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Minimum Wage and Intelligence: An Empirical Evidence

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Abstract

The purpose of this study has been to assess the relationship between intelligence or cognitive capital and wage in 118 countries using cross-sectional. Human capital is measured in terms of IQ and cognitive ability, while wage is appreciated in both minimum wages. The empirical evidence is based on OLS, IWLS and quantile regression. We establish a positive relationship between these two variables, which adorned stable.

Keywords

Wage, Minimum Wage, Intelligence, Human Capital, Skill

1. Introduction

Philippon and Reshef (2012) found out that in the 1980s, a financial employee was earning, in equal competence, the same salary as someone who worked in another sector of the economy. In 2000, salary was higher by 60%. In the United States of America (USA), the differences in salaries between categories of manpower, (as well as inside groups having the same qualification), increased from 30 to 50% since the 1970s (Juhn, Murphy, & Pierce, 1993). However, since the 2008 financial crisis with the remunerations of CEOs, the question related to wage gaps and inequalities was a major concern in public discussions. If these inequalities are quite considerable in each country without much difference between the rich countries and the poor ones, one cannot tell much unless the people's remunerations are considered. There are income gaps which exist between countries, on average. It is in this logic that the present research problem intends to carry on an in-depth investigation.

In this study, we explain the gaps between countries based on cognitive human capital. There are various channels to anticipate a positive effect on salary at

an adequate level. At micro level, numerous studies explain the gaps between individuals. Wai (2014) observes that billionaires, as a group, are very educated and possess high cognitive capacities. Almost one quarter of these billionaires, from the rest of the world, has graduated from prestigious schools. Moreover, Bastedo and Jaquette (2011) argue that highly selective schools were strongly attended by rich students. The reason behind such argument can be twofold:

Firstly, in the financial sector, the increase in salaries goes in line with the complexity of duties and the deregulation of the sector. Students from Harvard, who work in the financial sector, were found to earn on average a salary of almost three times higher than their colleagues in 2006 despite considering their colleagues' specific education history (Goldin & Katz, 2008). In these conditions, it is not surprising that if only 5% of graduates from Harvard have chosen to qualify in finance in 1969-1972, they constituted a ratio of almost 15% of graduate students who went to West Street between 1988 and 1992. Boustanifar et al. (2018) show that there is an existing form of brain drain in Finance for descent amount of salaries. Wai and Rindermann (2015) have shown that the fortunes 500 CEOs possess a considerable cognitive background. Katz and Murphy (1992) found out that on the American statistics, the salaries of workers who have received training at tertiary level increased up to 10% between 1971 and 1987. Whereas, during the same period, workers with a secondary level of education experienced a considerable dropped of 20% in their salaries. Nordman et al. (2015) show that cognitive competencies are essential in the determination of average salaries, and the traits of personalities have less executive power. Several studies confirm this argument (e.g. Willis, 1987; Muller & Nordman, 2005a, 2005b; Martins & Pereira, 2004) and these studies corroborate the effect of human capital.

Secondly, the cognitive human capital concept affect (economic) growth (e.g. Rindermann et al., 2015) which also affects labour market growth (Okun, 1962), where the salary is determined.

Another way through which one can establish this link is via technology, that is, the technical progress generates an asymmetric choc on the productivity of workers which could promote the use of qualified manpower in term of job opportunities and salary. Technology modifies relative salaries (maintains high salary for unusual duties, maintains low salary for regular jobs). Job is preserved regardless of the type of duties, but the pay gap increase. Krueger (1993) shows that in the end-1980s, having some computer literacy or expertise is an advantage which can lead to a bonus on one's salary from 10% to 15%. Other scholars have also confirmed the findings that the effect on salaries is considerable. For instance, Gollac and Kramarz (1997), Rindermann et al. (2009), establish a relationship between technology and cognitive capacities. From their conclusion, one can deduce that by improving any movement of technical progress, the cognitive human capital has a significant impact on salaries.

This last argument is also linked to negotiation, as salary arises from negotia-

tion. This is one dimension to point out. Whereas the cognitive human capital is linked to trust (Carl, 2014) and to the social network which is another important dimension to raise (Bacharach & Gambetta, 2001; Kosugi & Yamagishi, 1998). The two dimensions are essential in the negotiation process. These dimensions easily create room for discussion, as there is trust between actors involve; the negotiation of salaries requires patience in order to close room to monetary illusion, but also to asymmetric information. One could imagine that a population with potential human capital would be less likely to suffer from monetary illusion and asymmetric information. On the other hand, intelligence is important to decrease agency problems and moral hazards (Skowronski, 2002). Moreover, it is positively related to patience (Shamosh & Gray, 2008). Intelligent staffs have wider time horizons (Jones & Podemska, 2010; Potrafke, 2012; Kodila-Tedika & Asongu, 2015a). Additionally, Salahodjaev (2015) indicates that there is a negative relationship between intelligence and inflation, which again strengthen our argument of no monetary illusion. Moreover, the meta-analysis shows a relationship between cognitive abilities and negociation.

The rest of the study is organised as follows. Section 2 discusses the data. The empirical analysis and discussion of results are covered in Section 3. Robustness checks are presented in Section 4. We conclude with Section 5.

2. Data

The data on minimum wage are obtained International Labour Organisation. This human capital index is interesting in the perspective that it also combines education and IQ. Hence, it takes both the input and output dimensions of human capital into account, which is not the case with traditional indicators (Lutz, 2009). Consistent with Kodila-Tedika (2014), Kodila-Tedika and Asongu (2015b, 2016), Rindermann et al. (2015), the intelligence data are sourced from Meisenberg and Lynn (2011). The measures of institutional quality are obtained from the dataset compiled by Kaufmann, Kraay and Mastruzzi at the World Bank (www.govindicators.org). For democracy and communism, we use respectively data of Cheibub et al. (2010) and data Kalonda-Kanyama & Kodila-Tedika (2012).

3. Results

3.1. Preliminary Analysis

While **Table 1** presents the summary descriptive statistics of the variables used in this study, **Figure 1** presents the scatter plot between minimum wage (log) (y-axis) and human capital (x-axis) for the countries included in our sample. The evidence clearly suggests a negative relationship between these two variables. The estimated coefficient of β from each of the simple linear regression models or OLS model is positive and strongly significant.

Considering that wage is a function of many different factors, these figures on correlation must not be taken seriously unless further examination of the partial

Table 1. Descriptive statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
Cognitive ability	192	81.79	14.32	55	108
Human capital (or Intelligence)	177	84.30	10.93	61.2	106.9
Minimum Wage	126	5.44	1.25	3.04	8.47
Democracy	140	.66	.48	0	1
Institution	181	-.14	2.21	-4.89	4.59
Communist	109	.19	.40	0	1

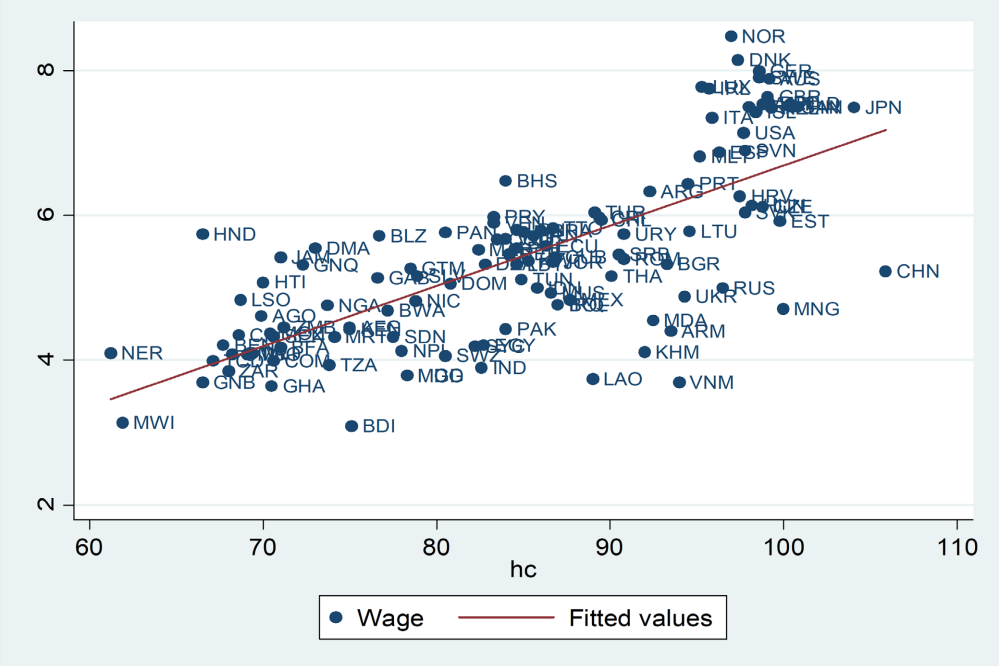

Figure 1. Minimum Wage and Human capital (Intelligence).

correlation of these other variables with wage on the one hand, and with human capital, on the other hand, is undertaken. This is the objective of Section 3.2.

3.2. Empirical Results

Table 2 shows econometrics results which take into account control variables which intend to eliminate "bias omission". Colon 1 suggests a relationship between the human capital variable and salary, statistically positive. This positive relationship is found to also be strongly significant. Moreover, the variable institutions impact significantly on the minimum wage, similarly to human capital. In colon 2, variable democracy was added. This variable was found to be non-significant, while the previous ones (human capital and institutions) maintain their signs. In colon 3, the proxy on revenue is among the variables found to be significant. Also, in colon 3, democracy remains non-significant. The results indicate that human capital and institutions remain strongly significant and positive

Table 2. Main result.

	(1)	(2)	(3)	(4)
Human capital	0.043***	0.045***	0.031***	0.048***
	(0.010)	(0.011)	(0.009)	(0.014)
Institution	0.296***	0.285***	0.168***	0.065
	(0.047)	(0.061)	(0.051)	(0.039)
Democracy		0.119	0.117	−0.243
		(0.191)	(0.176)	(0.195)
High revenu			1.068***	0.711***
			(0.225)	(0.222)
Communist				−1.022***
				(0.206)
Africa				(dropped)
Americas				0.788***
				(0.255)
Asia				0.097
				(0.290)
Europa				1.056***
				(0.334)
Oceania				1.519***
				(0.450)
_cons	1.827**	1.577*	2.436***	0.980
	(0.830)	(0.941)	(0.730)	(1.095)
Number of observations	115	102	102	79
R^2	0.685	0.706	0.767	0.852

Note: 0.01 - ***; 0.05 - **; 0.1 - *.

in colon 3. However, it is in colon 4 where the results present some changes. For instance, institutions are no longer significant, while maintaining a positive sign. Democracy, on the other hand, loses its usual sign while remaining non-significant. Revenue and human capital are still significant. Having a communist history has a strong and negative impact on salary (wage). The study control also the fixed effects of continents. However, due to multicollinearity problem Africa was omitted from the estimation. The results indicate except for Asia, the remaining continent presents a positive and statistically significant coefficient.

4. Robustness Check

In Section 4, several robustness checks are performed on the baseline specification in column 4 of Table 1. Concretely, the robustness checks entail: control-

ling for outliers (Section 4.1); the use of alternative measurements of cognitive human capital (cognitive ability) in Section 4.2 and the use of alternative econometric technic (Section 4.3).

4.1. Robustness with Respect to Influential Observations

In order to further improve the estimations, our empirical approach follows the M-estimators of Huber (1973) by using iteratively reweighted least squares (IRWLS). As Midi and Talib (2008) have noted, compared to the OLS approach, the advantage of these robust estimators is that they fix simultaneously any issue rising from the existence of outliers and/or heteroskedasticity (non-constant error variances). Based on the finding, the signs and significance of the variables across specifications are consistent with those of the preceding tables (Table 3).

Table 3. Huber to control for outliers.

	1	2	3	4	5
Human capital	0.087***	0.042***	0.044***	0.034***	0.055***
	(0.007)	(0.008)	(0.009)	(0.009)	(0.012)
Institution		0.305***	0.307***	0.170***	0.049
		(0.039)	(0.046)	(0.049)	(0.050)
Democracy			0.041	0.100	−0.213
			(0.178)	(0.167)	(0.209)
High revenue				1.025***	0.655***
				(0.225)	(0.241)
Communist					−1.083***
					(0.242)
Africa					(dropped)
Americas					0.735***
					(0.259)
Asia					0.051
					(0.269)
Europa					1.021***
					(0.357)
Oceania					1.472***
					(0.445)
_cons	−1.903***	1.872***	1.688**	2.282***	0.480
	(0.634)	(0.699)	(0.735)	(0.712)	(0.952)
Number of observations	118	115	102	102	79
R^2	0.543	0.679	0.709	0.747	0.831

Note: 0.01 - ***; 0.05 - **; 0.1 - *.

4.2. Alternatives Measures of Cognitive Human Capital

Cognitive human capital has been measured in different ways in the human capital literature. As discussed in the data section, the current measurement has experienced an evolution, while that of Rindermann (2007) proposed measurement of cognitive ability. Rindermann (2007) has defined cognitive ability as equal to student achievement assessments and intelligence test primarily measured for common cognitive ability at the macro-social level. This ability entails: 1) intelligence (the capacity to think) and 2) knowledge (degree of relevant and true knowledge, the ability of acquisition and usage knowledge) (Table 4).

Table 4. Other measures of cognitive capital.

	1	2	3	4	5
Cognitive Ability	0.057***	0.029***	0.035***	0.026***	0.035***
	(0.006)	(0.007)	(0.008)	(0.007)	(0.011)
Institution		0.318***	0.288***	0.165***	0.097**
		(0.044)	(0.057)	(0.048)	(0.041)
Democracy			0.061	0.076	−0.322
			(0.191)	(0.176)	(0.217)
Hinc revenu				1.076***	0.851***
				(0.223)	(0.224)
Communist					−0.818***
					(0.203)
Africa					−1.127***
					(0.405)
Americas					−0.333
					(0.312)
Asia					−1.045***
					(0.368)
Europa					−0.250
					(0.287)
Oceania					(dropped)
_cons	0.758	3.022***	2.461***	2.982***	3.348***
	(0.514)	(0.571)	(0.677)	(0.506)	(1.022)
Number of observations	126	120	103	103	80
R2	0.432	0.672	0.707	0.770	0.843

Note: 0.01 - ***; 0.05 - **; 0.1 - *.

4.3. More Control for Outliers Using Quantile Regressions

In this section, we employ the quantile regression (QR) approach which enables us to assess the role of human capital (IQ) on wage. The QR approach is robust to the control of influential outliers and contrary to the OLS technique it does not assume that error terms are normally distributed. The findings are consistent with those established in preceding tables (Table 5).

Table 5. Quantile regressions.

	Q25	Q50	Q75
Human capital	0.073***	0.066***	0.059**
	(0.019)	(0.009)	(0.030)
_cons	−0.209	1.165	2.541
	(1.551)	(0.813)	(2.484)
Observations	79	79	79
Pseudo R^2	0.6012	0.6320	0.6706
	Q25	**Q50**	**Q75**
Cognitive Ability	0.057***	0.041***	0.037**
	(0.016)	(0.015)	(0.015)
_cons	0.953	2.973**	3.313**
	(1.339)	(1.383)	(1.485)
Observations	80	80	80
Pseudo R^2	0.5883	0.5975	0.6602

Note: 0.01 - ***; 0.05 - **; 0.1 - *.

5. Conclusion

The purpose of this study has been to assess the relationship between intelligence or cognitive capital and wage in 118 countries using cross-sectional. Human capital is measured in terms of IQ and cognitive ability, while wage is appreciated in both minimum wages. The empirical evidence is based on OLS, IWLS and quantile regression. We establish a positive relationship between these two variables, which adorned stable.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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