Determinants of Sustainability and Human Capital

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Research Brief, Short Paper
ISSN 2687-8844
Vol. 1, No. 6 (2019, May 15)

Abstract

Knowledge and skills of a person are called 'human capital'. A person's stock of human capital is determined by her time-use choices. Based on the reasoning that policymakers must first learn what persons are already doing before designing public policies to enhance wellbeing, we focus on modeling people's time-use choices across Illinois counties. Results suggest that persons without a high school or a college diploma do not spend much time on education or skill development activities. We have developed a software that shows how much workers in Illinois counties, the 25+ age group with different levels of qualifications, are investing in (and valuing) skill development. Policymakers can build on this research to help workers gain the most for their investments in education and training.

Keywords: Human Capital, Illinois, Skill Development.

1.0. Introduction

The purpose of sustainable development is to contribute to enhanced wellbeing of persons (Athiyaman, 2019a; Sen, 2004). Wellbeing can be enhanced by expanding the capabilities of persons to lead the kinds of lives they value (Arrow et al (2014)). If we conceptualize capabilities as one's capital stock, then one's task is to use the capital to produce wellbeing. Dalziel (2017) highlight the types of capital associated in one's 'production plan'[2] (Table 1).

Human capital provides the owner with skills and attributes that can be used to attain wellbeing (for example, gain employment). Cultural capital and social capital stimulate behavior that makes social transactions easier. Economic capital offers financial returns. Natural capital provides ecosystem services that are essential for wellbeing. Intellectual products (knowledge capital) facilitates problem removal / avoidance (for example, wash clothes without water), and diplomatic capital helps nations to address issues jointly (for example, eradicate poverty).

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[2] The production plan can be denoted as: $y = (-(different\ types\ of\ capital), wellbeing)$; the negative sign denotes inputs to production; outputs are positive.

Table 1: Types of Capital: Determinants of Wellbeing

Capital	Examples of the Concept
Human	Developing personal skills and attributes through education, experience, and better health.
Cultural	Inheriting and passing on values[3] from generation to generation.
Social	Developing and strengthening trust within communities, for example, networks of volunteers.
Economic	Building physical assets.
Natural	Conserve and preserve the environment.
Knowledge	Developing intellectual property products.
Diplomatic	International collaboration for the common good of all life forms.

In the following pages we focus on understanding the variations in the 'levels' of different capital stocks[4] across Illinois counties with a view to designing public and private initiatives to expand the capital stocks.

2.0. Human Capital

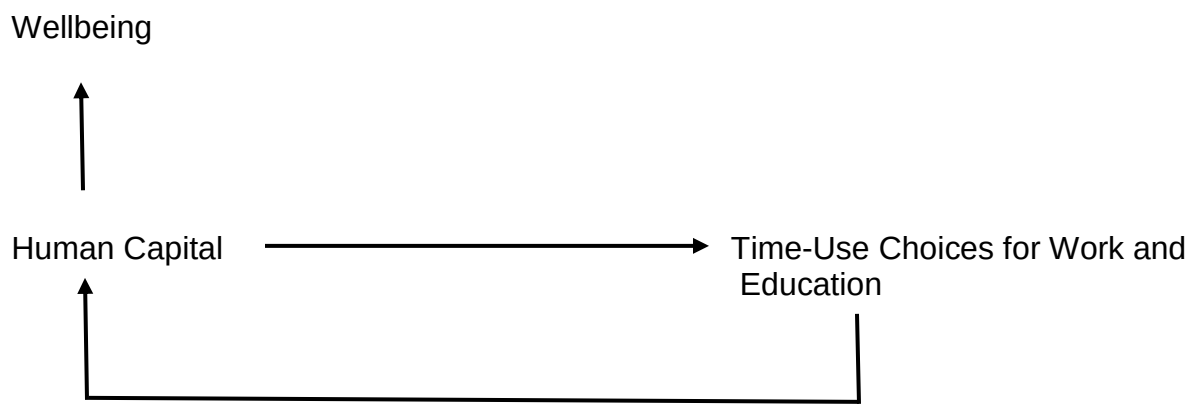
Knowledge and skills of a person, personal abilities, are labeled 'human capital'. A person's stock of human capital is determined by her time-use choices. Persons make time-use choices they believe will promote wellbeing. If there are persistent inequalities, then it is because of poor time-use choices[5]. It is assumed that individuals face little or no constraints such as personal ability or social capability to pursue time-use choices; social capability denotes societal barriers (for example, wage discrimination in employment; see Athiyaman (2011)). Persons' ability to make reasoned time-use choices suggests that policymakers must first learn what persons

[3] Values are what you want in life; behavior is directed towards value attainment.
[4] The term 'stocks' denotes a dynamic or longitudinal analysis; in contrast the term 'flows' is cross-sectional.
[5] Note that this is a value judgment; a judgment (response) that is based on cultural and societal influences or social norms. It is context specific, it may not be applicable in a different region of the world.

are already doing to enhance their wellbeing, before designing public policies to address wellbeing issues.

Consider Figure 1. It suggests that human capital influences time-use and in turn gets influenced by it, it is a non-recursive relationship[6]. We use this graphical representation to profile time-use choices across geographies (Illinois counties). In addition, we estimate the value county populations place on education and research activities using measures of expenses (for example, income spent on skill acquisition activities).

Figure 1: Time-Use Choices: Influences of Human Capital on Wellbeing



A recent report by McKinsey estimates that half of today's work activities coordinated by humans could be automated with present-day technology[7]. Table 2 suggests that few individuals are prepared (or preparing) for such a transition.

Table 2 also highlights a potential motivator for re-skilling, the higher the personal ability (education), less time is spent at work and more time is spent on other activities. In general, market work and other activities can be expanded when a person has higher levels of skills (Harmon et al 2003).

[6] It means a two-way relationship.
[7] See *Jobs lost, jobs gained: What the future of work will mean for jobs, skills, and Wages*. McKinsey Global Institute, November 2017.

Table 2: Time Spent on Activities Related to Enhancing Human Capital: Illinois[8]

	Weighted Average Number of Hours, Non-sleep Day[9]			
Level of Education[10] (% in Population, N = 8.6mil)	Work Activities[11]	Enrolled in a Class[12]	Conducting Research[13]	Residual[14]
9th Grade or Less (5%)	7.5	0.08	0.0	8.4
9th to 12th Grade (6%)	7.9	0.06	0.02	8.0
High School Diploma (26%)	8.0	0.03	0.03	8.0
Some College (21%)	7.8	0.19	0.19	7.8
Associate Degree (8%)	8.2	0.03	0.16	7.6
Bachelor's Degree (21%)	7.7	0.09	0.24	7.9
Graduate Degree (13%)	7.2	0.07	0.14	8.6

2.1. County-Level Assessments

Table 2 suggests that Illinois is a bimodal state, about 58% do not have any college certification. The lack of a college diploma translates into a lifetime of lower wages and higher unemployment (Dalziel, 2017). For example, as of November 2018 unemployment rate among college graduates was 2.2% compared to 3.5% for high school diploma and some college attendees (Newton, 2018).

[8] For population in the 25+ age group. Data are from the BLS' 2017 American Time-Use Survey (ATUS).
[9] The weights are based on number of respondents. The averages in columns 3-4 are conditional, computed across persons who reported > 0 work hours.
[10] These are ACS' classifications.
[11] Sum of all 0501 "Working" activities, ATUS coding lexicon.
[12] Sum of all 0601 "Taking Class" activities, ATUS coding lexicon.
[13] Linear combination of all 0603 "Research/Homework" activities, ATUS coding lexicon.
[14] Assumes 16 hours of non-sleep time. Residual = 16 – Σ Work and Education Activities.

Yet, persons without a high school or a college diploma do not spend much time on education or skill development activities (Table 2). To deepen such analysis at the county level, we have constructed a 'value index' for time spent on skill development. Calibrated at the educational-category level (see Table 2, Column 1), the index shows the monetary value each category places on enhancing ability and thus wellbeing.

In economics, value = benefits – costs. At the individual level, ability-enhancement costs include both income spent on educational goods and services and the opportunity cost of time. Thus, the personal value of ability development in Peoria County, Illinois, for high school graduates must be at least $36,769 per day, or $1.10 per person per day (Table 3).

Table 3: Human Capital in Peoria: Value Workers Place on Skill Development[15]

Human Capital: Estimates for Illinois Counties

Version 1.2019 Developed by Adee Athiyaman

For the State of Illinois:

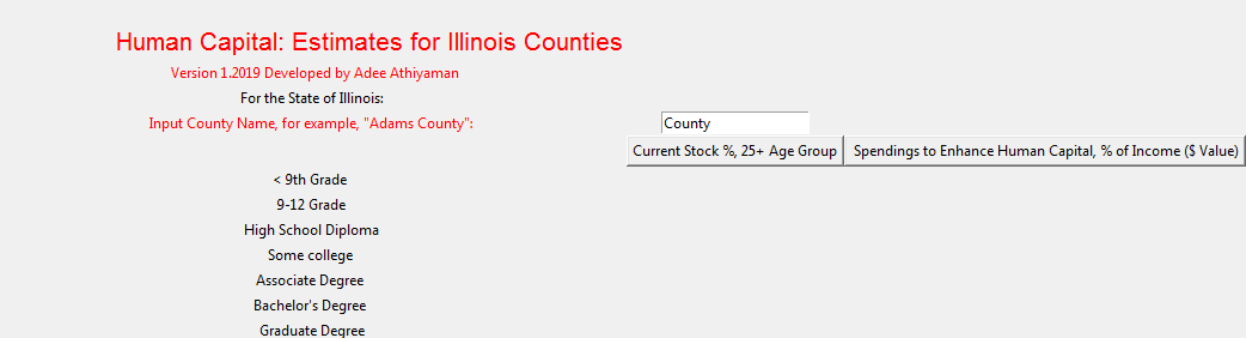
Input County Name, for example, "Adams County": Peoria County

	Current Stock %, 25+ Age Group	Spendings to Enhance Human Capital, % of Income ($ Value)
< 9th Grade	2.84	0.01 (3887)
9-12 Grade	7.12	0.01 (9731)
High School Diploma	27.01	0.007 (36769)
Some college	22.84	0.048 (215824)
Associate Degree	9.99	0.024 (50735)
Bachelor's Degree	18.92	0.041 (231877)
Graduate Degree	11.28	0.07 (358700)
	N =124320	

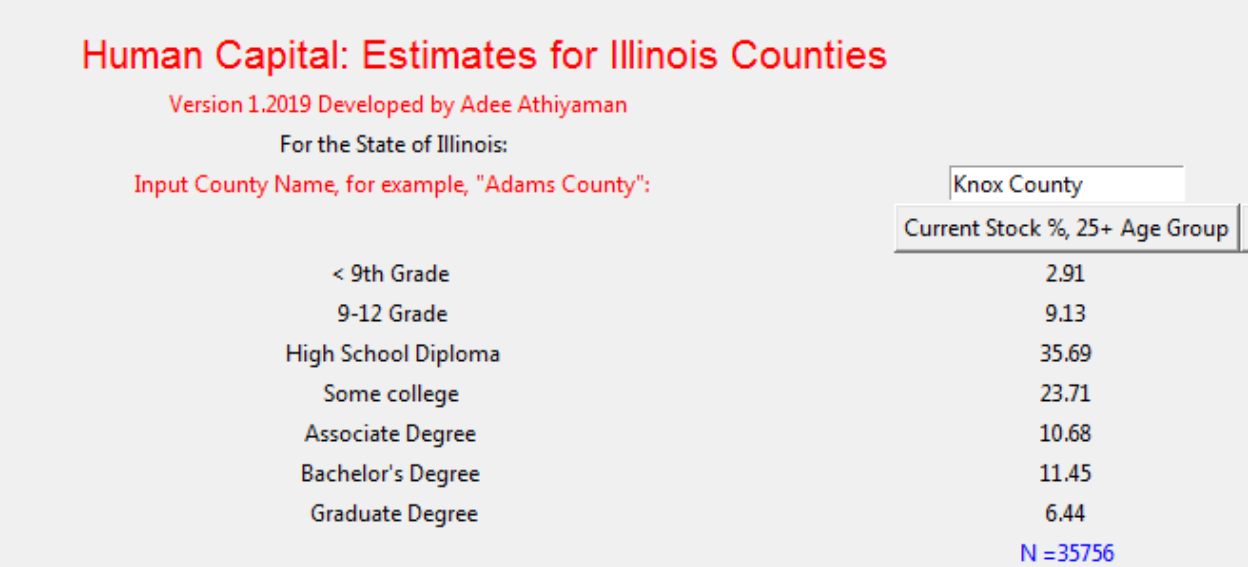
3.0. Summary and Conclusion

Extant research on human capital suggests there is a significant gap, brought on by digitization and advanced analytics, between the skills people have and the skills industry require (Cheng et al 2018). We have developed a software that shows how much workers in Illinois counties, the 25+ age group with different levels of qualifications, are investing in (and valuing) skill development. The software HC.Exe opens to the screen:

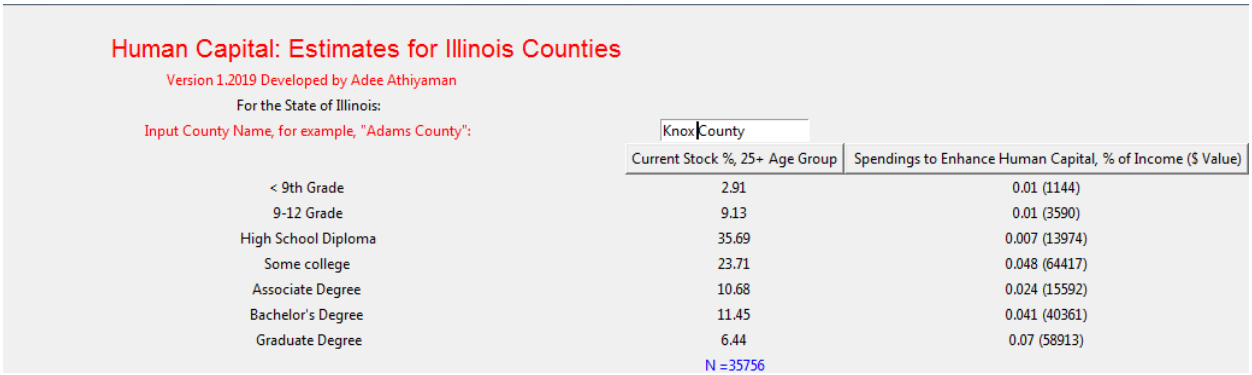
[15] Expenditure data on educational products and services were sourced from BLS' Table 2010. Opportunity costs computations were based on hourly wages sourced from the BLS' "Earnings by educational attainment, 2018" data.



The only input that is needed is the county name: for example, “Knox County”. Clicking on the button “Current Stock …” will return the percentage of workers in the county classified according to their qualifications:



The “Spending …..” button when clicked provides the percentage of income (and the monetary value) that each worker group spends on skill development purposes. This is the per-day spending for the group; to obtain per-person figures the total amount should be divided by the number of workers in the group (see screenshot below).



Policymakers can build on this research and data to help workers gain the most for their investments in education and training. For example, county libraries can offer digital learning options such as 15 to 30 minutes multimedia presentations on topics such as 'principles and practices of data science'. Research suggests that training courses are most effective when they are tailored for specific roles (Davies et al 2019), as opposed to being offered when the county secures a grant for new learning initiatives. Finally, employers and policymakers can start making the case for lifelong employability by sharing what they know about the dynamics of GDP growth in the county (see for example, Athiyaman 2019b).

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