Human capital investment: an analysis of the return of higher education

Dina Hadia*; Nasri Bachtiar; Elfindri

Faculty of Economics, Universitas Andalas, Indonesia

**To whom correspondence should be addressed. E-mail: dinahadia@gmail.com*

Abstract

This study is aimed to analyze particular problems related to economic return for West Sumateran workers who graduated higher education by using human capital investment concepts. The dataset is sourced from National Labor Force Survey for West Sumatera 2017 and contains 1798 records of those aging at least 15 years, graduating from academy, university and postgraduate schools and distributed in all main industries. The return to higher education is estimated using Mincerian framework by considering modulatory effects of college major graduated. Other worker characteristics including training and experience are used to measure earning differentials among worker. The result of this study shows that the return to higher education is significantly positive and amplified if workers graduated from certain college majors. It is also found that participating in job training and having working experience prior to current job significantly increase highly educated workers earning in West Sumatera.

***Keywords**: Human capital investment, Return higher education, Unemployment*

JEL classification: O15, I25

INTRODUCTION

The unemployment, in the sense of rising amount of labor force with imbalanced employment rate, has been becoming a common development issue in every part of the nation in recent years. For West Sumatera, the unemployment rate has sharply increased from 6.04 percent in 2016 to 7.7 percent in 2017. It is also recorded that the average earning of the workers in West Sumatera is lower than that of entire Sumatera.

The competitiveness of highly educated graduates in acquiring jobs depends on local employment rate. Higher rate of unemployment may lead to lowering the total return to education, especially for the higher one since the its large amount of investment is exposed to the recent risk of being jobless due to economic slow downing. Therefore, it becomes more problematic for West Sumatera to achieve the efficacy of higher education in its own labor market. However, the labor market demand for certain college major's graduate is also decisive in determining the return to higher education. In this study, such college major effect is involved in our analysis to catch the reflection of higher education potency in West Sumatera.

To explain the return to higher education in West Sumatera, we delve into the relationship between earning and several workers characteristics including years of schooling, college majors, job training participation, and working experience by using the theory of human capital investment considered as the most appropriate and practical approach for the case. Becker (1975) introduced an economic concept that analyze individual investment decision when dealing with the trade-off between investing more

time and costs in adding education (and training) or investing experiences by straightly accepting the first job. The activities done based on this decision making in the trade-off is then assumed as investment that maximizes the present value of lifetime economic and psychological benefits for a person. Whatever the investment takes form, it shall enhance an intangible entity that determines future productivity called human capital. The activities which induces costs, time and certain other sacrifices in order to accumulate the stock of human capital is known as human investment.

According to Becker (1975), human capital is not only a resource but also a capital that yields returns compensating all cost invested, develops itself both in quantity and quality over the time during human investment. In labor market, human capital represents the value of a worker thus specify the ability of such worker in producing goods and services. Human capital investment is mainly assumed as adding one extra years of schooling in order to earn certain unit of increment in earning in the future. The forgone income due to extra years of studying in school, tuition, costs for books and other equipment, transportation and others relevant costs sum up as the total investment one must cover with future earning (Atmanti 2005).

Becker (1994) considered the following activities as human capital investment: 1) ***Job training***. Job training provides essential skills demanded by jobs. Generic training provides basic skills which are commonly applicable in almost all jobs. Firm-specific training provides typical skills needed for accomplishing particular jobs which may not available in other places thus establish stronger bond between employer and trainees; 2) ***Schooling***. Schooling is an effort to acquire cognitive knowledges in one or more majors; 3) ***Other efforts in seeking knowledge***. Beside schooling and training, human investment may cover migration and accessing economic information which could be geographically difficult and costly; 4) ***Self-improvement***. Firms normally invests in maintaining physical and mental wellbeing of its employees by providing medical services, nutrition, protection from harmful works and creating positive working policies.

Neoclassical theory suggests that in maximizing profits firms, production factors are utilized and then rewarded as much as the value of marginal increase in the product yielded by each factor. Therefore, the wage of an employee is the value of marginal increase in the goods or services produced by the employee. This is known as the theory of marginal productivity. It is derived from the theory what is called Marginal Product of Labor (MPL), defined as additional output received by firm in the response of adding one more labor. In classical view, MPL is real wage (MPL = wage/product). The theory of marginal productivity implies that labor demand and supply would be always equal or there would be zero possibility of unemployment since the wage flexibility is apparent in labor market. It means that if everybody is willing to have a job for certain real wage rate, then the unemployment is a matter of voluntary or personal preference.

Solow (1979) introduced the Theory of Efficient Wage. Efficient wage is equal to marginal product under certain conditions that sufficiently maximize firm's profit (Sugiono, 2012). However, firms prefer to arrange higher wage than that offered in perfectly competitive market for some reasons:1) Higher wage is intended to enhance working discipline that strongly associate with higher total productivity as well as being an incentive and reward for workers to achieve higher goals; 2) High repetitive recruitment costs could be avoided if firm successfully establish stronger bond with its employees by offering more appropriate salary which lowers the risk of job resigning. Higher wage offered may keep the firm from (i) forgone production due to loss of employees; (ii) New recruitment cost; (iii) New training costs; and (iv) lower productivity of new recruits; 3) An attractive strategy to win highly qualified individuals in firms labor

market competition; 4) A reward for determined workers that may stimulate to improve future working achievements; 5) In less developed countries, higher wage is expected to help fulfill better nutrition for workers in order to live healthy and productive.

West Sumateran labor market is recorded to offer a slight lower wage for highly educated workers compared to entire Sumateran labor market thus potentially lower the return to education. The average monthly earning of highly educated workers in West Sumatera is approximately Rp 3.4 million while the average monthly earning of all provinces in Sumatera is Rp 3.5 million. Despite the return to education is still positive for most situation (Blundell, Dearden, Meghir & Sianesi, 1999), Juwita and Lestari (2013) viewed that investment in education becomes less beneficial in a situation of excess labor supply since it forces highly educated graduates to accept low qualified jobs thus the earning cannot compensate the costs invested in human capital. Sanisah (2010) found that education-skill mismatch, commonly known as over-education and under-education, has been becoming the central issues of today's national unemployment. This situation is exacerbated by the tendency of 64-74 percent of secondary and tertiary school graduates to not starting their own business and voluntarily prefer to be unemployed while waiting future formal job recruitments.

Human investment is demanded to affect development sustainability. Pelinescu (2015) found that workers innovation capability and education attainment correlate strongly with GDP per capita. However, public education investment cost as part per GDP is apparently found to negatively affect the GDP per capita. This suggests that public investment in education somehow fails to address the challenge of providing productive skill and qualifications needed to boost GDP.

This study focuses on higher education that have contributed significantly to high unemployment rate in West Sumatera. It becomes more intriguing since the number of university students in West Sumatera keeps increased over years and results in larger investment costs. In this study we shall reveal the unemployment tendency of academy and university graduates in addition to our attempt to analyze the micro relationship between education, job training, working experience, and college majors. The main goal is to identify some factors potential for improving worker earning and some insight to optimize human capital supply that underpin the sustainability in national development especially in West Sumatera.

METHODS

Data

We use the records of National Labor Force Survey (SAKERNAS) 2017 for West Sumatera as our data to analyze the characteristics of highly educated workers in West Sumatera. The respondents are 1798 individuals aging at least 15 years, working primarily in an industry and graduating from academy, university or postgraduates schools. The survey was conducted officially by Badan Pusat Statistik to provide public data on employment. Panel sampling is implemented, meaning that the same households in sample are interviewed several times during the year. Sampling is designed to achieve accuracy up to regency level. Household samples are selected by using two stages one phase stratified sampling method.

Empirical framework

We observe the relationship between monthly earning and several explanatory variables including education, college majors, job training and working experiences. The basic concept of investment in education as reviewed by Mincer (1958) proposes that individual discount rate associated to present value of lifetime earning equals the return

to education if the discount rate is small enough or close to market discount rate value. In this model known as the Compensating Difference Model, the discount rate is given by schooling coefficient. In Mincer's later work (1974), the model is augmented to involve the effect of potential labor market experiences by assuming the human investment drops to zero as working age increases. The latest Mincer's model has become a potent instrument that explains the return to education and the diminishing return to working experiences.

In this study we appraise that the approach of having the years of schooling as our proxy for education based on Mincer's assumption on educational investment is quite reasonable. Schultz (1961) considered that the inseparability between education costs and other costs may lead to biased rate of return to education thus cost-based approach is not preferred besides requiring massive datasets to be compiled. Therefore, instead of using actual costs, Schultz recommended to implement time-based approach (years of schooling) in measuring the return to investment in formal education since it reflects the costs level and other sacrifice fairly. In this study, we observe 6 schooling levels above senior high school (SMA, 12 years of schooling) which cover the entire higher education as described in the Table 1.

Table 1. Higher education levels in Indonesia

No	Schooling name	Schooling category (degree)	Assumed years of schooling
1	Diploma-1/Diploma-2 (D1/D2)	Academy (Baccalaureate)	14
2	Diploma-3 (D3)	Academy (Baccalaureate)	15
3	Diploma-4 (D4)	Academy (Baccalaureate)	16
4	Strata-1 (S1)	University (Bachelor)	16
5	Strata-2 (S2)	Postgraduate (Master)	18
6	Strata-3 (S3)	Postgraduate (Doctor)	22

Hundreds of college majors graduated by study respondents are then grouped into 12 based on college majors classification issued by RISTEKDIKTI (Ministry of Research, Technology and High Education of Indonesia) as listed in Table 2. Then 1798 college major codes from the dataset are mapped to the corresponding group in RISTEKDIKTI classification.

Table 2. College majors classification

No	College majors group
1	Mathematics and nature sciences (MNS)
2	Agriculture
3	Husbandry
4	Medical
5	Health Sciences
6	Engineering
7	Economics
8	Social and humanities (SH)
9	Religion
10	Arts
11	Education
12	Other majors

Since choosing college major is an attribute of higher education, then college majors are involved in our model as modulatory variables for years of schooling thus stated as factor of education. Interaction between years of schooling and college majors gives unique changes in the return to education given the potency of each major in labor

market. Beside education and college majors, we involved job training participation and working experience as other dichotomous variables. We finally state our model as follows:

$$\ln E = \alpha_i + a_i Edu + \left(\sum_{k=1}^{12} b_{ik} Maj_k\right) Edu + c_i Trai + d_i Exper + \varepsilon_i$$

Where $\ln E$ is log of monthly earning, α is regression intercept that represents the default earning if no investment involved, a_i is the schooling coefficient that represents the return to higher education, b_{ik} is the modulatory coefficient that represents additional return to education due to graduating from college major k, c_i is the coefficient for for job training participation that represents earning differential between those trained and untrained, d_i is the coefficient for job experience that represents earning differential between those having prior experience of working and not having any working experience, ε is an error term that represent unobserved abilities in the model and i is the individual index.

The value ranges for each variable in the model is described in Table 3.

Table 3. Variable information

Symbols	Variable names	Value
$\ln E$	Log of Monthly Earning	Log of Rupiah
Edu	Years of schooling	14 for D1/D2 15 for D3 16 for S1/D4 18 for S2 22 for S3
Maj_k	College majors	MNS= 1, others = 0 Agriculture =1, others = 0 Husbandry = 1, Others = 0 Medical = 1, Others = 0 Health sciences = 1, Others = 0 Engineering = 1, Others = 0 Economics = 1, Others = 0 SH = 1, Others = 0 Religion = 1, Others = 0 Arts = 1, Others = 0 Education = 1, Others = 0 Other majors =1, Others = 0
$Trai$	Job training participation	1= participated in at least one certified training 0= never participated
$Exper$	Working experience	1= having experience prior to current job 0= first job

RESULTS AND DISCUSSION

Employment characteristic in West Sumatera

Table 4 shows the West Sumateran labor force of 367 thousand, consists of 96 thousands of academy graduates and 271 thousand of university and postsecondary graduates. From the figure, 86 thousands of academy graduates and 252 thousand of university and postsecondary graduates have been employed. The rest constitutes 7.1 percent of highly educated unemployment and becomes burden for local economies. The most dense labor force is recorded for Padang with over 100 thousand or around 28

percent of West Sumateran labor force. Despite the concentrated labor force in Padang city, Solok regency and Pasaman regency apparently becomes the highest for unemployment for academy graduate (23.4 percent) and university plus postsecondary graduates (16.3 percent) respectively.

Table 4. Labor force situation in West Sumatera 2017

Regency/city	Labor force		Employed		Unemployed			
	Academy	Above academy	Academy	Above academy	Academy	%	Above academy	%
Kep. Mentawai	736	1,489	736	1,489	0	0,0	0	0,0
Pesisir Selatan	5,424	18,836	5,290	17,075	134	2.5	1,761	9.3
Kab. Solok	5,982	15,472	4,584	14,368	1,398	23.4	1,104	7.1
Sijunjung	1,743	9,884	1,743	9,693	0	0.0	191	1.9
Tanah Datar	5,799	13,039	5,743	12,289	0	0.0	750	5.8
Padang Pariaman	3,628	14,273	3,628	13,674	0	0.0	599	4.2
Agam	11,875	22,259	10,381	21,227	1,494	12.6	1,032	4.6
Limapuluh Kota	5,427	13,881	5,038	13,614	389	7.2	267	1.9
Pasaman	2,745	12,492	2,642	10,454	103	3.8	2,038	16.3
Solok Selatan	1,888	8,622	1,765	8,441	123	6.5	181	2.1
Dharmasraya	4,102	9,446	3,960	9,271	142	3.5	175	1.9
Pasaman Barat	4,396	14,218	4,197	13,217	199	4.5	1,001	7.0
Padang	28,041	73,298	23,366	67,843	4,675	16.7	5,455	7.4
Solok	2,257	6,173	2,126	5,699	131	5.8	474	7.7
Sawahlunto	1,647	4,000	1,365	3,696	282	17.1	304	7.6
Padang Panjang	1,343	4,593	1,274	4,444	69	5.1	149	3.2
Bukittinggi	4,531	11,483	4,139	10,150	392	8.7	1,333	11.6
Payakumbuh	3,125	10,314	3,093	9,536	32	1.0	778	7.5
Pariaman	1,808	7,310	1,472	6,517	336	18.6	793	10.8
Total	96,497	271,082	86,598	252,697	9,899	10.26	18,385	6.78

Source: SAKERNAS, 2017

Highly educated unemployment

Even though the total unemployment rate has dropped to below 10 percent, it seems to happen mostly for those graduating from elementary school (SD) and junior high school (SMP) who are willing to accept blue collar jobs to get the daily living. For the higher graduates, the unemployment rate is worse. In 2017, the total unemployment for West Sumatera is only 5.58 percent, but the highly educated unemployment rate reach 7.67 percent. It indicates that regional development in West Sumatera seems to give smaller benefit for higher graduates and shall stimulate them to accept low qualified jobs or migrate to other provinces to find better jobs.

From the college major's point of view as shown by Figure 1, Economics and Health Sciences majors contribute the largest share for unemployment in West Sumatera, respectively of 13.30 percent and 13.05 percent. In the last decade, the labor supply of both major groups have been excessive due to massive establishment and development of new colleges in expectation to "export" qualified graduates to many other provinces and regions. However, the excess labor supply have been facing the economic slowdown nationwide and leading to more severe local unemployment of highly educated graduates. The religion, education, and agriculture majors are recorded to contribute the lowest unemployment rate (below 5.58 percent) in West Sumatera. It seems that the graduates of these three major groups are more flexible in accepting jobs in local labor market and not requiring the jobs to be formal.

Engineering graduates are reported to receive high earning when employed. On another side, the unemployment rate for engineering majors is apparently high (7.95

percent) compared to other majors. Relatedly, this phenomenon could be explained by the Efficiency Theory. Since the firms specializing in engineering-related jobs likely to offer above competitive labor market wage for determined workers in maintaining production efficiency, graduates in engineering may prefer to be unemployed when offered with low wage.

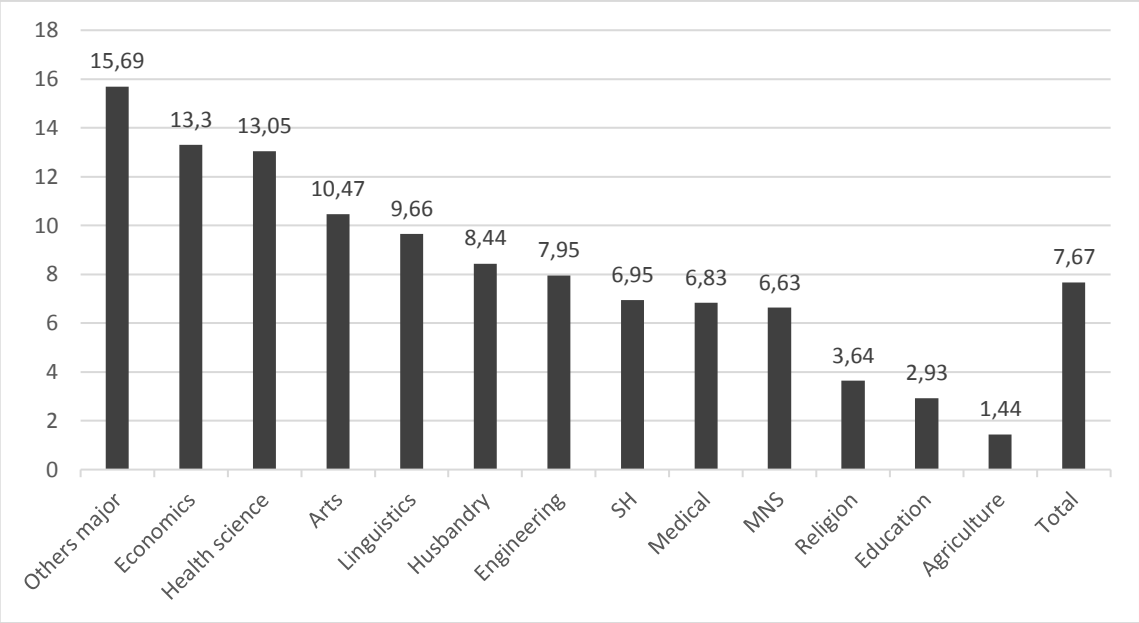

Figure 1. Unemployment rate by college major groups in West Sumatera
Source: SAKERNAS 2017[1].

We breakdown the unemployment characteristics by college majors in the following Table 5 shows the West Sumateran unemployment characteristics by college majors.

Table 5. Cross comparison between workers earning and unemployment rate by college major group

	Low earning	High earning
Low unemployment	1). Agriculture UR: 1.44; AE: 2,245,127 2). Education UR: 2.93; AE: 3,388,225 3). Religions UR: 3,64; AE: 2,965,801	1). Medical UR: 6.83; AE: 3,830,337 2). Social and humanities UR: 6.95; AE: 4,539,021 3) MNS UR: 6.63; AE: 3,564,085
High unemployment	1). Economics UR: 13.30; AE: 3,018,491 2). Health sciences UR: 13.05; AE: 2,940,116 3). Linguistics UR: 9.66; AE: 2,107,142	1). Arts UR: 10.47; AE: 4,136,710 2). Engineering UR: 7.95; AE: 3,549,949

Source: Calculated based on SAKERNAS, 2017
Note: -Division based on unemployment rates of West Sumatera and average wages
-UR: unemployment rate (in percent), AE: average earning (in Rupiah)

[1] The unemployment rate is the percentage of the number unemployed divided by the total labor force.

Relative distribution: academy or university

By calculating relative distribution, it would frame more interesting employment rate in West Sumatera by college majors. The result in Figure 2 shows that academy graduates in Economics and MNS are likely to be employed more than university graduates of those majors. In contrast, university graduates in SH are more likely employed than those graduating from academy. This indicates that university graduates in SH are more flexible to accept jobs or willing to have various jobs.

In Health Sciences, the academy graduates are booming in West Sumateran labor market, especially for D3 degree with unbalanced the demand for this major, leading to highest academy unemployment rate. Beside the low demand due to national economic situation, the problem beyond this phenomenon is more structurally concerning how the educational system was established for most academies in West Sumatera. Lack of proper assessment for college operation and weaker student entry selection account for incompetent graduates in national and international labor market.

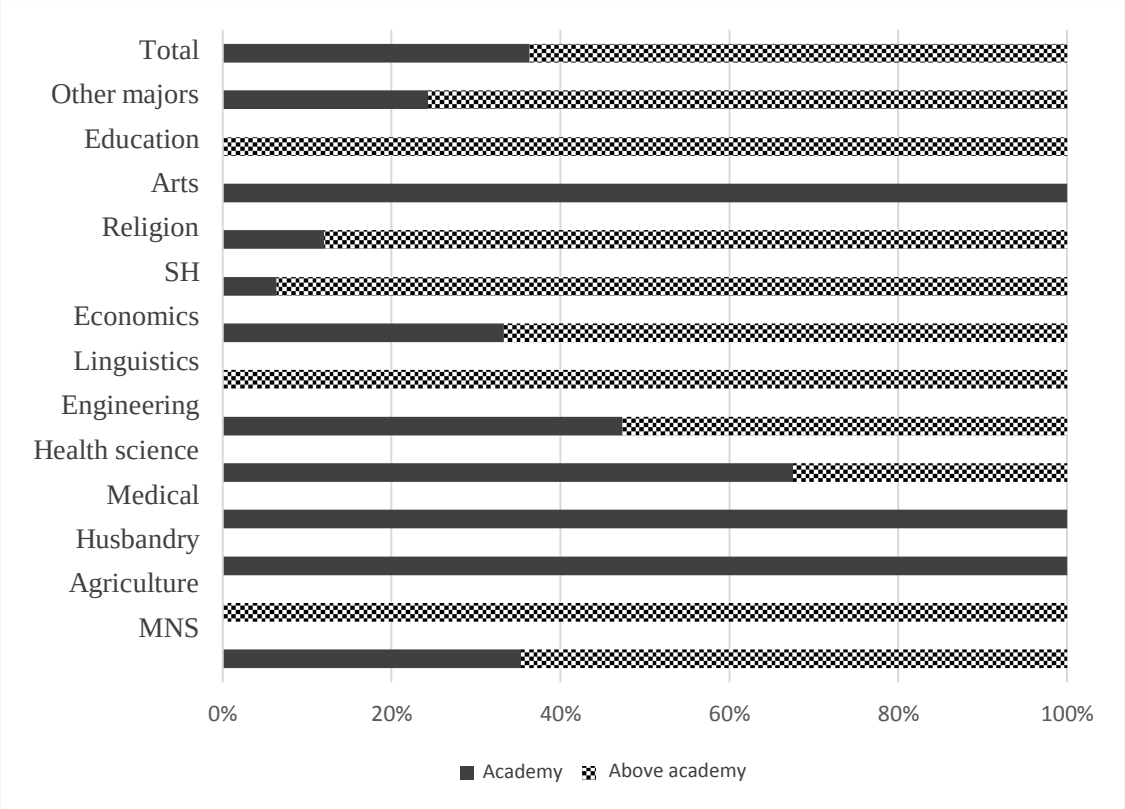

Figure 2. Relative distribution for unemployment by college majors
Source: Calculated based on SAKERNAS, 2017

Earning by college majors

Figure 3 shows our calculation on graduate's average earning of each college major. Arts and SH are both leading in average earning compared to other major groups. The earning of Medical graduates is recorded below Arts and SH, which is not expected given the relatively much higher amount of investment in Medical majors. However, it is not surprising that Medical graduates are not flexible in labor market when dealing with job options and may force them to work in matching occupations despite unmatched salaries.

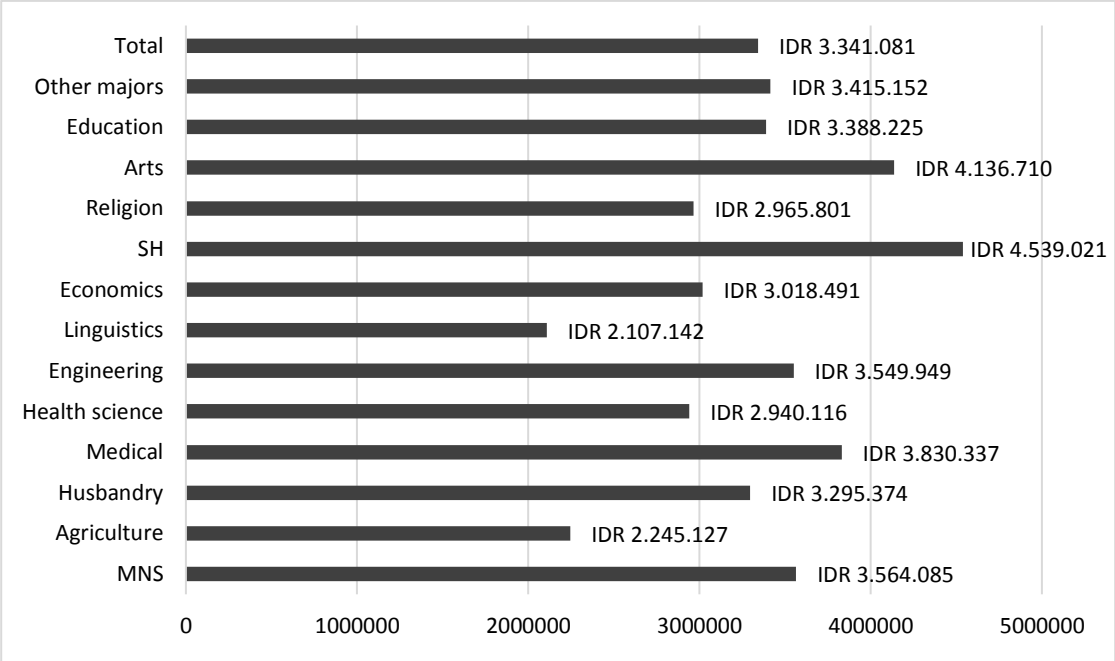

Figure 3. Average earning by college major groups
Source: Calculated based on SAKERNAS, 2017

Estimation for return to higher education in West Sumatera

Table 6 shows the estimated model of earning for West Sumateran workers who graduated from academy, university and postgraduate schools. Years of schooling, job training participation and working experience are found to affect earning significantly and positively, meanwhile only 8 out of 12 major groups observed are reported to affect earning significantly.

Table 6. Estimated effects of explanatory variables on earning

Variable	Coefficient	Std. Error	Prob.
EDU	0.171902	0.031638	0.0000 *
EDU×MNS	0.026725	0.009339	0.0043 *
EDU×Agriculture	0.014637	0.012503	0.2419
EDU×Husbandry	0.022046	0.015463	0.1542
EDU×Medical	0.042089	0.012175	0.0006 *
EDU×Health Sciences	0.027981	0.009012	0.0019 *
EDU×Engineering	0.032056	0.009121	0.0005 *
EDU×Economics	0.025646	0.008491	0.0026 *
EDU×SH	0.044687	0.008932	0.0000 *
EDU×Religion	0.009158	0.008968	0.3073
EDU×Arts	0.021404	0.014221	0.1325
EDU×Education	0.023634	0.008090	0.0035 *
EDU×Other majors	0.034033	0.014528	0.0193 **
TRAI	0.235368	0.049522	0.0000 *
EXPER	0.898997	0.096612	0.0000 *
α	10.58544	0.491398	0.0000 *
R-squared	0.123954		
F-statistic	14.63975		

*Note * significant at 1%; ** significant at 5%.*

From the estimation, years of schooling significantly affects the earning of West Sumateran workers in positive way. The coefficient of years of schooling is reported of 0.172. It means that by holding other factors constant, one extra years of schooling in higher education enhances 17.2 percent of earning. In instances, five extra years of schooling, which may happen if someone improves his education from D3 to S2 degree, is likely to induce around 50 percent rise in earning. This rate of return seems to be very promising for local education investors when compared to current market interest rate of around 10 percent as well as stimulate more incentive for West Sumateran in the race toward college degrees. In fact, Febrina & Chotib (2019) found that education has been a significant attractor for those especially unmarried and younger from other provinces to migrate to West Sumatera. Nevertheless it is remained the problem that West Sumateran industrial demand for highly educated graduates has not shown the equal promising improvement in recent years due to national economic stagnancies and slow local economic transformation. The annual statistic records reveals that West Sumatera relies fully on primary sectors since its share undergoes increases in latest five years (BPS, 2018), suppressing the share of more advanced sectors. Meanwhile the primary sectors demanded skills are not mainly provided by higher education. This may help explain the high unemployment rate for higher educated people in West Sumatera.

In the attribution to college majors, higher education seems to give largest benefit for workers with social humanities and medical degrees. Both majors contribute respectively of extra 4.4 percent and 4.2 percent to the return to higher education. These figures are quite shocking given the higher investment cost in medical education compared to that of social and humanities. This also seems contrast to studies that previously found that especially humanities and social major graduates tend to earn lower after graduating from college (see Lyonette, Hunt & Baldauf, 2017). However, Lyonette, Hunt & Baldauf (2017) also highlighted a number of positive qualities that commonly possessed by SH graduates such as (i) confidence in communication, interpersonal and softer skills; (ii) higher entrepreneurship passion and (iii) higher tendency to improve education in expertise which are apparently demanded in certain labor market situation. Specifically, graduating from Law major, a part of humanities major group, is also reported to as one of the most prominent among many college majors when it concerns the return to education ((Blundell, Dearden, Meghir & Sianesi, 1999). It is also found that the unemployment rate for SH majors is 6.95 percent, relatively lower than that of West Sumateran higher education. In contrary, the medical graduates seem to have less similar qualities probably caused by lacking of job options in labor market.

In the bottom of the chart, graduating from education majors seem to give least additional benefit to workers earning. The major effect is reported to give only 2.3 percent extra to the return to education or around 19.3 percent in total return to education. This is probably resulted by the massive graduates supply wave in the last decade in West Sumatera that forces the graduates to work as voluntary (assisting) teachers and are paid below labor market standard given limited regional and institutional budget to employ these graduates.

There are four major groups that are estimated to give insignificant effect to the return to higher education namely agriculture, husbandry, religions and arts. It is important to draw one's focus on the first two majors for the case of West Sumatera. The share increment of West Sumateran primary sector (agriculture, livestock farming, forestry and fishery) in its recent GDP apparently induces virtually no effect on the

welfare of graduates in agriculture and husbandry college majors. This may be caused by the tendency of both majors graduates who prefer to be employed rather than starting own business in primary sectors. Based on our data, 62 – 71 percent of these graduates work as state and firm employees.

Around 48.39 percent of graduates in religion majors earn below West Sumateran minimum wage and most of these graduates work as Islamic teachers. This is related to excess supply as found in the case of education majors. Meanwhile, graduates in arts are reported to have large variation of earning, from around Rp. 500 thousand to Rp. 4 million thus cause indeterminate changes in the return to higher education. The typical characteristic of arts graduates who accept jobs more for passion rather than living is presumed to become the explanation for the high variation in their earning.

The effect of job training and working experience on worker earning

From the regression estimations, job training participation affects worker's earning positively and significantly. The earning differential between trained workers and untrained workers is reported of 23.47 percent, holding constant other variables. This finding follows the human capital theory undoubtedly. A tremendous earning differential is constituted between those experienced and fresh workers as large as 89.87 percent. Working experience has been shown as a significant explanatory of worker's earning universally (see Fahmy, Bachtiar & Sari (2016) for example of the case of international workers in Malaysia). Therefore, it implies that job training and working experience prior to current job are effective ways of human investment for West Sumateran workers. However, the rise in amount of West Sumateran academy and university fresh graduates may take place as a challenge as well as an opportunity for public and private job training providers to develop and offer job training programs in order to supply demanded skills in West Sumateran labor market.

CONCLUSION AND RECOMMENDATION

Conclusion

This research is aimed to analyze the return to higher education for workers in West Sumatera by using Mincer framework as baseline. The relationship between earning and worker's characteristics including years of schooling in academy, university and postgraduate schools, graduating from certain college majors, participation in job training and working experience is approached with human investment concept introduced by Becker. According to the investment concept, the return to education is represented by the estimated of schooling coefficient. Further elaboration in our framework suggests that college majors is an unseparated attribute of higher education that best stated as a factor of education attainment.

The regression result shows that the return to higher education is quite large, around 17 percent. It implies that investing in higher education seems to be promising and yield future benefits for West Sumateran graduates when employed. The rate of return to education is amplified if workers graduate from certain college majors such as Social and Humanities and Medical. However, several majors such as economics and engineering contribute to high unemployment rate due to excess supply and low wage offered. Concerning the stagnancy of economic transformation West Sumatera, it is indicated by the increasing share of primary sectors apparently in local GDP, graduates in agriculture and husbandry majors should be employed better. In fact, both majors have not

contributed yet to reducing the unemployment rate in West Sumatera and not significantly received significant extra return to years of schooling.

The result also shows that the earning differential is found to be constituted by job training participation and working experience significantly. Trained and experienced workers significantly receive earning as large as 23 percent and 89 percent higher than those untrained and inexperienced. It implies that participating in job training and developing career in particular job should be considered as an effective human investment besides studying in higher educations.

Recommendation

To sustain the optimum supply of human capital in West Sumatera, in the sense of higher employment rate and higher earning for academy and university graduates, it is important to evaluate the educational system in order to provide students with entrepreneurship, interpersonal and highly demanded skills in modern industries such as complex problem solving, public management, creative thinking, decision making etc. This discretion in human capital should be emphasized for agriculture and husbandry majors and aimed for development of local primary industries.

Local institution of higher education in West Sumatera should also establish stronger partnership with industries, especially those specialize in primary output production to ensure the link and match between university qualification and industrial career. Local government is also expected to empower local primary industries with implementation of university researches in order to improve outputs and stimulate student apprenticeship. Regarding the training provision, it is also expected for public institution and private companies to broaden training availabilities with distant learning and develop training curriculum to response the demand of labor market in West Sumatera. According to World Economic Forum reports (2018), current millennials should possess the skill of high ordered thinking and leadership communication ability. Such skills such be introduced to student as earlier as possible in higher education. Since the qualification to run predictive and quantitative jobs tends to deplete in the future, the demand for softer skills that promote sophisticated abilities in dealing with complex situation and human natures shall rise significantly and should be responded seriously by higher education.

ACKNOWLEDGEMENT

The authors would like to thank the Badan Pusat Statistik (BPS) for providing the data during the research.

REFERENCES

Atmanti, H.D. (2005). Investasi Sumber Daya Manusia Melalui Pendidikan. *Dinamika Pembangunan*, 2(1), 30–39.

Badan Pusat Statistik. (2017). *Keadaan Angkatan Kerja di Provinsi Sumatera Barat 2017*. Padang: BPS

Badan Pusat Statistik. (2016). *Laporan Perekonomian Provinsi Sumatera Barat 2016*. Padang: BPS

Badan Pusat Statistik. (2017). *Potret Pendidikan Indonesia Statistik Pendidikan 2017*. Jakarta: BPS

Badan Pusat Statistik. (2017). *Sumatera Barat Dalam Angka 2017*. Padang: BPS

Becker, G.S. (1975). *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education, 2nd edition*. National Bureau of Economic Research. New York: Columbia University Press

Becker, G.S. (1994). *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education, 3rd edition*. National Bureau of Economic Research. Chicago: The University of Chicago Press.

Blundell, R., Dearden, L., Meghir, C., & Sianesi, B. (1999). Human Capital Investment : The Returns from Education and and the Economy. *Fiscal Studies* 20(1):1–23.

Clark, A. (2003). Returns to Human Capital Investment in a Transition Economy. *International Journal of Manpower*, 24(1):11–30.

Danim, S. (2004). *Ekonomi Sumber Daya Manusia*. Bandung: Pustaka Setia.

Djoko, M.A.S.S., Karyana, Y., Karim, N.A., Mirdad, A.J., Fatah, R.H.A., Kusdiana, D., Pamungkas, P., & Badranaya, D.. (2015). *Mobilitas Penduduk dan Bonus Demografi*. Bandung: Unpad Press.

Elfindri & Bachtiar, N. (2004). *Ekonomi Ketenagakerjaan*. Padang: Andalas University Press.

Ehrenberg, R.G & Smith, R.S. (2003). M*odern Labor Economics: Theory and Public Policy*. Boston: Scott, Foresman and Company

Fahmy, R., Bachtiar, N., & Sari, D.T. (2016). The Effect of Human Capital on Earning of Indonesian Migrant Workers from West Sumatra in Malaysia. *International Journal of Economic Research* 13(5):2297–2311.

Febrina, R. & Chotib (2019). Macroeconomic Determinants of Internal Migration to West Sumatra. *Conference proceedings*, Asia Pasific Business and Economics Conference, 341-348

Jhingan, M.L. (2014). *Ekonomi Pembangunan dan Perenca*naan. Jakarta: RajaGrafindo Persada.

Juwita, R & Lestari, R.B. (2013). Kontribusi Tingkat Pendidikan Terhadap Pendapatan Sektoral Di Kota Palembang. *Forum Bisnis dan Kewirausahaan*, 2(2), 149–64.

Kaufman, Bruce.E. & Julie L.H. (2003). *The Economics of Labor Market*. New York: Thomson/South-Western

Kutner, M.H., Nachtsheim, C.J., & Neter, J. (2004). *Applied Linear Regression Models*. 4th ed. New York: McGraw-Hill Companies, Inc.

Lyonette, C., Hunt, W., & Baldauf, B. (2017). Occupations and Skills of Arts, Humanities, and Social Sciences Graduates and Postgraduates. *Warwick Institute for Employment Research.*

Mincer, J.A. (1974). *The Human Capital Earnings Function*. National Bureau of Economic Research.

Pelinescu, E. (2015). The Impact of Human Capital on Economic Growth. *Procedia Economics and Finance*, 22, 184–90.

Purnastuti, L., Wahyuni, D., & Mustofa. (2015). Analisis Tingkat Pengembalian Investasi Pendidikan di Daerah Istimewa Yogyakarta. *Paper Proceeding*, Seminar Nasional Universitas Negeri Yogyakarta

Sanisah, S. (2010). Pendidikan Tinggi dan Pengangguran Terbuka. *Lentera Pendidikan* 13(2):147–59.

Sugiono, M. (2012). Pengembangan Human Capital dan Pendidikan Kosmopolitan. In Hendrawan, S., Indraswari, Yazid, S. (Eds), *Pengembangan Human Capital:*

Perspektif Nasional, Regional dan Global. Yogyakarta: Graha Ilmu

Weisbrod, B.A. (1962). Education and Investment in Human Capital. *The Journal of Political Economy* LXX(5):106–23.