Intelligence 53 (2015) 154–159

Contents lists available at ScienceDirect

Intelligence

Intelligence, human capital and HIV/AIDS: Fresh exploration

Oasis Kodila-Tedika [a,*], Simplice A. Asongu [b]

[a] Department of Economics, University of Kinshasa, B.P. 832 KIN XI, Kinshasa, Democratic Republic of the Congo
[b] African Governance and Development Institute, P. O. Box 1834, Yaoundé, Cameroon

ARTICLE INFO

Article history:
Received 28 June 2015
Received in revised form 14 October 2015
Accepted 14 October 2015
Available online 30 October 2015

JEL classification:
D60
I10
I20
J24
O15

Keywords:
Health
Human capital
Intelligence

ABSTRACT

This study complements existing literature on the relationship between HIV/AIDS and human capital by introducing previously unexplored indicators and more robust empirical strategies. The overarching purpose is to assess whether previous findings on the relationship withstand empirical scrutiny when alternative indicators and methodologies are employed. Four main HIV/AIDS measurements are regressed on intelligence for a maximum of 195 cross-sectional averages over the past decade. The empirical evidence is based on OLS, IWLS and 2SLS. The following findings are established. First, human capital decreases HIV prevalence, with a higher magnitude on 'Women's share of population aged 15 and above living with HIV'. This implies improving average human capital levels across communities may be more beneficial to girls above the age of 15 living with HIV. The relatively similar negative magnitudes across other dependent variables implies that increasing human capital decreases deaths from HIV/AIDS by almost the same rate at which it reduces infections to the disease. Moreover, the HIV infection rate in children between the ages of 0 and 14 does not significantly change with improvements in human capital. More policy implications are discussed.

1. Introduction

While the positive correlation between intelligence and health has been substantially documented in many studies, only some have tried to present causal analyses. Barber (2005) has linked it to the example of low birth weight; Lynn and Vanhanen (2006) to undernourishment and Meisenberg and Lynn (2012) to malnourishment. Many studies have also assessed the relationship with: (i) infant mortality (Barber, 2005; Lynn & Vanhanen, 2006; Kanazawa, 2006; Templer, 2008; Rushton & Templer, 2009; Reeve, 2009); (ii) maternal mortality (Lynn & Vanhanen, 2006; Reeve, 2009), life expectancy (Lynn & Vanhanen, 2006; Kanazawa, 2006; Lynn, Meisenberg, Mikk, & Williams, 2007; Ram, 2007; Templer, 2008; Rushton & Templer, 2009; Reeve, 2009) and (iii) HIV/AIDS[1] (Templer, 2008; Rindermann, Sailer, & Thompson, 2009; Rushton & Templer, 2009; Reeve, 2009).

The present line of inquiry complements the last strand by investigating the effect of intelligence on health, notably on: HIV/AIDS. The theoretical underpinnings motivating the study are consistent with Meisenberg and Lynn (2012) who have established that the growth-promoting impact of intelligence depends on a number of channels, inter alia: a reduced burden of infectious diseases. Whereas theoretical underpinnings may be intuitive, to the best of our knowledge, empirical scrutiny on the nexus has not yet been firmly established. It is interesting to note that, in the strand closest to the present study, HIV/AIDS is measured in terms of the percentage of infected individuals. As far as we have reviewed, Reeve (2009) is the line of inquiry that has steered clear of existing literature by considering HIV/AIDS deaths. We go a step further by exploiting four different indicators related to HIV/AIDS, namely: 'Adults (aged 15 and above) living with HIV'; 'Adults (aged 15 and above) and children (0–14 years) living with HIV'; 'Women's share of population aged 15 and above living with HIV (%)' and 'AIDS estimated deaths'. Hence, the use of this plethora of variables enables us to investigate whether previous findings withstand empirical scrutiny.

As concerns human capital, while it has been substantially measured quantitatively by economists, there has been a scanty use of qualitative indicators (e.g Lutz, 2009).[2] Traditional indicators in growth regressions include: average years of schooling, life expectancy of the school, secondary and tertiary enrolments, lifelong learning and knowledge economy (Barro, 1991; Benhabib & Spiegel, 1994; Caselli, Esquivel, & Lefort, 1996; Mankiw, Romer, & Weil, 1992; Levine & Renelt, 1992; Sala-i-Martin, Doppelhofer, & Miller, 2004; Asongu & Nwachukwu, 2015; Asongu & Nwachukwu, in press). Unfortunately, the use of these

* Corresponding author.
E-mail addresses: oasiskodila@yahoo.fr (O. Kodila-Tedika), asongusimplice@yahoo.com (S.A. Asongu).

[1] Human immunodeficiency virus infection and acquired immune deficiency syndrome (HIV/AIDS).

[2] A qualitative indicator within this context refers to the quality of human capital.

http://dx.doi.org/10.1016/j.intell.2015.10.005
0160-2896/

traditional indicators has not resulted in conclusive outcomes. With regard to issues of data quality (Cohen & Soto, 2007; De la Fuente & Doménech, 2006), Weede and Kämpf (2002) have emphasised that these traditional indicators have for the most part focused on human capital inputs as opposed to outputs. In order to address this gap in the literature, Hanushek et al. (Hanushek & Kimko, 2000; Hanushek & Woessmann, 2008, 2009) have used international assessment tests (Trends in International Mathematics and Science Study (TIMSS) and the Program of International Student Assessment (PISA)).

The psychologist, Richard Lynn and political scientist, Tatu Vanhanen have also contributed to addressing the underlying issue by compiling intelligence quotient (IQ) data from many countries. This data has been employed in a substantial bulk of published works (Lynn & Vanhanen, 2012b). This data is also being increasingly employed by economists (e.g. Weede and Kämpf, 2002; Jones & Schneider, 2006; Ram, 2007; Potrafke, 2012; Kodila-Tedika & Kanyama-Kalonda, 2012; Kodila-Tedika, 2014; Rindermann et al., 2015; Kodila-Tedika & Mustacu, 2014; Kodila-Tedika & Bolito-Losembe, 2014; Kodila-Tedika & Asongu, 2015a). The data of Hanushek and Lynn and Vanhanen are increasingly being improved (Rindermann, 2007a, b; Meisenberg & Lynn, 2011). The last versions from Meisenberg and Lynn (2011) and Lynn and Vanhanen 2012ab have been recently employed by Meisenberg and Lynn, (2012). We follow this stream because there is an apparent advantage of combining traditional and new data. This is engaged in the data description section.

From a technical perspective, the bulk of studies assessing the relationship have been from psychologists who have employed simple correlations and path analysis as methodologies (Templer, 2008; Rindermann et al., 2009; Rushton & Templer, 2009; Reeve, 2009). We steer clear of this literature by using more classical empirical approaches employed by economists, namely: Ordinary Least Squares (OLS), Iteratively Weighted Least Squares (IWLS) and Two Stage Least Squares (2SLS). Accordingly, by employing an alternative methodological approach, we also contribute to the literature by investigating if the established relationship in the literature can be viewed from a different angle.

We have established the following findings. First, human capital decreases HIV prevalence, with a higher magnitude on 'Women's share of population aged 15 and above living with HIV'. This implies improving average human capital levels across communities may be more beneficial to girls above the age of 15 living with HIV. The relatively similar negative magnitudes across other dependent variables implies that increasing human capital decreases deaths from HIV/AIDS by almost the same rate at which it reduces infections to the disease. Moreover, the HIV infection rate in children between the ages of 0 and 14 does not significantly change with improvements in human capital.

The rest of the study is organized as follows. Section 2 discusses the data and methodology. Empirical results are presented in Section 3. Section 4 concludes with implications and future research directions.

2. Data, preliminary analysis and methodology

2.1. Data

The sample consists of a maximum of 195 cross-sectional averages over the past decade. Four indicators are used to measure the dependent variable or HIV/AIDS, namely: Adults (aged 15 and above) living with HIV; Adults (aged 15 and above) and children (0–14 years) living with HIV; Women's share of population aged 15 and above living with HIV (%) and AIDS estimated deaths. For the first variable, AIDS deaths are the estimated number of adults and children who have died due to AIDS-related causes. 'Adults and children living with HIV' refers to the number of people ages 0–49 (adult aged between 15 and 49 and children aged between 0 and 14) who are infected with HIV. 'Adults living with HIV' refers to the number of people aged between 15 and 49 who are infected with HIV. Female rate is as a percentage of the total population aged 15 and above who are living with HIV. Prevalence of HIV is the percentage of people who are infected with HIV. The data is obtained from the United Nations AIDS (UNAIDS) estimates.

Consistent with Kodila-Tedika and Asongu (2015a), the data on intelligence is from Meisenberg and Lynn (2011). Previous versions of this dataset can be found in Lynn and Vanhanen (2002, 2006). This dataset is a compilation of hundreds of average national IQ tests observed over the 20th and the 21st centuries using best practice methods. Average IQ is a measure of general-purpose human capital as well as a measure of the nation's labor quality (Hanushek & Kimko, 2000; Jones & Schneider, 2006). With regard to institutional quality, we consider IQ as a measure of the ability of a nation's human capital to cooperate in order to produce a nationally efficient outcome in terms of pro-market policies.

The measures of institutional quality are obtained from the dataset compiled by Daniel Kaufmann, Art Kraay and Massimo Mastruzzi at the World Bank (www.govindicators.org). This dataset aggregates indicators of six broad dimensions of governance: voice and accountability, political stability and absence of violence/terrorism, government effectiveness, regulatory quality, rule of law and control of corruption. The six aggregate indicators are based on 30 underlying data sources reporting the perceptions of governance of a large number of survey respondents and expert assessments worldwide. We use only government effectiveness to avoid issues of multicollinearity and over parameterization because of the high degrees of substitution among underlying governance indicators (Andrés et al., 2013, pp.9–10).

The data on religious composition is taken from La Porta et al., (1999) to create the dummy variable 'Muslims Religion' which takes the value 1 if Muslims are the dominant religious group in the country, and 0 if the dominant religious group in the country is Protestantism or Catholicism or Other Religions.

The data on GDP per capita is from Pen World Tables 7.1, while that on population size from World Development Indicators of the World Bank. Table 1 presents the summary descriptive statistics of the variables used in this study. The disclosed variations are quite substantial. Hence we can be confident that reasonable and significant linkages will emerge. The correlation matrix which is provided in the Appendix A enables us to anticipate expected signs.

2.2. Methodology

In accordance with recent human capital literature (Asongu, 2013; Ang & Kumar, 2014; Kodila-Tedika & Asongu, 2015a), the specification in Eq. (1) investigates the correlation between human capital and HIV/AIDS prevalence.

$$HIV/AIDS_i = \alpha_1 + \alpha_2 HC_i + \alpha_3 C_i + \varepsilon_i \quad (1)$$

Where: $HIV/AIDS_i$ (HC_i) represents a HIV/AIDS prevalence (Human Capital) indicator for country i, α_1 is a constant, C is the vector of control variables, and ε_i the error term. *HIV/AIDS* includes the four measures HIV/AIDS prevalence. *HC* is the *Human Capital* variable while *C* entails: *Muslim*, *GDP* per capita (*log*), *Government effectiveness* and *Africa*. Consistent with the underlying human capital literature, the interest of Eq. (1) is to estimate if human capital affects 'HIV/AIDS prevalence' by Ordinary Least Squares (OLS) with standard errors that are corrected for heteroscedasticity.

3. Empirical analysis

3.1. Preliminary analysis

Fig. 1 presents the scatter plot between HIV/AIDS (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 same conclusion is obtained when analyzing the relationship