

## **Financial Development, Economic Growth and Human Capital Accumulation:**

### **What is the link?**

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#### **Abstract**

A number of studies have explored the factors influencing financial development. Among them are national legal origin, settler mortality hypothesis, institutional factors, political factors, macroeconomic policies including capital account openness, social capital and also cultural factors. The relationship between financial development, human capital and economic growth, although acknowledged in the theoretical literature remains less explored at the empirical level. In this study we examine interaction between financial development, human capital and economic growth. The study aims to understand and examine how financial development is related to human capital accumulation and economic growth in a unified framework. In a cross-country panel data context using rigorous econometric techniques we examine these questions.

Keywords: Financial development; Human capital; Economic Growth

JEL Classification E44; I25; J24; O16

## 1. Introduction

The prospect of greater economic growth is of interest to economists, but also to the society at large. Of recent interest is the role that financial markets and financial intermediation play, if any, in economic growth. While most theoretical and empirical work support the notion that vibrant and efficient financial markets are a channel to support and increase economic growth, an increasing literature also examines whether economic growth leads to growth in financial markets, whether there are other factors which lead to a well-developed financial market. King and Levine (1993a) explore the link between measures of financial market development and future economic growth. They measured the development of financial markets as financial market depth (liquid liabilities to GDP), bank credit depth (deposit money bank domestic assets to deposit money bank domestic assets plus central bank domestic assets), as well as the distribution of assets in the financial sector, claims on the nonfinancial private sector to total domestic credit and claims on the nonfinancial private sector to GDP. King and Levine (1993b) theorize and empirically support this relationship and find economic growth is the result of the financial markets' basic intermediation advantages of evaluating potential investment opportunities, efficiently allocating resources for these investments as well as providing diversification of risks.

Subsequent research tries to identify the mechanisms in which financial market development affects economic growth. Rajan and Zingales (1998) show that industry sectors with a greater dependence on external finance experience more robust growth in countries with more-developed financial markets. More developed financial markets have a lower cost of external finance enabling firms to obtain the capital they need for growth. In addition, developed financial markets play an especially beneficial role for new firms. Beck, Levine, and Loayza (2000) find financial markets impact growth through increasing total factor productivity. Interestingly, neither Beck et al (2000) nor Rajan and Zingales (1998) find the level of financial market development affects personal savings rates or physical capital accumulation. While these early studies focused on the effect of financial intermediation through the debt markets, Levine and Zervos (1998) include both measures for banking development and stock market liquidity simultaneously to determine the effect on economic growth. Both measures are significantly and positively related to future economic growth, indicating banks and equity markets provide different financial services that contribute to economic growth.

A number of studies have explored the factors influencing financial development. Among them are national legal origin (La Porta, Lopez-de-Silanes, Shleifer & Vishny 1997, 1998); settler mortality hypothesis (Acemoglu, Johnson, & Robinson 2001); institutional factors (Beck, Demirgüç-Kunt & Levine 2003); political factors (Rajan & Zingales 1998; Outreville 1999); macroeconomic policies including capital account openness (Huang 2005; Chinn & Ito 2005); social capital (Guiso, Sapienza & Zingales 2004) and also cultural factors (Stultz & Williamson 2003). The relationship between financial development and human capital, although acknowledged in the theoretical literature remains less explored at the empirical level (Grier 2005). Some studies have examined finance and human capital along with other variables such as infrastructure in relation to economic growth (Ferri and Mattesini 1997; Hakeem 2010; Outreville 1999). The literature suggests that better educated people are less risk averse, have high information and are high savers (Zaman, Izhar, Khan & Ahmad. 2012). Improving educational levels including adult education provides new opportunities to people and empowers them. Education also allows people to move from informal sector to formal sector opportunities enabling access to formal financial services. Financial sector

development through credit channels also enables human capital accumulation and influences economic growth. Thus the effect is both ways. In this study we examine the interaction between financial development and human capital and their relationship to economic growth.

The paper is structured as follows. Section 2 sets out briefly the literature covered in the area of finance, human capital and growth. Section 3 lays down the model, data and econometric techniques. Section 4 discusses the results and the last section of the study concludes.

## **2. Financial Development, Human Capital and Economic Growth: Literature Overview**

Human capital, defined as ‘direct expenditure on education, training, health and internal migration’ has been well acknowledged as a useful source of economic growth. It has been acknowledged as a crucial input in promoting economic growth (Mankiw et al.1992; Psacharopoulos 1984). Benhabib and Spiegel (1994) argue that a well-educated labour force contributes to innovation, adoption of technology and contribute to economic growth. Schultz (1993) stressed on the high importance of human capital and its immense contribution to economic progress. Finance too has been considered as an important factor in leading to growth. Levine (1997) concluded that, ‘theoretical reasoning and empirical evidence suggests a positive, first-order relationship between financial development and economic growth’.

In the nineties some studies examined the relationship between human capital and borrowing constraints and their influence on economic growth. Primary among these studies are Japelli and Pagano (1984); De Gregorio (1996); Christou (1993); Buiter and Kletzer (1995); Barro, Mankiw and Sala-I-Martin (1995). Japelli and Pagano (1984) suggested that borrowing constraints increase savings and promote economic growth. However, De Gregorio (1996) conjectured that although borrowing constraints increased savings and economic growth; they also reduce human capital accumulation and affect economic growth negatively. Similar to the findings of de Gregorio (1996), Christou (1993) also showed that borrowing constraints lead to reduction investment in human capital. In another study, Christou (2001) suggested that increased government expenditure improves human capital accumulation and reduces the effect of borrowing constraints. Buiter and Kletzer (1995) in their model show that the borrowing constraints (as the future income from the present education is considered as poor collateral) limit human capital accumulation and self-financing of human capital leads to differential productivity across countries.

Chou & Chinn (2000) in their theoretical model considered endogenous human capital accumulation, economic growth and financial innovation in a unified framework and postulated that human capital leads to the building of financial innovations leading further to financial development which in turn contributes to human capital accumulation. Financial innovations and human capital accumulation also lead to increased productivity which raises an economy’s steady state growth.

Benhabib and Spiegel (2000) examined the impact of financial development on the rates of investment in physical and human capital. Financial development in their study leads to the accumulation of physical capital positively and significantly. The authors however, noted a weak relationship between the financial development and human capital. This could be due to the choice of particular variables (the authors also mention that different results may be

possible if enrolment ratios instead of average years of schooling is considered) and the rigours of the cross-country exercise.

Among the empirical studies Outreville (1999) was perhaps one of the early ones to have examined the relationship between financial development and non-financial factors such as human capital and political stability. In a cross-country context covering 57 countries the study noted high positive correlation between financial development and human capital and negatively related to political instability.

Using translog production function, Evans et al. (2002) investigated the relative importance of human capital and financial development in economic growth process in a panel dataset of 82 countries for the period 1972-1992. The study employed two indicators of financial development ( $M_2/GDP$ ; domestic credit/GDP) and three indicators for human capital (primary and secondary school enrolment rates and real public expenditure on education). The authors found that finance (whether taking  $M_2/GDP$  or credit) has a significant contribution to economic growth. The study also found that the interaction between both credit and finance contribute significantly to economic growth and are equally important in the development process.

Kendall (2009) addresses financial sector development at the local level and its impact on local growth in the Indian context. Using district level dataset for Indian districts (covering nine states) Kendall found that local financial sector development is positively related to local growth. The study also noted that improvements in human capital at the local level can overcome the financial constraints and promote economic growth.

In contrast, Hakeem (2010) employing augmented Solow model in a panel data framework examined the impact of financial development and human capital in facilitating economic growth in the Sub-Saharan Africa region. The study found a complementary relationship of the financial development and human capital to economic growth in the Sub-Saharan Africa countries. However, it noted lower impact of the financial development on growth which could be due to the existence of financial repression, low institutional development and poor infrastructure.

Maskay (2012) examined the extent to which the effect of financial development on growth depended on a country's human capital and whether this effect varies with the differences in human capital. The study employed two indicators for financial development-  $M_3/GDP$  (liquid liabilities) and the size of stock market as a proportion of GDP and proportion of population above 25 having completed secondary education as a measure of human capital. The findings (similar to Kendall) show a substitute relationship between the two as the countries with low level of financial development can achieve high economic growth with improvements in human capital.

More recently the global financial crisis has brought about a renewed interest in the interaction between finance and human capital. Some studies have examined this in relation to skill intensity in the financial sector and its role in the creation of innovative financial products with repercussions for the non-financial sector as well. Kneer (2013) based on the sample of 13 EU countries for the period 1980-2005, that is a period characterised by the financial sector reforms in several countries in general, found that financial liberalisation leads to the upgrading of skills, as highly skilled people move to the financial sector resulting in 'brain-drain' from the non-financial sector. This resulted in the decline in labour productivity, total factor productivity and value added growth in the R&D skill intensive

industries. The misallocation of labour across the sectors following the financial sector reforms has been observed by other studies as well (Arcand, Berkes and Panizza 2011; Cecchetti and Kharoubi 2012). Phillipon and Reshef (2013) also showed that the financial liberalisation led to an increase in the skill-intensity in the US financial sector. Increased ICT intensity also created higher demand for skilled labour. Overall, the increased demand for skilled labour in the financial sector could be due to removal of controls on financial activities; emergence of new and complex activities, more so in the securities market; increased competition with removal of barriers to entry and finally, also globalisation with the removal of geographical barriers has also assisted in increasing the demand for skilled people (Kneer 2013).

### **3. Methods**

The links between a country's financial development and economic growth is well researched in previous literature as has the link between human capital development and economic growth. As previously shown in works such as King and Levine (1993), Levine and Zervos (1998), and Demirguc-Kunt and Maksimovic (1998), the relationship between financial market development and economic growth is difficult to model for several reasons. First, the appropriate metric of economic growth must be chosen and estimated reliably, as does the metric of financial market development. Second, these relationships are neither necessarily unidirectional nor contemporaneous. Finally, in many cross-country studies, data consistency over many time periods can be problematic as well, leading to unbalanced panel and estimation errors. Earlier studies have implemented simultaneous equation models, including pooled OLS, instrumental variables, 2SLS and 3SLS. In addition, many studies have used the average of multiple years of data as a single measurement point.

More recently, generalized method of moments (GMM) estimation has been used, as in Levine, Loayza, and Beck (2000). As noted in this paper, the GMM estimations have several advantages including the reduction of biases on estimated coefficients due to unobserved country-specific effects. In addition, GMM also reduces endogeneity problems resulting from lagged effects of explanatory variables. We employ the GMM model in our study to determine whether the economic growth channels of financial development and human capital are independent or related to one another. If these channels are not independent, we will examine the relationship between these two channels, which of the two channels is primary or dominant.

Two recent studies take a similar approach to this study. Kendall (2012) investigates the link of financial development and human capital to economic growth in India. Using data from each state, he employs both simultaneous equation models and GMM to and finds that Indian states in in the lowest quartile of financial development (credit / net domestic product) had economic growth rates 4% points lower than those in the upper quartile. However, he also notes that this financial constraint can be greatly reduced with a greater amount of human capital. Recently, Maskay (2012) uses a cross-country study using similar methods to Kendall (2012). Cross-country have a greater risk of introducing omitted variable problems, but also provide a wider context in which to study the relationship.

We use real per capita GDP growth as are measure of economic growth. While a very broad measure of economic growth, it is the standard measure in many of the studies on financial market development and economic growth. To estimate financial market development, we follow Levine et al (2000) and use three related measures: Private Credit to GDP, Financial Assets to GDP, Liquid Liabilities, and Domestic Credit to GDP. Private credit is the value of

credits by financial intermediaries to the private sector scaled by GDP. Liquid Liabilities is the financial system divided by GDP. This includes currency, demand deposits, and interest bearing liabilities and is a broad measure of the amount of financial intermediation in the country, but does not distinguish the source or use of funds. Financial Assets is another broad measure of financial intermediation, but distinguishes between sources of funds, capturing the party responsible for investment decision. As in previous literature, we use education to measure human capital.

The pooled OLS model we estimate takes the general form of:

$$Growth_{i,t} = \alpha + \beta_1 Finance_{i,t} + \beta_2 Human_{i,t} + \gamma [Conditioning Variable Set]_{i,t} + \varepsilon_i$$

where Growth is the 5-year economic growth rates for the country, Finance is the different estimates of financial intermediation described above, Human is the measure of human capital (education), and the conditioning variable set includes country measures of environmental factors affecting growth, including population growth, inflation, and government activity in the economy (government consumption).

A second model is also tested using financial measures, but also interacting these measures with the amount of human capital within the country. This model takes the form:

$$Growth_{i,t} = \alpha + \beta_1 Finance_{i,t} + \beta_2 Finance \times Human_{i,t} + \gamma [Conditioning Variable Set]_{i,t} + \varepsilon_i$$

This model is similar to both Kendall (2012) and Maskay (2012) and allows a test of whether human capital has a mitigating effect on the impact of financial intermediation in the economic growth of the country. If this interaction is found to be significant, then it demonstrates a related channel to economic growth.

#### 4. Data and Empirical Results

To estimate the models, we use a cross-country study, consisting of 126 countries from the time period 1960 – 2010. Data is collected from the International Financial Statistics database for estimates of financial intermediation. Human capital and other conditioning variables were collected from the World Bank Development Indicator (WDI) database. Based on data availability, the number of country period observations ranges from 227 (using financial assets measure) – 849 (using domestic credit measure), larger than previous studies.

The early literature predicts a positive relationship between the level of financial development and economic growth as well as a positive relationship between human capital and economic growth. The more recent literature finds less of an impact financial development of economic growth. In Kendall's (2012) study, both financial development and human capital (literacy) are positively related to economic growth of Indian states. Maskay (2012) finds somewhat differing results. When no interaction terms are included in the pooled OLS model, he finds that financial development (as measured by liquid liabilities) is significantly negative, and human capital has no effect. However, the GMM results confirm a negative relationship between finance and growth, but a strongly positive one with human capital. Table 1 presents the estimates of the impact on financial development and human capital on economic growth. Human capital on its own does not have a significant relationship to economic growth, contrary to recent studies. In addition, measures of financial intermediation are for the most part negatively related to economic growth, contrary to the earlier research. The exception is liquid liabilities, which maintains a positive relationship to economic growth (contrary to Maskay, 2012). Taken as a whole, the broadest measures of

financial intermediation are important to economic growth. It is important to have a deep financial market. However, it seems to be less important as to whether the financial market is primarily private or public.

Our second estimation is using financial development and interacting financial development with human capital. Table 2 presents the results from this pooled OLS model, yielding a few interesting results warranting further investigation. First, measures of financial intermediation are all positively related to economic growth, with the exception of financial assets measure (also lowest number of observations), whereas before, the relationships were for the most part significantly negative. This is consistent with the earlier studies. The second interesting finding is negative relationship with the interaction term (finance  $\times$  human). This relationship is consistent with Kendall (2012) and Maskay (2012). The interpretation is an increase in human capital mitigates the impact of financial intermediation as a channel for economic growth. That is not to say it eliminates the need for well-functioning banking and capital markets, but can make up for some of the deficiencies in these markets.

This relationship poses an interesting question as to the relationship between human capital and financial capital. If human capital can mitigate the need or reliance of financial intermediation for economic growth, then is human capital a factor in the development of financial intermediation or vice versa.

## **5. Conclusion**

Using a cross-country sample, we investigate the previously studied relationship between financial intermediation and economic growth, but in the light of a country's human capital. Pooled OLS results show that financial intermediation has a positive impact on economic growth, but human capital reduces the reliance or impact of financial intermediation on a country's economic growth. This result has several important implications and directions for future research. While human capital is not a substitute for a well-functioning financial system, it plays a very important role in growing an economy. As such, countries should be conscious of the effort to invest in and develop the human capital through basic education. Secondly, the results raise a question concerning the relationship between human capital and the level of financial development. Our results may indicate these two drivers of growth may not be completely independent, and the development of one may grow the other.

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Table 1: Pooled OLS Regressions: Financial Depth

VARIABLES	(1) realgdppc_gr	(2) realgdppc_gr	(3) realgdppc_gr	(4) realgdppc_gr
Initial GDP	-0.00000** [0.000]	-0.00000 [0.000]	-0.00000*** [0.000]	-0.00000 [0.000]
Population Growth	-0.46593*** [0.155]	-0.85012*** [0.204]	-0.44713*** [0.160]	-0.45927*** [0.139]
Inflation	0.00024 [0.000]	0.00038 [0.000]	0.00009 [0.000]	0.00012 [0.000]
Govt. Consumption	0.00421 [0.067]	0.04320 [0.112]	0.00356 [0.065]	-0.03099 [0.069]
HC	0.01265 [0.014]	-0.00239 [0.025]	0.00409 [0.014]	0.01243 [0.014]
PC to GDP (%)	-0.00027* [0.000]			
FI Assets to GDP (%)		-0.00057*** [0.000]		
LL to GDP (%)			0.00033** [0.000]	
DC to GDP (%)				-0.00038*** [0.000]
Constant	0.12504*** [0.040]	0.16071*** [0.059]	0.12795*** [0.040]	0.14359*** [0.037]
Observations	790	227	782	849
R-squared	0.069	0.141	0.070	0.058

Robust standard errors in brackets

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Table 2: Pooled OLS Regressions: Financial Depth with interactions

VARIABLES	(1) Realgdppc_gr	(2) realgdppc_gr	(3) realgdppc_gr	(4) realgdppc_gr
Initial GDP	-0.00000** [0.000]	-0.00000 [0.000]	-0.00000*** [0.000]	-0.00000 [0.000]
Population Growth	-0.41381*** [0.146]	-0.85046*** [0.204]	-0.38922*** [0.145]	-0.39909*** [0.131]
Inflation	0.00026* [0.000]	0.00039 [0.000]	0.00009 [0.000]	0.00014 [0.000]
Govt. Consumption	-0.00018 [0.067]	0.04084 [0.112]	-0.03551 [0.066]	-0.03663 [0.069]
PC to GDP (%)	0.04492*** [0.017]	-0.00571 [0.026]	0.06619*** [0.019]	0.04406*** [0.016]
HC * PC	0.00282*** [0.001]			
FI Assets to GDP (%)		-0.00145 [0.001]		
HC * FI		0.00028 [0.000]		
LL to GDP (%)			0.00482*** [0.001]	
HC * LL			-0.00172*** [0.000]	
DC to GDP (%)				0.00263*** [0.001]
HC * DC				-0.00110*** [0.000]
Constant	0.03921 [0.047]	0.17036*** [0.063]	-0.02361 [0.052]	0.05844 [0.043]
Observations	790	227	782	849
R-squared	0.090	0.142	0.113	0.079

Robust standard errors in brackets

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1