



Intelligence and finance



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ARTICLE INFO

Article history:

Received 15 December 2014
 Received in revised form 5 June 2015
 Accepted 9 June 2015
 Available online 29 June 2015

Keywords:

Finance
 Banking sector
 Intelligence
 IQ
 Stock market
 Cross-country

ABSTRACT

This paper explore the effect of intelligence on financial development using data from 180 nations, over the period 2000–2012. The results provide strong support for the claim that intelligence is positively associated with the supply of finance to economy. This paper establishes that, moving from country with the mean IQ score (84.1) to the highest national IQ score (107.1) is associated with 3.6 fold increase in the size of banking sector. The positive effect of intelligence remains intact when we control for other antecedents of financial development.

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1. Introduction

There are ample cross-country studies on the link between financial development and economic growth (e.g. Roubini & Sala-i-Martin, 1992; Roubini & Sala-i-Martin, 1995; King & Levine, 1993; Levine, 1997; Rajan & Zingales, 1998). By and large, extant literature documents that financial development has a positive effect on economic growth. Access to finance improves productivity (Butler & Cornaggia, 2011), reduces poverty (Jalilian & Kirkpatrick, 2002) and promotes exports (Beck, 2002).

While the literature addressing the link between finance and economic development dates back at least as far as Hicks (1969), 'the frontier of the literature in this field is, therefore, shifting towards providing answers to the question of why some countries are more financially developed than others' (Baltagi, Demetriades, & Law, 2009 p. 1). Indeed, research shows that economic development, trade openness, and institutions are determinants of financial development across the nations (e.g. La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1999; Rajan & Zingales, 2003; Huang & Temple, 2005; Law, 2009). Another line of studies finds that non-economic antecedents, such as culture, social trust and religion, have significant effect on finance (e.g. Stulz & Williamson, 2003).

The recent advances in the intelligence literature show that intelligence has direct effect on wide range of socio-economic outcomes (Weede & Kämpf, 2002; Lynn & Vanhanen, 2010; Meisenberg, 2012).

We depart from a seminal work by Lynn and Vanhanen (2002) (L&V henceforth) who develop a novel model where 'population IQs are the major determinant of the wealth and poverty of nations in the contemporary world' (Lynn & Vanhanen, 2002 p. 1). Departing on the findings posited by L&V we suggest that intelligence may be an important antecedent of financial development through which it influences economic growth. Particularly, we conjecture that there are several channels through which intelligence can be linked to financial development.

First, intelligence, measured by IQ scores, does promote economic growth (e.g. Weede & Kämpf, 2002; Salahodjaev, 2015a). Moreover the effect of cognitive skills on economic growth is relatively stronger compared to other conventional measures of human capital (literacy rates and school enrollment) employed in the related growth literature (Hanusek, 2013).

In particular cross-country variations in intelligence levels are associated with the degree of technological achievement (Lynn, 2012) and ability to produce sophisticated goods (Rindermann, Sailer, & Thompson, 2009), which in turn are instrumental to economic outcomes. As suggested by Rindermann et al. (2009) p. 20 'In societies with a higher cognitive average the smart fraction reaches a higher cognitive level. This smart fraction pushes growth through excellence in areas relevant for economic affluence, like in technology and science'. Subsequently, this will have effect on demand for financial services and, later, on the level of financial development (Ang & McKibbin, 2007). In developing countries, running efficiently functioning financial institutions may require a degree of skills and education, which might indicate intelligence. Combining these links with the findings of previous studies we propose that intelligence will have positive effect on finance.

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Second, the decision of financial institution to supply credit has been conjectured as to be driven by higher level of social capital and trustworthiness of the borrower. In light of the growing complexity and pace of financial operations, the supply of finance to economy is closely interlinked with such characteristics of the social order as trust (Guiso, Sapienza and Zingales (2004)), which is viewed by modern economics as one of the main underpinnings of human society that enables the functioning of markets and institutions (Seabright, 2010).¹ In societies that are more intelligent economic agents trust each other more (Kosugi & Yamagishi, 1998) as intelligence produce social networks that detect and penalize the dishonest behavior (Bacharach & Gambetta, 2001). For example, Sturgis, Read, and Allum (2010), using data from National Child Development Study (NCDS) and British Cohort Study (BCS70), shows that generalized trust of individual is a function of individual's intelligence. Similarly, Carl (2014) documents that intelligence is positively associated with trust in a sample of 15 Spanish regions, 20 Italian regions, 50 US states, and 107 countries.

In addition, intelligent agents have wider time horizons and intelligence can be important in decreasing agency problems and moral hazard. In this context, using experimental data, Skowronski (2002) links cognitive mechanisms to consistent-behavior of individuals. As a result, the supply of the finance to economy will depend not only on the social trust, but also on the intelligence, which may signal willingness of economic agents to cooperate in favor of long-term rewards (Shamosh & Gray, 2008). Based on the findings that social trust is the result of intelligence, we can argue that intelligence may increase financial development and consequent supply of credit to economy.

Combining these streams of literature, we document that intelligence is a robust determinant of financial development. Specifically, moving from country with the mean IQ score (84.1) to the highest national IQ score (107.1) is associated with 3.6 fold increase in the size of banking sector.

The rest of the paper is organized as follows. Section 2 presents data and methodology. Then, in Sections 3 and 4, we discuss empirical results. Finally, Section 5 concludes the paper.

2. Data and methods

2.1. Financial development

Financial development is a complex, multidimensional concept (Rajan & Zingales, 2003). While much of the celebrated literature on this issue measures financial development by the banking sector depth and stock market development, some studies take into account inflow of foreign capital (e.g. Chang, 2015).

In line with conventional literature, the financial data in our study covers two aspects of financial development (e.g. King & Levine, 1993). These are (1) the size of banking sector, and (2) the size of stock market relative to the size of GDP. The proxy for the size of banking sector is domestic credit to private sector relative to GDP (dcred). The size of stock market is measured by stocks traded as % of GDP (stock). Because intelligence is available on a cross-sectional basis, we average the data over the years 2000–2013 (Table A1).

2.2. Intelligence

We measure intelligence using the data by Lynn and Vanhanen (2012a). While a number of studies criticized the use of IQ in empirical literature (Volken, 2003; Barnet & Williams, 2004), there is plenty robust evidence showing that national IQ's are highly correlated with other measures of human capital and social development (e.g. Rindermann,

2007; Jones and Schneider, 2010; Lynn & Vanhanen, 2012b; Salahodjaev, 2015b).

2.3. Control variables

Since intelligence is not only determinant of cross-national differences in financial development, we control for the key antecedents of finance. By and large, empirical literature is close to broad consensus that three kinds of macroeconomic variables matter: First, more developed countries enjoy greater demand for financial services and therefore the size of banking sector and stock market is larger compared to less developed nations. We include logged GDP per capita in 2000 to control for this effect. Second, increase in the rates of inflation may distort decision-making and reduce the supply of finance. In particular, severe inflation rates drive down that ability of financial institutions to distribute financial resources efficiently (Boyd, Levine, & Smith, 2001). In our study inflation rate is measured by the average GDP deflator over the years 2000–2013. Third, trade openness may have effect on financial development. Trade openness is represented by the sum of exports and imports as a percentage of GDP.

To test whether types of legal system have impact on financial development (La Porta et al., 1999), we include historical legal systems as the control variables. Similarly, we control for major religious denominations. Since the seminal work by Weber (1905), religion has been shown to affect the creditor rights and economic attitudes among individuals (e.g. Guiso, Sapienza, & Zingales, 2003).

Descriptive statistics of the dependent variables and key explanatory regressors and bivariate correlation matrix are shown in Table 1 and Table 2. The variance inflation factor (VIF) scores computed after regression estimations did not indicate concern with multicollinearity issues.

To illustrate the association between intelligence and financial development, we provide correlations between IQ scores and the measures of financial development. Fig. 1 lends support that overall intelligence is positively associated with finance. For instance, the correlation between national IQ scores and size of banking sector is $r = .70$.

2.4. Methodology

This section presents the econometric specification to explore the effect of intelligence on financial development. The regression model of interest can be expressed as:

$$FD_i = \alpha_0 + \alpha_1 IQ_i + \beta X + \varepsilon_i$$

where FD_i is one of the measures of financial development in country i , IQ is the intelligence which will be proxied by national IQ's, and X is a vector of control variables suggested by the literature.

Table 1
Descriptive statistics.

Variable	Source	Mean	St. dev.	Min	Max
Private credit as a % of GDP (logged)	WDI	3.45	0.95	0.67	5.39
Stocks traded as % of GDP (logged)	WDI	1.67	2.28	−4.36	5.91
IQ	Lynn and Vanhanen (2012a)	84.10	10.85	60.1	107.1
Openness (logged)	WDI	4.39	0.58	−0.40	5.95
Initial GDP per capita (logged)	WDI	8.84	1.26	6.16	11.62
Inflation	WDI	7.63	9.24	−2.51	84.41
English common law	La Porta et al. (1999)	0.34	0.47	0	1
Napoleonic civil law	La Porta et al. (1999)	0.43	0.49	0	1

¹ For example, Oxford Dictionary defines credit as 'the ability of a customer to obtain goods or services before payment, based on the trust that payment will be made in the future'.

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