interaction terms between education variables and experience. This allows us to observe the impact of interaction between these two variables on a worker’s wage earnings. The effect of overeducation and under-education on wage should meet several restrictions that were suggested by Bauer (2002) and Hartog (2000). Namely  should be less than , and  must be negative and its absolute value must be less than . Therefore one can summarizes the restrictions as, , and .

Inclusion of the interaction terms in the wage equation specification changes the basic formulas for measuring the marginal effect of covariates on the dependent variable. Consequently these restrictions might be satisfied up to a specific level of potential experience. Evidence suggests that new entrants in labor market are more likely to experience an overeducation mismatch and face lower returns to over-educated years in comparison to years of adequate education.

This wage model will allow us to see if the rate of return to overeducation is indeed smaller than adequate education or not. We can also compare the rate of return to over-education over time.

One weakness of the HIES data is that there are a considerable number of individuals whose daily work hours are positive but reported monthly wage and salary is missing or zero. This characteristic of the available data leads us to use the well-known censored (Tobit) model for empirical analysis. In the standard Tobit model (Tobin 1958), we have a dependent variable that is left-censored at zero:



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| --- | --- | --- |
|  |  | (5) |

Here the subscript indicates the observation,is an unobserved (“latent”) variable, is a vector of explanatory variables, β is a vector of unknown parameters, and is a disturbance term.For unbiased estimation of equation 5, the variable should have the characteristics of a normal random variable. In data censoring cases this requirement means that the variable of interest,should have a homoscedastic normal distribution. In some cases the logarithmic transformation can be used to make this assumption more plausible. One can show that OLS using the entire sample or OLS using the subsample for which are both inconsistent estimators of . Tobit proposed the MLE method for consistent estimation of , which usually is conducted by two stage Tobit or full maximum likelihood estimation methods. We have use the full maximum likelihood method in our analysis.

**Empirical Findings**

In the first stage of our statistical analysis we estimate a multinomial logit model for incidence of overeducation in Iran for four annual HIES surveys, by sectors and geographical areas. The odds of overeducation (P3/P2) are specified as function of job affiliation and occupation characteristics of an employee, his/her experience, marital status and gender (Equation 3). The model will allow us to identify the correlation of these factors with the likelihood that a worker is overeducated or undereducated. The coefficient estimates of log odds for 2001 and 2012 HIES data appear in table 4. The independent variables for occupation include dummy variables for ten occupation categories. The default occupation category is Unskilled Workers. We repeated the regressions for 2005 and 2009 HIES data but do not report the tables in here.

Table 4. Determinants of the Odds of Overeducation and Under-education

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| Odds of Overeducation in 2001 and 2012, Iran HIES Data, Low-skill Occupations  |
| Regression method: Multinomial Logit | Rural Areas, Private Sector | Rural Areas, Public Sector | Urban Areas, Private Sector | Urban Areas, Public Sector |
|   | 2001 | 2012 | 2001 | 2012 | 2001 | 2012 | 2001 | 2012 |
| Clerk | -2.123\*\*\* | -1.621\*\*\* | -1.842\*\*\* | -1.656\*\*\* | -1.971\*\*\* | -1.379\*\*\* | -1.163\*\*\* | -1.732\*\*\* |
| (0.484) | (0.355) | (0.365) | (0.408) | (0.280) | (0.189) | (0.199) | (0.227) |
| Service or retail employees  | -0.689\*\*\* | -0.23 | -1.049\*\*\* | -1.233\*\*\* | 0.087 | 0.058 | -0.684\*\*\* | -0.956\*\*\* |
| (0.221) | (0.195) | (0.373) | (0.426) | (0.165) | (0.125) | (0.256) | (0.240) |
| Agricultural, Animal Husban. | 0.276 | 0.778\*\* | 1.982\*\*\* | -1.23 | -0.298 | 0.424 | 0.417 | -0.382 |
| (0.210) | (0.303) | (0.552) | (0.764) | (0.370) | (0.377) | (0.602) | (0.808) |
| Production worker | -0.743\*\*\* | -0.146 | 0.239 | -1.541\*\*\* | -0.644\*\*\* | -0.048 | 0.161 | -0.071 |
| (0.125) | (0.101) | (0.288) | (0.553) | (0.121) | (0.092) | (0.225) | (0.307) |
| Machine operator | -0.492\*\*\* | 0.065 | 0.496\* | 0.03 | -0.174 | 0.095 | 0.246 | -0.029 |
|   | (0.152) | (0.140) | (0.295) | (0.375) | (0.150) | (0.120) | (0.223) | (0.238) |
| Agri-fish (Econ. Sector) | -0.322 | -0.959\*\*\* | -0.229 | -1.872\*\* | 0.126 | -0.675\*\* | -1.009 | -1.46\*\*\*  |
|   | (0.373) | (0.314) | (0.692) | (0.947) | (0.477) | (0.330) | (0.682) | (0.636) |
| Industry (Econ. Sector) | -0.481 | -0.813\*\*\* | 0.17 | -1.282 | -0.302 | -0.609\*\* | -0.402 | -0.228 |
|   | (0.370) | (0.308) | (0.541) | (0.881) | (0.434) | (0.302) | (0.329) | (0.439) |
| Services (Econ. Sector) | -0.327 | -0.296 | 0.476 | -0.83 | -0.116 | -0.227 | -0.585\* | 0.014 |
|   | (0.379) | (0.311) | (0.514) | (0.809) | (0.433) | (0.298) | (0.301) | (0.403) |
| Construction (Econ. Sector) | 0.00 | -0.346\*\*\* | -0.267 | -0.446 | 0.137 | -0.515\*\*\* | -0.504 | -1.064\*\* |
| (0.144) | (0.126) | (0.390) | (0.425) | (0.132) | (0.099) | (0.614) | (0.417) |
| Marital status (1 = Married) | 0.726\*\*\* | 0.649\*\*\* | 0.421 | 0.743\* | 0.538\*\*\* | 0.470\*\*\* | 0.594\*\*\* | 0.137 |
| (0.085) | (0.077) | (0.294) | (0.387) | (0.096) | (0.075) | (0.200) | (0.222) |
| Experience | -0.181\*\*\* | -0.182\*\*\* | -0.128\*\*\* | -0.130\*\*\* | -0.138\*\*\* | -0.132\*\*\* | -0.105\*\*\* | -0.085\*\*\* |
|   | (0.009) | (0.007) | (0.014) | (0.016) | (0.008) | (0.005) | (0.009) | (0.009) |
| Gender (Male = 1)  | -0.22 | -0.317\*\* | -0.296 | -0.159 | -0.31 | -0.256\* | -0.913\*\*\* | -0.394 |
|   | (0.154) | (0.159) | (0.435) | (0.582) | (0.197) | (0.136) | (0.226) | (0.257) |
| Constant | 1.599\*\*\* | 1.486\*\*\* | 0.545 | 2.241\*\* | 1.294\*\*\* | 1.273\*\*\* | 2.020\*\*\* | 1.724\*\*\* |
|   | (0.405) | (0.355) | (0.710) | (1.013) | (0.482) | (0.334) | (0.428) | (0.532) |
| N (# of Observations) | 6466 | 9222 | 913 | 541 | 4114 | 6821 | 1590 | 1194 |
| \* p<0.10, \*\* p<0.05, \*\*\* p<0.01 |  |  |  |  |  |  |  |

Our Multinomial Logit models for odds of overeducation identify several significant socio-economic correlates in both urban and rural samples. The estimated coefficients strongly and consistently confirm that overeducation is compensating for the lack of experience. A jobseeker with no experience initially accepts a position for which he is overeducated. However after starting at a low-skill position he hopes to gradually move up to a more skilled position in the same organization, which will be a better match for his college degree and field of specialization.

The gender coefficients in Table 4 show that in 2001 the impact of gender on odds of overeducation was insignificant but in 2012 men were less likely than women to be overeducated. Women are more likely to be overeducated in both rural and urban areas. This finding is in contrast with that of Filiztekin (2011) for the Turkish labor market, where he finds a negative association for females. In the public sector gender had no significant impact on odds of overeducation in 2012. We other regressions that we have not reported in this article we combined the public and private sector observations and found that employment in public sector is associated with larger likelihood of overeducation. This result is consistent with our initial expectations and general social observations. Public sector jobs put more emphasis on educational requirements and it is no surprise that government employees performing a task are likely to be more educated than private workers doing the same task.

Table 4 further shows that the odds of overeducation in professional jobs are smaller than less skilled jobs with the exception of agriculture, animal husbandry and fisheries. For the production (industrial) workers category we observe that this category has a negative correlation with odds of overeducation in 2001 in the private sector but the coefficient becomes insignificant 2012. This result indicates that the number of overeducated workers has significantly increased in this job category in more recent years.

Impact of Overeducation on Wage

In the second section of our regression analysis we measure the impact of overeducation on wage earnings of workers based on HIES databases for four annual surveys. We conduct this analysis by three different methods of measuring surplus years of education that we introduced in an earlier section of this article.

*Method 1: Overeducation and overeducation as deviations from the mean years of education in each job category;*

 *Method 2: Overeducation and under-education as deviations from the mode of years of education in each job category;*

 *Method 3: Overeducation as years of education above high school (12 years) for job categories in which average years of education in our database is less than 12.*

Tables 5, 6 and 7to show the impact of overeducation on wage earnings of workers, based on these three measurement methods. These models also include interaction variables for overeducation and experience. If we consider *X* as overeducation and *Y* as experience then the total effect of surplus years of education on wage is measured by the following formula:

*A*\**X* +*B*\**X*\**Y*=*X*\*(*A*+*B*\**Y*).

 Hence the total marginal effect of overeducation on wage earnings of a worker is obtained by (*A*+*B*\**Y*). When *A* and *B* have the same sign the interaction reinforces the direct impact of *X*. When *A* and *B* have opposite signs this means that interaction effect weakens the direct effect of *X* and might even reverse it. In our samples the impact of the interaction variable is small because most of the individuals who are overeducated are the young college graduates that have only a few years of job experience if any. Our sample of observations for these regressions is limited to low-skill job categories. This sample restriction allows us to focus on vertical mismatch (overeducation in low skill jobs) without worrying about horizontal mismatch (Professionals working on high skill jobs that don’t match their education).

The results for mean-based measure of overeducation appear in Table 5. Our hypothesis about the impact of overeducation on a worker’s wage calls for the coefficient of overeducation to be negative. This means that an individual who is overeducated in its current profession is earning a lower salary in comparison to a job for which he is adequately educated. If the sign of overeducation is positive then we expect its magnitude to be smaller than the coefficient of adequate education. This condition indicates that the marginal return to additional years of education is smaller than adequate education.

The figures in Table 5 offer support for our hypothesis in the private sector in both rural and urban settings. The coefficients of overeducation are negative and they are significant for most sample years. The corresponding coefficients of adequate education are either insignificant or positive. These findings indicate that in the private sector overeducation does not lead to a larger wage income for employees in low skill job categories. To the contrary, some overeducated workers face what is known in the education literature as “earning punishment” for their additional education.

The results for public sector employees are much weaker. In Rural areas the coefficient of overeducation was positive and significant in 2001 but became negative and significant in 2009. This negative sign, however, was not supported by the 2012 data.In the Urban areas the coefficients were statistically insignificant for all four years.

Table 5. Coefficients of Overeducation and Adequate Education in Wage Equations with Mean-based measurements of Overeducation

and Under-education and TOBIT Regression Models.

|  |  |  |  |
| --- | --- | --- | --- |
| Tobit regressions, Mean | Rural and private |  | Rural and public |
|  | 2001 | 2005 | 2009 | 2012 |  | 2001 | 2005 | 2009 | 2012 |
| Years of over education | -0.486\*\* | -0.344\* | -0.169 | -0.470\*\*\* |  | 0.684\*\* | 0.339 | -0.844\* | 0.109 |
|  | (0.196) | (0.189) | (0.200) | (0.155) |  | (0.282) | (0.300) | (0.497) | (0.308) |
| Years of adequate education | -0.049 | 0.084 | 0.069 | -0.044 |  | 0.098 | -0.153\* | -0.153\*\* | 0.100\* |
|  | (0.088) | (0.073) | (0.067) | (0.053) |  | (0.087) | (0.091) | (0.073) | (0.057) |
| Years of under education | 0.019 | 0.692 | 0.556 | -0.124 |  | 0.304 | -2.192\*\*\* | -0.146 | -0.135 |
|  | (0.941) | (0.697) | (0.497) | (0.428) |  | (0.653) | (0.685) | (0.645) | (0.687) |
| Experience#overeducation | 0.011 | 0.011 | 0.029\* | 0.045\*\*\* |  | -0.015 | -0.012 | 0.069\*\* | 0.008 |
|  | (0.013) | (0.013) | (0.016) | (0.012) |  | (0.016) | (0.021) | (0.035) | (0.021) |
| Experience#adequateeducation | -0.001 | -0.003 | -0.004 | 0.005\* |  | -0.001 | 0.009\*\* | 0.010\*\*\* | -0.003 |
|  | (0.004) | (0.004) | (0.004) | (0.003) |  | (0.004) | (0.004) | (0.004) | (0.003) |
| Experience#undereducation | 0.002 | -0.018 | -0.009 | 0.019 |  | -0.012 | 0.072\*\*\* | 0.009 | 0.009 |
|  | (0.029) | (0.022) | (0.016) | (0.014) |  | (0.022) | (0.022) | (0.020) | (0.021) |
| Sigma | 8.771\*\*\* | 8.356\*\*\* | 7.997\*\*\* | 6.805\*\*\* |  | 3.643\*\*\* | 4.068\*\*\* | 3.126\*\*\* | 2.378\*\*\* |
|  | (0.100) | (0.088) | (0.071) | (0.059) |  | (0.090) | (0.123) | (0.104) | (0.074) |
| #OBS | 7377 | 7713 | 10177 | 9245 |  | 933 | 632 | 489 | 542 |
|  | Urban and private |  | Urban and public |
| Years of over education | -0.270 | -0.758\*\*\* | -0.272\*\* | -0.337\*\*\* |  | -0.142 | 0.130 | 0.087 | -0.069 |
|  | (0.164) | (0.165) | (0.138) | (0.108) |  | (0.153) | (0.215) | (0.191) | (0.194) |
| Years of adequate education | -0.020 | -0.098\* | -0.046 | -0.020 |  | 0.054 | 0.047 | -0.008 | -0.100\*\*\* |
|  | (0.058) | (0.054) | (0.041) | (0.031) |  | (0.035) | (0.043) | (0.035) | (0.030) |
| Years of under education | -0.403 | -0.311 | 0.195 | 0.417 |  | -0.082 | -0.257 | -2.245\*\*\* | -0.424 |
|  | (0.607) | (0.512) | (0.369) | (0.323) |  | (0.444) | (0.565) | (0.615) | (0.568) |
| Experience#overeducation | 0.024\*\* | 0.038\*\*\* | 0.030\*\*\* | 0.031\*\*\* |  | 0.010 | -0.004 | -0.010 | 0.005 |
|  | (0.011) | (0.011) | (0.010) | (0.009) |  | (0.009) | (0.014) | (0.014) | (0.011) |
| Experience#adequateeducation | 0.000 | 0.003 | -0.002 | 0.002 |  | -0.004\*\* | -0.003 | 0.000 | 0.004\*\*\* |
|  | (0.003) | (0.003) | (0.002) | (0.002) |  | (0.002) | (0.002) | (0.002) | (0.002) |
| Experience#undereducation | 0.011 | 0.001 | -0.008 | -0.006 |  | -0.007 | 0.007 | 0.069\*\*\* | 0.015 |
|  | (0.019) | (0.017) | (0.012) | (0.010) |  | (0.014) | (0.017) | (0.017) | (0.017) |
| sigma | 6.194\*\*\* | 6.351\*\*\* | 5.854\*\*\* | 4.753\*\*\* |  | 2.565\*\*\* | 3.116\*\*\* | 2.904\*\*\* | 2.311\*\*\* |
|  | (0.080) | (0.075) | (0.054) | (0.044) |  | (0.047) | (0.064) | (0.057) | (0.048) |
| #OBS | 4229 | 5083 | 7763 | 6835 |  | 1594 | 1294 | 1408 | 1192 |
| \* p<0.10, \*\* p<0.05, \*\*\* p<0.01 |  |  |  |  |  |  |  |  |

 In order to test the sensitivity of our results to the measurement of overeducation and under-education we repeat the wage equation regressions with mode-based measures that were explained above. The results are reported in Table 6. We observe that the sign of overeducation coefficients remain the same for the private sector regressions in both rural and urban regions. However, the negative coefficient of overeducation is only significant in 2012. This indicates that the impact of extra education on wages changed from neutral to negative overtime as more and more overeducated workers competed for low-skill jobs.

For the sample of public sector jobs in urban areas, the mode-based regressions, (Table 6), generate more significant coefficients for the overeducation index and the corresponding interaction terms. The coefficient of overeducation is positive in the public sector sample and the significance of this coefficient is stronger in 2009 and 2012 samples.

Table 6. Coefficients of Overeducation and Adequate Education in Wage Equations with Mode-based measurements of Overeducation

And Undereducation and TOBIT Regression Models.

|  |  |  |  |
| --- | --- | --- | --- |
| Tobit regressions, Mode | Rural and private |  | Rural and public |
|  | 2001 | 2005 | 2009 | 2012 |  | 2001 | 2005 | 2009 | 2012 |
| Years of over education | -0.054 | -0.120 | -0.044 | -0.172\*\* |  | 0.102 | 0.306\*\* | 0.230 | 0.304\*\* |
|  | (0.084) | (0.074) | (0.095) | (0.078) |  | (0.098) | (0.133) | (0.159) | (0.128) |
| Years of adequate education | -0.078 | -0.147 | -0.158 | -0.227\*\*\* |  | -0.020 | -0.048 | 0.013 | 0.062 |
|  | (0.138) | (0.102) | (0.102) | (0.083) |  | (0.084) | (0.121) | (0.140) | (0.096) |
| Years of under education | -0.369 | -0.071 | -0.090 | -0.273\* |  | -0.189 | -0.546\*\* | 0.379 | 0.363 |
|  | (0.229) | (0.152) | (0.193) | (0.164) |  | (0.185) | (0.271) | (0.307) | (0.284) |
| Experience#overeducation | -0.000 | 0.001 | 0.021\*\*\* | 0.019\*\*\* |  | 0.004 | -0.005 | -0.003 | -0.011\* |
|  | (0.004) | (0.004) | (0.006) | (0.005) |  | (0.004) | (0.006) | (0.009) | (0.007) |
| Experience#adequateeducation | 0.012\* | 0.002 | 0.021\*\*\* | 0.017\*\*\* |  | 0.005 | 0.019\*\* | -0.021\*\* | -0.019\*\* |
|  | (0.007) | (0.005) | (0.007) | (0.006) |  | (0.006) | (0.009) | (0.010) | (0.009) |
| Experience#undereducation | 0.005 | 0.007 | 0.019\*\*\* | 0.012\*\*\* |  | -0.000 | 0.004 | -0.001 | -0.006 |
|  | (0.007) | (0.006) | (0.005) | (0.004) |  | (0.004) | (0.006) | (0.006) | (0.004) |
| Sigma | 8.775\*\*\* | 8.360\*\*\* | 7.982\*\*\* | 6.799\*\*\* |  | 3.635\*\*\* | 4.056\*\*\* | 3.104\*\*\* | 2.352\*\*\* |
|  | (0.100) | (0.088) | (0.070) | (0.059) |  | (0.090) | (0.123) | (0.104) | (0.073) |
| #OBS | 7380 | 7713 | 10182 | 9248 |  | 933 | 634 | 489 | 542 |
|  | Urban and private |  | Urban and public |
| Years of over education | -0.073 | -0.138\*\* | 0.015 | -0.157\*\*\* |  | -0.064 | 0.119 | 0.149\* | 0.333\*\*\* |
|  | (0.071) | (0.067) | (0.066) | (0.055) |  | (0.060) | (0.077) | (0.083) | (0.078) |
| Years of adequate education | -0.160\*\* | -0.020 | -0.012 | -0.185\*\*\* |  | -0.006 | 0.113\* | 0.044 | 0.169\*\*\* |
|  | (0.070) | (0.068) | (0.068) | (0.055) |  | (0.039) | (0.060) | (0.060) | (0.064) |
| Years of under education | -0.325\*\* | -0.163 | 0.121 | 0.008 |  | -0.192\* | 0.017 | -0.801\*\*\* | 0.139 |
|  | (0.161) | (0.132) | (0.153) | (0.133) |  | (0.111) | (0.204) | (0.232) | (0.234) |
| Experience#overeducation | 0.006 | 0.007\* | 0.008\* | 0.010\*\*\* |  | 0.005\* | -0.002 | -0.006 | -0.011\*\*\* |
|  | (0.004) | (0.004) | (0.004) | (0.004) |  | (0.003) | (0.004) | (0.004) | (0.004) |
| Experience#adequateeducation | 0.003 | -0.000 | 0.003 | 0.002 |  | 0.004 | -0.005 | 0.022\*\*\* | -0.006 |
|  | (0.005) | (0.005) | (0.005) | (0.004) |  | (0.004) | (0.007) | (0.007) | (0.007) |
| Experience#undereducation | 0.001 | -0.003 | 0.004 | 0.008\*\*\* |  | -0.000 | -0.006\*\* | -0.003 | -0.008\*\*\* |
|  | (0.004) | (0.004) | (0.004) | (0.003) |  | (0.002) | (0.003) | (0.003) | (0.003) |
| sigma | 6.182\*\*\* | 6.354\*\*\* | 5.863\*\*\* | 4.751\*\*\* |  | 2.589\*\*\* | 3.103\*\*\* | 2.898\*\*\* | 2.297\*\*\* |
|  | (0.080) | (0.075) | (0.054) | (0.044) |  | (0.047) | (0.064) | (0.057) | (0.048) |
| #OBS | 4233 | 5089 | 7773 | 6840 |  | 1596 | 1297 | 1408 | 1195 |
| \* p<0.10, \*\* p<0.05, \*\*\* p<0.01 |  |  |  |  |  |  |  |  |

Our third set of regressions use the same model as the previous two but apply a third method for measuring overeducation. For a subsample of occupations in which the average years of education of wage-earning employees is under 12 years we use 12 years of education as the cut off level for overeducation. In these occupations anyone with more than 12 years of education is identified as overeducated. Overeducation is measured as years of education after 12 years of high school. The underlying logic is that it is now culturally accepted that all individuals must earn a high school diploma and learn the general skills associated with 12 years of education.

 The coefficients of overeducation variables in table 7 offer coefficient signs for overeducation, which are consistent with those reported in table 5 and table 6. In the rural private sector regression models overeducation has a significant negative coefficient for all for sample years. In the urban private sector regression models the coefficient of overeducation is negative and significant for 2005 sample only. These results are consistent with our other regression results for the private sector.

In the public sector regressions the overeducation coefficients are statistically insignificant in rural areas but point to positive significant returns to overeducation in urban areas in 2005 and 2012 samples. These results are also consistent with the positive return to overeducation that was observed with other measurement methods (Tables 5 and 6).

Table 7. Coefficients of Overeducation and Adequate Education in Wage Equations with More-than-12-years measurement of

Overeducation Variable and TOBIT Regression Models.

|  |  |  |  |
| --- | --- | --- | --- |
| Tobit regressions, 12 years of schooling | Rural and private |  | Rural and public |
|  | 2001 | 2005 | 2009 | 2012 |  | 2001 | 2005 | 2009 | 2012 |
| Years of over education | -0.513 | -0.544 | 0.007 | 0.113 |  | 0.614\* | -0.020 | 0.587 | 0.125 |
|  | (0.717) | (0.406) | (0.462) | (0.327) |  | (0.359) | (0.326) | (0.371) | (0.313) |
| Years of adequate education | 0.131 | 0.228 | 0.322 | 0.328 |  | 0.061 | -0.148 | 0.227 | 0.068 |
|  | (0.190) | (0.202) | (0.256) | (0.222) |  | (0.103) | (0.150) | (0.179) | (0.122) |
| Years of under education | 0.299 | 0.324\*\* | 0.133 | 0.283\*\* |  | -0.336 | -0.564\*\* | 0.381 | -0.893\*\*\* |
|  | (0.215) | (0.148) | (0.152) | (0.126) |  | (0.215) | (0.266) | (0.278) | (0.203) |
| Experience#overeducation | -0.026 | 0.087 | 0.099\*\* | 0.038 |  | -0.036 | 0.016 | -0.016 | -0.017 |
|  | (0.084) | (0.062) | (0.042) | (0.024) |  | (0.028) | (0.030) | (0.029) | (0.018) |
| Experience#adequateeducation | -0.013 | -0.018\*\*\* | 0.002 | -0.006 |  | 0.007 | 0.015 | -0.021\*\* | 0.026\*\*\* |
|  | (0.008) | (0.007) | (0.006) | (0.005) |  | (0.008) | (0.010) | (0.009) | (0.007) |
| Experience#undereducation | 0.004 | -0.014 | -0.015 | -0.012 |  | -0.010\* | 0.005 | -0.010 | -0.009\* |
|  | (0.014) | (0.011) | (0.019) | (0.013) |  | (0.005) | (0.008) | (0.008) | (0.005) |
| Sigma Constant | 8.364\*\*\* | 7.655\*\*\* | 8.191\*\*\* | 7.123\*\*\* |  | 3.464\*\*\* | 4.057\*\*\* | 3.212\*\*\* | 2.464\*\*\* |
|  | (0.138) | (0.113) | (0.091) | (0.078) |  | (0.116) | (0.158) | (0.131) | (0.093) |
| #OBS | 3379 | 3616 | 6562 | 5931 |  | 509 | 386 | 331 | 375 |
|  | Urban and private |  | Urban and public |
| Years of over education | -0.032 | -0.589\*\* | 0.515\*\* | 0.488\*\*\* |  | -0.019 | 0.032 | 0.212 | 0.293\*\* |
|  | (0.326) | (0.234) | (0.236) | (0.177) |  | (0.174) | (0.176) | (0.168) | (0.133) |
| Years of adequate education | -0.093 | 0.048 | 0.184\* | 0.000 |  | -0.087\* | -0.035 | 0.082 | 0.105 |
|  | (0.088) | (0.110) | (0.103) | (0.098) |  | (0.052) | (0.066) | (0.067) | (0.069) |
| Years of under education | 0.063 | -0.078 | 0.229\*\* | 0.269\*\*\* |  | -0.423\*\*\* | -0.157 | -0.377\*\* | -0.087 |
|  | (0.152) | (0.125) | (0.101) | (0.088) |  | (0.114) | (0.139) | (0.155) | (0.128) |
| Experience#overeducation | 0.017 | 0.061\*\*\* | 0.017 | -0.006 |  | 0.005 | 0.007 | -0.004 | -0.010 |
|  | (0.021) | (0.021) | (0.018) | (0.012) |  | (0.009) | (0.011) | (0.011) | (0.008) |
| Experience#adequateeducation | -0.006 | 0.003 | -0.004 | -0.007\*\* |  | 0.019\*\*\* | 0.006 | 0.012\*\* | 0.002 |
|  | (0.006) | (0.006) | (0.004) | (0.003) |  | (0.004) | (0.005) | (0.005) | (0.004) |
| Experience#undereducation | 0.003 | 0.001 | -0.007 | 0.002 |  | 0.005\*\* | 0.003 | -0.003 | -0.004 |
|  | (0.005) | (0.006) | (0.006) | (0.005) |  | (0.002) | (0.003) | (0.003) | (0.003) |
| sigma | 5.804\*\*\* | 5.904\*\*\* | 5.639\*\*\* | 4.860\*\*\* |  | 2.418\*\*\* | 2.636\*\*\* | 2.969\*\*\* | 2.218\*\*\* |
|  | (0.106) | (0.090) | (0.070) | (0.060) |  | (0.055) | (0.066) | (0.069) | (0.054) |
| #OBS | 2047 | 2862 | 4204 | 3886 |  | 1038 | 842 | 997 | 874 |
| \* p<0.10, \*\* p<0.05, \*\*\* p<0.01 |  |  |  |  |  |  |  |  |

 Combining the results of our regression analysis in tables 5, 6 and 7, we notice that the results are consistent. We find that overeducation either has no significant positive impact or has a statistically significant negative association with a worker’s wage in the private sector. On the other hand, we notice that overeducation has a statistically significant positive association with a worker’s wage in the public sector. This unusual outcome for the public sector is a direct consequence of the legal and overt biases in favor of university education that have been build into public sector recruitment, promotion and salary structure in Iran.

**Conclusion**

In this article we have tried to shed light on Iran’s growing overeducation crisis, which has resulted high rates of unemployment and underemployment among the country’s pool of university graduates. We used the annual Household Income and Expenditure Survey to conduct a statistical investigation into incidence of overeducation and its impact on wage earnings of university graduates. Four annual surveys for 2001, 2005, 2009 and 2012 were used for this purpose. This 12-year data range allows us to detect any possible time trends in prevalence of overeducation. We limited our sample data to individuals that were employed in low-skill and semi-skill jobs in each observation year.

Our descriptive analysis clearly demonstrated that the share of college graduates in low skill professions, for which the adequate level of education was high school or less, has gradually increased during 2001-2012. Out data also suggests that the increase in share of college graduates was larger for workers in comparison to self-employed and employers in the same profession.

When comparing these college graduate shares in comparable jobs in the United States and Iran we noticed that the ratio was significantly larger in the United States. This is partly because of the high incidence of overeducation in the United States. This difference is also partly due to a cultural difference. In Iran, similar to many Middle Eastern countries, university graduates consider it beneath their social status to accept low status service or manual jobs and would rather to endure long periods of unemployment than to accept one of these jobs. There is far less negative stigma attached to acceptance of such jobs in the American culture. Consequently while we observe high ratios of underemployment and low unemployment among college graduates in the United States, the opposite is true in Iran.

Our Multinomial logit regressions identified several significant correlates of the odds of overeducation. These models revealed that in 2001, gender was not a significant factor but by 2012 the odds of overeducation for women was higher than men. As expected we observed that experience had a strong negative correlation with likelihood of overeducation and this result remained valid overtime. We also observe that the odds of overeducation are larger in the public sector than in the private sector.

 We used a Mincerian wage equation to test the impact of overeducation and under-education on wage earnings of workers. Using three different measures of overeducation and limiting our sample to low-skilled and semi-skilled workers we were able to confirm our hypothesis that overeducation did not have a positive impact on wages in the private sector. In some regression models we even observed a negative coefficient for overeducation, which suggested that overeducated workers were earning lower wages. When we repeated the regressions for public sector employees however, we obtained an opposite result. The coefficient of overeducation was positive and our hypothesis was rejected.

These findings indicate that the marginal effect of overeducation in private and public sectors are opposite each other. This is a significant finding that has not been reported in the overeducation literature for other developing countries. A possible explanation for this observation is that hiring, promotion and wage rate in the public sector is directly linked to an employee’s level of education regardless of productivity. This incentive mechanism has played an important role in increasing demand for higher education in Iran and hence is partly responsible for the growing crisis of overeducation that it is currently experiencing.

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[معاون وزیر علوم: اشتياق بيش از حد به ادامه تحصيل نشانه نامناسب بودن شرايط بازار كار است](https://www.parsine.com/fa/news/28674/%D9%85%D8%B9%D8%A7%D9%88%D9%86-%D9%88%D8%B2%DB%8C%D8%B1-%D8%B9%D9%84%D9%88%D9%85-%D8%A7%D8%B4%D8%AA%D9%8A%D8%A7%D9%82-%D8%A8%D9%8A%D8%B4-%D8%A7%D8%B2-%D8%AD%D8%AF-%D8%A8%D9%87-%D8%A7%D8%AF%D8%A7%D9%85%D9%87-%D8%AA%D8%AD%D8%B5%D9%8A%D9%84-%D9%86%D8%B4%D8%A7%D9%86%D9%87-%D9%86%D8%A7%D9%85%D9%86%D8%A7%D8%B3%D8%A8-%D8%A8%D9%88%D8%AF%D9%86-%D8%B4%D8%B1%D8%A7%D9%8A%D8%B7-%D8%A8%D8%A7%D8%B2%D8%A7%D8%B1-%D9%83%D8%A7%D8%B1-%D8%A7%D8%B3%D8%AA) (December 3, 2010)

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**Appendix**

|  |
| --- |
| Table A-1Tobit regression Wage Equations. (Overeducation based on more than 12 years of education.) |
|  | 2001 | 2005 | 2009 | 2014 |
| gender | 2.302\*\*\* | 1.931\*\*\* | 2.609\*\*\* | 1.814\*\*\* |
|  | (0.412) | (0.363) | (0.288) | (0.242) |
| exprience | 0.139\*\*\* | 0.091\*\* | 0.141\*\*\* | 0.088\*\*\* |
|  | (0.040) | (0.037) | (0.028) | (0.024) |
| exprienceSqu | -0.002\* | -0.002 | -0.003\*\*\* | -0.150\*\* |
|  | (0.001) | (0.001) | (0.001) | (0.070) |
| agrifish | -6.110\*\*\* | -6.427\*\*\* | -3.215\*\*\* | -3.513\*\*\* |
|  | (1.298) | (1.042) | (0.671) | (0.629) |
| industry | -1.300 | -1.426 | -0.287 | -1.274\*\* |
|  | (1.216) | (0.983) | (0.624) | (0.582) |
| services | -1.487 | -0.791 | 0.009 | -0.636 |
|  | (1.218) | (0.984) | (0.621) | (0.578) |
| construction | -1.078\*\*\* | -1.157\*\*\* | -0.992\*\*\* | -0.802\*\*\* |
|  | (0.314) | (0.277) | (0.208) | (0.178) |
| clerk | 2.636\*\*\* | 2.284\*\*\* | 2.069\*\*\* | 1.099\*\*\* |
|  | (0.530) | (0.452) | (0.380) | (0.304) |
| service or shop and market assistant | 0.713\* | 0.826\*\* | 0.839\*\*\* | 0.137 |
|  | (0.414) | (0.369) | (0.283) | (0.232) |
| agricultural, animal husbandry~ | 2.718\*\*\* | 3.525\*\*\* | 2.537\*\*\* | 1.138 |
|  | (0.806) | (0.802) | (0.705) | (0.721) |
| production worker | 0.506\* | 0.829\*\*\* | 0.705\*\*\* | 0.383\*\* |
|  | (0.281) | (0.259) | (0.193) | (0.165) |
| machine operator | 1.117\*\*\* | 1.263\*\*\* | 0.684\*\*\* | 0.235 |
|  | (0.358) | (0.320) | (0.235) | (0.210) |
| years of over education | 0.166 | -0.555\*\*\* | 0.155 | -0.106 |
|  | (0.266) | (0.210) | (0.180) | (0.130) |
| years of adequate education | 0.016 | -0.006 | 0.032 | 0.014 |
|  | (0.054) | (0.047) | (0.035) | (0.030) |
| years of under education | -0.022 | -0.078 | 0.005 | 0.015 |
|  | (0.110) | (0.090) | (0.069) | (0.062) |
| Over\*Exp | 0.010 | 0.055\*\*\* | 0.027 | 0.014 |
|  | (0.020) | (0.021) | (0.017) | (0.011) |
| Under\*Exp | -0.000 | 0.003 | 0.002 | -0.001 |
|  | (0.005) | (0.004) | (0.003) | (0.003) |
| Adequate\*Exp | 0.001 | 0.001 | 0.002 | 0.000 |
|  | (0.003) | (0.003) | (0.002) | (0.002) |
| Constant | 8.033\*\*\* | 9.446\*\*\* | 8.347\*\*\* | 12.032\*\*\* |
|  | (1.369) | (1.108) | (0.742) | (0.678) |
| Sigma Constant | 6.191\*\*\* | 6.359\*\*\* | 5.863\*\*\* | 4.756\*\*\* |
|  | (0.080) | (0.075) | (0.054) | (0.044) |
| N | 4233 | 5089 | 7773 | 6840 |
| \* p<0.10, \*\* p<0.05, \*\*\* p<0.01 |  |  |  |  |
| Sample: Private Sector Employees in Urban Areas |  |  |  |

**Endnotes**

1. Educational upgrading means that they hire a college graduate to do the job that was done by a high school graduate before without any change in skill requirements. Similarly a job that was assigned to college graduates with an undergraduate degree is now assigned to a job applicant with graduate degree. [↑](#endnote-ref-1)
2. Al-Agha, et al (2008). “Ravand roshd kami amuzesh aali khosusi v dolati dar jomhuri eslaami Iran”. [↑](#endnote-ref-2)
3. [http://www.entekhab.ir/fa/news/151755/آمار-دانشجویان-سراسر-کشور](http://www.entekhab.ir/fa/news/151755/%D8%A2%D9%85%D8%A7%D8%B1-%D8%AF%D8%A7%D9%86%D8%B4%D8%AC%D9%88%DB%8C%D8%A7%D9%86-%D8%B3%D8%B1%D8%A7%D8%B3%D8%B1-%DA%A9%D8%B4%D9%88%D8%B1) [↑](#endnote-ref-3)
4. <http://www.pnu.ac.ir/Portal/Home/Default.aspx?CategoryID=a60e380f-99d7-4f37-823d-4ea444d7720b> [↑](#endnote-ref-4)
5. High unemployment rate and low wages of undergraduate graduates encourages many of them to enroll for graduate studies. In 2012 nearly 896,000 applicants participated in the masters degree entrance exams of which 82,535 were admitted. (Source: <http://www.khabaronline.ir/detail/275586/society/education>, Khabaronline, February 11, 2013.) [↑](#endnote-ref-5)
6. Vedder (2010) reports Bureau of Labor Statistics data that shows 15% of Taxi drivers and 17.5% of Office clerks in the US had college degrees in 2008. [↑](#endnote-ref-6)