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Financial sector: does size matter?

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Abstract

Huge empirical literature suggests the strong positive relationship between economic growth and size of financial sector. We document that this relationship is not robust, while the efficiency of financial sector measured by interest rate spread is strongly related to current and subsequent economic growth.

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1 Introduction

Economists hold dramatically different views regarding the link between economic growth and financial development. A vast empirical literature documents that financial development promotes economic growth. Theoretical explanations are that financial institutions reduce the costs of acquiring information (Boyd and Prescott [1986], Bhattacharya and Pfleiderer [1985], Allen [1990], Greenwood and Jovanovic [1990]), mobilize and pool savings (Acemoglu and F.Zilibotti [1997]), facilitate risk diversification and, thus, promote growth through capital accumulation and technological innovations (Saint-Paul [1992], King and Levine [1993b], Obstfeld [1994], Devereux and Smith [1994]). In the influential paper, King and Levine [1993a] use ordinary-least-square estimates on a large set of countries and find that various financial indicators are good predictors of future economic growth. Similarly, Levine and Zervos [1998] using extreme-bound analysis conclude that banks and stock markets are the robust determinants of long-run economic growth. Levine [2005] proposes a perfect summary on both empirical and theoretical research in this area. On the other hand, some economists have sceptical view about the role of the financial sector in the economy. For example, Robinson [1952] asserted that economic growth creates demand for financial instruments, and where the production grows finance follows. Robert Lucas, Nobel Laureate, states that economists "badly over-stress" (Lucas [1998, p.6]) the role of the financial sector while another Nobel Laureate Merton Miller [1998, p.14] says that the idea that "financial markets contribute to economic growth is a proposition too obvious for serious discussion". The global 2008 financial crisis demonstrated one more time that the link between growth and finance could be reversed. Both economists and politicians began to worry about excessively oversized financial sector. In this paper we revise the finance-growth relationship by distinguishing two concepts, the size and the efficiency of finance. The main message of the paper is that the efficiency of finance is strongly related to economic growth while the link between growth and the size of finance is fragile.

2 Data

The most important question concerning the research in finance-growth relationship are the financial indicators used in the analysis.

The traditional indicator of the level of financial development is the ratio of liquid liabilities of financial system to GDP, the "financial depth". Liquid liabilities are also known as broad money, or M3. However, there is a simple proxy of the size of financial intermediation relative to the size of the economy, and it does not necessarily indicate how well financial sector fulfills its functions.

To measure the relative importance of deposit money banks versus Central Bank researchers construct an indicator that equals to the ratio of deposit money bank domestic assets to total (deposit banks plus Central Bank) domestic assets. The intuition underlying this measure is that commercial banks are more likely to provide the functions of financial system than Central Bank. But there are still two main problems. First, commercial banks are not the only ones financial intermediaries, and, second, commercial banks may simply lend money to the government.

To overcome the latter problem people use the ratio of claims on private sector to total domestic credit to measure to whom credit is allocated. The first problem is solved in the literature by introducing various financial markets indicators. We refer readers to Levine [2005] for a detailed discussion of advantages and disadvantages of the financial measures presented above. We would like to pay your attention to the fact that all these indicators reflect the size of the financial sector but not the level of services provided by financial system.

Table 1: Descriptive statistics.

	1960-1989		1980-2009	
	Mean	Correlation with growth	Mean	Correlation with growth
GYP	2.42		1.87	
	[2.27]		[2.25]	
LLY	41.43	0.27	48.79	0.2
	[26.44]		[30.7]	
BANK	78.41	0.12	78.12	0.29
	[17.88]		[19.11]	
PRIVATE	25.31	0.34	33.15	0.19
	[18.5]		[27.1]	
INV	23.49	0.12	23.41	0.41
	[7.59]		[7.03]	
IRS	5.25	-0.14	8.99	-0.15
	[3.04]		[7.91]	
EXP+IMP	70.88	0.07	85.68	0.24
	[42.79]		[48.44]	

Standard deviations are given [in brackets].

GYP - average real GDP per capita growth rate, in percents. LLY - the average ratio of liquid liabilities of financial system to GDP, in percents. BANK - the average ratio of deposit money bank domestic assets to total domestic assets, in percents. PRIVATE - the average ratio of claims on private sector to total domestic credit, in percents. INV - average gross fixed capital formation rate, in percents. IRS - the interest rate spread. EXP+IMP - the export plus import ratio in GDP, in percents.

We use the interest rate spread (IRS) to measure the efficiency of the financial sector. Interest rate spread is the interest rate charged by banks on loans to prime customers minus the interest rate paid by commercial or similar banks for demand, time, or savings deposits. The spread between lending rate and deposit rate reflects the costs of intermediation, i.e. costs to mobilize savings, costs to acquire information about different investment projects, costs to monitor these projects etc. "Improvements in the efficiency of financial intermediation, due to improved information production, are likely to reduce the spread between the internal rate of return on investment in firms and the rate of return on savings received by savers" as it was mentioned by Greenwood, M.Sanchez, and Wang [2007, p.2]. Greenwood, M.Sanchez, and Wang [2007] are not the only ones who used interest rate spread as the measure of financial development in his research. Ahlin and Pang [2008] considered the spread between the saving and borrowing interest rate as the measure of financial development as well in his recent paper about corruption and finance.

We believe that interest rate spread, also known as the intermediation margin, reflects the efficiency of the financial sector in the same way that the price does in the industrial sector. Financial openness contributes to the financial sector development, in particular more specialized savings programs and financial instruments become available, spreading risks and reducing costs to liability holders. A narrowing of the interest rate spread reduces transaction costs, which lowers the overall cost of investment, therefore, the intermediation margin is a summary measure of the financial system efficiency, and it is a perfect indicator to be used in finance-growth regressions.[1]

We have two dependent variables. Real GDP per capita (in constant US dollars) growth (GYP) is an indicator of economic growth. Gross fixed capital formation in percents of GDP (INV) as an indicator of

[1] Although if the government sets interest rates, spread becomes less reliable measure of efficiency.

physical capital accumulation.

The data we use come from World Bank National Accounts and IMF's International Financial Statistics. We have a panel data set over the 1960-2009 period for 209 developed and developing countries. The lack of data, especially financial, and elimination of outliers typically restricts our analysis to around 100 countries. The descriptive statistics of variables involved in regressions are given in *Table 1.*

To control for different economic phenomena we add to our regressions the initial value of GDP (in constant US dollars) to control for initial conditions, secondary school enrollment rate to control for the level of human capital, inflation rate, general government final consumption expenditures. We also include export and import of goods and services, this variable will reflect the fact that more open countries tend to grow faster.

3 Growth and size of finance

We reproduce the famous King and Levine [1993a] research for different time periods. We run cross-country regressions [2]:

$$\bar{Y}_i = Const + \beta \bar{F}_i + \gamma \bar{X}_i + \epsilon_i \tag{1}$$

where $\bar{Y}_i$ is a set of average growth indicators; $\bar{F}_i$ is a set of average financial measures; $\bar{X}_i$ is a set of other explanatory variables such as initial GDP, secondary school enrollment rate, ratio of trade, inflation rate and government consumption expenditures.

Table 2: Cross-country regressions.

	1960-1989			1980-2009			1960-2009		
	LLY	BANK	PRIVATE	LLY	BANK	PRIVATE	LLY	BANK	PRIVATE
GYP	0.024**	0.032**	2.01***	0.01	0.028***	1.08	0.021	0.023**	1.15
	[0.034]	[0.005]	[0.000]	[0.12]	[0.000]	[0.17]	[0.15]	[0.05]	[0.19]
N of obs.	79	95	83	79	95	83	79	95	83
R^2	0.33	0.41	0.32	0.30	0.37	0.19	0.34	0.38	0.29
INV	0.079***	0.131***	3.45***	0.038**	0.121***	−2.00	0.057*	0.11	1.7
	[0.001]	[0.001]	[0.009]	[0.015]	[0.005]	[0.24]	[0.06]	[0.27]	[0.35]
N of obs.	77	93	81	77	93	81	77	93	81
R^2	0.36	0.32	0.35	0.41	0.32	0.24	0.37	0.31	0.27
	[P-value in brackets]								

** significant at 0.05 level, *** significant at 0.01 level.

GYP - average real GDP per capita growth rate, in percents. INV - average gross fixed capital formation rate, in percents. LLY - the average ratio of liquid liabilities of financial system to GDP, in percents. PRIVATE - the average ratio of claims on private sector to total domestic credit, in percents. BANK - the average ratio of deposit money bank domestic assets to total domestic assets, in percents. Other explanatory variables: log of initial GDP, log of average gross secondary school enrollment rate, average inflation rate, average ratio of government final expenditures to GDP, average ratio of export plus import to GDP.

The *Table 2* summarizes results. The left side of the table is a pure reproduction of King and Levine [1993a] study. It argues that all considered financial indicators are strongly associated both with GDP per

[2]We exclude from our regressions the following oil exporters countries Algeria, Angola, Ecuador, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates, and Venezuela.

capita growth and gross fixed capital formation after controlling for initial GDP per capita value and other economic phenomena.

Let us now have a look on the right side of the table. The robust relationship between various financial indicators and the measures of economic growth vanishes. If the measure of deposit money bank domestic assets, BANK, enters in both regressions with positive and significant coefficients, the ratio of claims on private sector is not significant no more. LLY stays significant only when the dependent variable is gross fixed capital formation.

We performed some sensitivity checks. We include oil exporters countries, use subsamples (different regions, different income classification, OPEC), use subperiods, omit sub-Saharan countries. We examine statistical properties of the error terms and run regressions with White-heteroscedasticity correction. These manipulations do not alter results. For causality identification we run the same regressions as before where the dependent variable is GDP per capita growth, average over 1980-2009, and financial indicators are average over 1960-1980. We do not find a significant dependence.

The revelation of these discrepancies between two time periods requires the additional research. In any case we can conclude that the relationship between the size of the financial sector (measured by LLY, PRIVATE and BANK) and economic growth is not robust. Does this mean that the connection between finance and growth has recently vanished? Probably not. Probably the indicators of the size of finance are not a good ones to measure the finance-growth relationship.

4 Growth and efficiency of finance

In this section we present statistic and econometric work which prove that the interest rate spread (indicator of the *efficiency* of the financial sector) is positively and significantly associated with economic growth and physical capital accumulation.

4.1 Summary statistics

We start our work with a simple statistical analysis. Following the classification of King and Levine [1993a] we divide observations into four groups of countries according to their investment rate. The table below reports results.

Table 3 reports the average level of the interest rate spread over the applicable period in each country group and the correlation coefficient between the interest rate spread and the real GDP per capita growth among all country groups.

As we switch from countries with low investment rate to countries with high investment rate we can observe a considerable decrease in the interest rate spread, and these funding are insensitive to estimation period. If someone compares data over 1960-1990 and 1980-2009 periods he can observe a significant increase in the IRS among all groups of countries. We find a negative correlation between IRS and growth.

In order to provide some visual presentation of our previous results we finish the statistical analysis with some simple scatters.

Table 3: The average level of the interest rate spread. Investment rate classification.

	Very high investment rate	High investment rate	Low investment rate	Very low investment rate	Correlation with growth
1960-2009	6.64	7.75	8.68	9.52	-0.16
	(6.90)	(7.71)	(8.55)	(9.85)	
N of obs.	62	52	34	24	164
1960-1990	4.63	4.52	5.4	5.7	-0.14
	(4.74)	(4.67)	(6.02)	(5.93)	
N of obs.	48	29	22	21	111
1980-2009	6.67	8.29	9.33	10.61	-0.15
	(6.94)	(8.09)	(8.79)	(10.61)	
N of obs.	59	51	40	22	164

(data in parentheses report the average level of IRS when OPEC countries are excluded) *very high investment rate* - the average investment rate is greater than 24.3%, *high investment rate* - the average investment rate is between 20.5% and 24.3%, *low investment rate* - the average investment rate is between 16.7% and 20.5% and *very low investment rate* - the average investment rate is less than 16.7%.

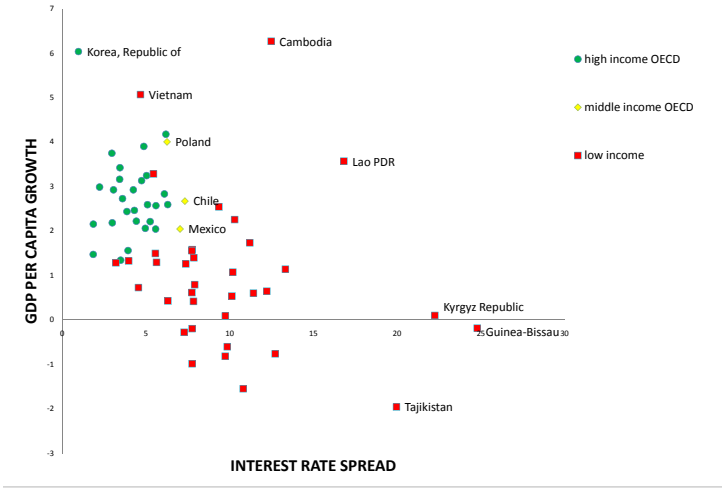

Figure 1. Real GDP per capita growth and interest rate spread. Average over 1960-2009.

Without any rigorous econometric analysis an ordinary observer can reveal a clear distinction between high income (we include also three middle income OECD countries: Chile, Mexico and Poland) and low income countries. While the first ones are concentrated in the left upper corner, the second ones are scattered in the right lower corner.

The chart provides two main conclusions. The first one is that high income and OECD countries have similar economies, the green points on the chart are very close to each other, while low income countries have very different economies, from Tajikistan with a negative 2% per capita growth to Cambodia with 6.3% real per capita growth.

The scatter has a negative slope. OECD countries which have greater economic growth are associated with lower interest rate spread than low income countries which have normally lower economic growth. In more correct reformulating, countries with higher economic growth are associated with lower interest rate spread value. And this is a second result.

4.2 Econometric analysis: contemporaneous regressions

To gauge the strength of the previous statistical analysis we run cross-country regressions. In order to eliminate the business cycle effects we compute the average of each indicator over the 1960-2009 period. Before computing the average we remove outliers which are normally related to hyperinflation. In addition we remove Haiti and Nicaragua that experienced negative IRS over the 1960-2009 period.

Table 4: Growth and IRS: 1960-2009. Contemporaneous regressions.

Independent variable	Regressions			
	(1)	(2)	(3)	(4)
const	10.3	7.98	7.67	5.55
	(0.000)	(0.001)	(0.002)	(0.011)
IRS^2	0.01***	0.01***	0.01***	0.01***
	(0.000)	(0.000)	(0.000)	(0.000)
IRS	−0.43***	−0.47***	−0.49***	−0.46***
	(0.000)	(0.000)	(0.000)	(0.000)
Log GDP in 1960	−0.18**	−0.16**	−0.15*	−0.13**
	(0.023)	(0.05)	(0.07)	(0.05)
EXP+IMP		0.005*	0.005*	0.006**
		(0.07)	(0.06)	(0.03)
INF		0.12*	0.16**	0.16**
		(0.09)	(0.03)	(0.04)
INF^2		−0.004	−0.005**	−0.005**
		(0.12)	(0.05)	(0.05)
OPEC dummy			−1.35**	−1.36**
			(0.03)	(0.03)
Sub-Saharan Africa dummy				−0.93***
				(0.010)
East Asia dummy				0.80**
				(0.05)
number of observations	87	87	87	87
R^2	0.298	0.525	0.542	0.555

*significant at 0.1 level, **significant at 0.05 level, ***significant at 0.01 level. (P-value in parentheses)
Dependent variables: real per capita GDP growth, average over 1960-2009. Explanatory variables: irs - interest rate spread, average over 1960-2009; log GDP in 1960 - the logarithm of per capita GDP in 1960 computed in constant dollars; EXP+IMP - the export+import ratio in GDP, average over 1960-2009; INF - GDP deflator rate, average over 1960-2009; OPEC dummy - dummy variable for OPEC members countries; Sub-Saharan Africa dummy - dummy variable for Sub-Saharan countries; East Asia dummy - dummy variable for East Asia countries (World Bank classification).

We remove also Bosnia and Herzegovina and Equatorial Guinea because of very high GDP growth rate over 1960-2009 period. We restrict our analysis to countries where inflation rate does not exceed 40% after elimination of hyperinflation periods. First, we regress per capita growth on the IRS and the logarithm of GDP per capita value in 1960, subsequently we include other explanatory variables (X) to control for different economic phenomena. The analysis of the component-plus-residual plot reveals not linear specification of the IRS component, and we include IRS^2 in addition to IRS in our regressions.

$$\bar{Y}_i = C + \alpha I\bar{R}S + \beta I\bar{R}S^2{}_i + \gamma\bar{X}_i + \epsilon_i \tag{2}$$

Table 4 summarize results. The dependent variable is average real per capita GDP growth over the 1960-2009 period. We observe that IRS enters with negative and significant coefficient at 0.001 level after

controlling for initial GDP. Results are stable after controlling for different economic phenomena (inflation, trade ratio), and after including dummy variables for OPEC countries, Sub-Saharan Africa and East Asia countries. This means that interest rate spread, which is an indicator of financial sector efficiency, is strongly associated with economic growth.

We performed some sensitivity checks. We used gross fixed capital formation rate as a dependent variable. We restricted our analysis only to developed or developing countries, high income or low income countries. We considered different sub-periods. These modifications did not alter results. We find a significant negative association between interest rate spread and different measures of economic growth.

4.3 Econometric analysis: future regressions

The findings that financial development is strongly associated with economic growth may be interpreted in different ways.

Table 5: Growth and initial IRS: 1980-2009.

Independent variable	GDP per capita growth, 1960-2009.		
	(1)	(2)	(3)
const	1.14	0.04	2.31
	(0.61)	(0.98)	(0.4)
$IRS^2_{initial}$	0.013***	0.015***	0.014***
	(0.002)	(0.000)	(0.001)
$IRS_{initial}$	−0.42***	−0.4***	−0.385***
	(0.000)	(0.000)	(0.000)
Log initial GDP	0.11	0.15*	0.13
	(0.229)	(0.089)	(0.25)
EXP+IMP		0.009***	0.008***
		(0.006)	(0.01)
INF		−0.055***	−0.05***
		(0.004)	(0.008)
OECD dummy			0.86*
			(0.1)
Latin America dummy			1.06*
			(0.101)
number of observations	60	60	60
R^2	0.28	0.474	0.51

*significant at 0.1 level, **significant at 0.05 level, ***significant at 0.01 level.
(P-value in parentheses)

Dependent variables: real per capita GDP growth, average over 1980-2009. Explanatory variables: irs - interest rate spread, average over 1960-1980 (in order to enlarge the dataset); log initial GDP - the logarithm of per capita GDP in 1960-1980 computed in constant dollars;EXP+IMP - the export+import ratio in GDP, average over 1980-2009; INF - GDP deflator rate, average over 1980-2009; OECD dummy - dummy variable for OECD members countries; Latin America dummy - dummy variable for Latin America countries (World Bank classification).

Sceptics may believe that strong correlation between finance and growth may arise because of contemporaneous effects of various shocks on financial and economic development. To examine whether finance simply follow growth or lead it we take initial interest rate spread as an instrumental variable. We study the relationship between this financial indicator at the beginning of the period and subsequent economic

growth using ordinary least squares method.

$$\bar{Y}_i = C + \alpha I\bar{R}S_{1960,i} + \beta I\bar{R}S^2_{1960,i} + \gamma\bar{X}_i + \epsilon_i \tag{3}$$

Table 5 summarizes results. The regressions indicate that interest rate spread at the beginning of the period is significantly associated with economic growth after controlling for initial conditions and various economic indicators. Coefficients do not differ from those obtained in contemporaneous regressions. The findings are robust to concerned time period. The results hold when we restrict the analysis to developed or developing countries, high income or low income countries, exclude OPEC members. This suggests that financial development is a good predictor of subsequent economic growth. These findings are consistent with the view that financial sector development favors economic growth by increasing capital accumulation.

5 Conclusion

In this paper we ask a question weather [King and Levine 1993a] findings about the strong connection between economic growth and various financial indicators are robust. Drawing on recent data we show that three financial indicators, the ratio of financial liabilities to GDP, the ratio of claims to private sector to total domestic credit and the ratio of deposit money bank domestic assets to total domestic assets, are not robustly related to economic growth, neither to gross fixed capital formation.

We propose an alternative measure of financial development, the interest rate spread. We suggest that it is an indicator of the efficiency of financial sector. We show that interest rate spread is strongly associated with contemporaneous and subsequent growth.

We point out that the difference between the size and the efficiency of finance is important. We stress that a country having a small financial sector is not necessarily less financially developed. It may be the opposite, its financial sector is developed enough and it does not need additional resources to fulfill its functions. From the other hand, huge financial sector is not always efficient and may simply extract resources from the economy.

We suggest that economic growth is associated with the efficiency of financial sector and not its size and propose the interest rate spread as an indicator of financial development. Theoretically, it is always negatively associated with economic growth and it is a good indicator to be used in finance-growth regressions. In practice, it would be important to decompose the spread between efficiency and country-specific effects to make more fine the analysis of finance-growth relationship.

The main message of the paper is that the efficiency of financial sector promotes growth, and not its size. And thus huge financial sector that lead to a recession should not be a surprise.

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