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Abstract

Aghion, Howitt and Mayer Foulkes postulate that one mechanism by which financial development enhances economic growth is by increasing a nation's ability to obtain frontier technology, which then increases the rate at which productive activity expands. This study empirically tests this hypothesis for a sample of 12 small island open economies of the Caribbean between 1980 and 2004. Possible simultaneity in the relationship between financial development and economic growth is accounted for by introducing a new proxy for financial development, for which its determination is uncorrelated with economic growth. The results of the empirical analysis shows that financial development enhances economic growth in the Caribbean by increasing country's steady state level of income per capita, and not by the mechanism put forward by Aghion, Howitt, and Mayer Foulkes (2006).

The Role of Financial Development for Economic Growth in Caribbean Islands

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Aghion, Howitt and Mayer Foulkes postulate that one mechanism by which financial development enhances economic growth is by increasing a nation's ability to obtain frontier technology, which then increases the rate at which productive activity expands. This study empirically tests this hypothesis for a sample of 12 small island open economies of the Caribbean between 1980 and 2004. Possible simultaneity in the relationship between financial development and economic growth is accounted for by introducing a new proxy for financial development, for which its determination is uncorrelated with economic growth. The results of the empirical analysis shows that financial development enhances economic growth in the Caribbean by increasing country's steady state level of income per capita, and not by the mechanism put forward by Aghion, Howitt, and Mayer Foulkes (2006).

Researchers such as Robert King and Ross Levine have established the importance of the financial sector to the real economy.[1] A fundamental role of the financial services industry in promoting economic development is to mobilize savings, by allocating capital to the most productive projects in the economy. The great depression of the late 1920's and the global financial crisis of 2008 has highlighted the potential for financial markets to create intermittent periods of miserable economic downturn. Default in an unprecedented number of loans has left aggregate demand for global production at a bare minimum since the current financial crisis. World production leaders such as the U.S, has experienced a contraction in output of 3%, while other high income regions such as Japan, the U.K, and the Euro zone have been harder hit, experiencing contractions of 5%, 3.8%, and 3.2% respectively. The aftermath of the current global crisis has created the necessity for policy makers to draw closer attention to, and re-evaluate the structure their economies, with particular emphasis on the financial sector. This study will identify, in retrospect, the role of financial development for economic growth in the small island open economies of the Caribbean prior to the global crisis of 2008.

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[1] [1] See King and Levine (1993), and Ross Levine (2003) for empirical work and a review of the literature.

An endogenous growth model of technological innovation frames the empirical analysis. Panel data techniques are used to control for unobservable country and time specific factors that influence growth in the Caribbean. The economic analysis reveals that the development of the financial sector is important for generating economic growth in the region, it increases the level of income per capita thus increasing economic growth performance. The study shows that policies focused on improving the financial sector will enhance economic welfare in the small island economies. The following section gives an overview of the Caribbean island economies included in the study.

Overview of the Caribbean Economy and Banking

The countries included in the sample are Barbados, The Bahamas, The Dominican Republic, Haiti, Jamaica, Trinidad & Tobago, and the Eastern Caribbean Currency Union countries of Antigua & Barbuda, Dominica, Grenada, St. Kitts & Nevis, St. Lucia, and St. Vincent & The Grenadines.[2] Some countries experience significant year by year swings in real GDP, while other countries experience relatively stable real growth rates. Further more, there is significant disparity in the average rate of growth throughout the region.

The division of GDP by industry is consistent across most countries, with the exception of Haiti and Trinidad & Tobago. The petroleum industry in Trinidad & Tobago, and agriculture in Haiti, account for almost one third of the value added in these countries. This share is considerably higher than any one industry's contribution to GDP in any other Caribbean country. St. Lucia has the most even contribution to GDP by industry, in which government services contributes the highest share, 14.7% to GDP.

There is however variation in the specific industries having significant contribution to GDP throughout the region. The financial sector is responsible for a large share of value added in most Caribbean islands, and in some cases the contribution of the financial sector to value added accounts for as much as 16% of the total, more than twice the 7.5% contribution to value added in the U.S in 2008. The largest contributors to GDP in almost all Caribbean countries are banking and insurance, the provision of government services, and retail and wholesale trade. The average contribution to GDP in these countries is 13.3% (7 countries), 17.2% (8 countries),

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[2] Not included are other country members of the Caribbean Community (CARICOM) such as Belize and Guyana, and British overseas territories such as The Cayman Islands, Anguilla, Bermuda, and The Turks & Caicos Islands.

13.2% (9 countries), respectively. In only four of the twelve countries does the hotel and restaurant sector contribute a large value to GDP. [3]

The composition of the economy varies throughout the Caribbean region, and likewise economic performance. Must countries however do have a relatively large financial sector. This research study will identify how the financial sector has impacted economic performance in these economies.

Literature Review

Traditional neoclassical growth models such as that of Harrod-Domar and Robert Solow (1956) leave unexplained the continuous divide between the world's richest and poorest nations. Researchers such as Robert Lucas argue that growth is embedded in productivity increasing ideas, such that theoretical growth models should move away from identifying factors impacting capital accumulation, and move towards modeling factors determining the generation of new productive ideas. A branch of the literature models growth as being determined by the extent of technological "innovation". Within this framework growth is endogenized in the decision to provide research work that creates innovation, that is, increases productivity and expands a country's production possibilities frontier. Similar to the exogenous growth models of Solow, economic growth within this branch of the literature converges to a balanced growth path, which is the rate of its technological progress. Financial development may endogenously promote growth by reducing uncertainty (Blackburn and Hung 1998), channeling capital to its most productive uses (De La Fuente and Marin 1996), allowing for the pooling of investment risks Allen and Gale (1997), converting liquid asset holdings into long term illiquid investment projects (Diamond and Dybvig 1983; Bencivenga and Smith 1991).

A number of studies provide empirical evidence on the financial sector's role in economic growth. King and Levine (1993) are among the earliest to empirically investigate the finance and growth relationship. They use four measures of financial development to show that finance impacts growth through both components of production: capital accumulation and productivity. Levin et al. (2000) extend the work of King and Levine (1993) in by including additional measures of financial development and control for possible simultaneity in the finance

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[3] This study classifies a large contributor as a sector that contributes at least 10% to GDP in any given year. The four are Antigua (10%), Dominican Republic (13.4%), Jamaica (11.5%), and St. Lucia 14.2%. Even though the hotel and tourism industry is not a large contributor to GDP, it employs more than 25% of the labor force in the ECCU for example.

and growth relationship. [4] Levin et al. (2000) also find strong positive effect of financial development on economic growth.

There is overwhelming evidence of the relationship between financial development and growth through role of banks in corporate governance, risk pooling, and the provision of credit in large economies. There is little evidence of this relationship in small nations. Banking in small nations may or may not be actively involved in country growth enhancing activity, or at least to the extent found in larger countries. By using cross-sectional data between 1960 and 1993 Aitkins and Boyd (1998) identify a positive effect of financial development on growth for Caribbean islands. This study is different from that of Aitkins and Boyd (1998) and contributes to the existing literature by testing the mechanism through which financial development enhances growth put forward by Aghion et al. (2005).

Theory and Data

The growth theory used to frame the empirical specification is that of Aghion, Howitt, Mayer-Folkes (2005) in which technological progress and economic growth arises, or can be defined as innovation in the production process.[5] Aghion et al. (2005) argue that the financial sector enhances economic growth by facilitating production innovation, and increases the rate at which countries converge to the world's frontier growth rate.

Within the model there is a world leading economic growth rate given by the rate of technological progress. This leading growth rate is termed the frontier growth rate and also describes the growth rate of the technology leader. The results of the model are that countries with a high level of financial development will grow at the same rate as the technology leader. Aghion et al (2005) provide empirical support for this result using a cross section of 70 countries, which includes five Caribbean islands. By removing the influence of the broader sample, this study will identify the extent to which the findings of Aghion et al. (2005) can be generalized to all small island economies.

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[4] The include a measure of the extent of credit issued by privately owned banks. Micco et al. (2007) show that private banks are more efficient than government run banks. Galindo et al. 2004 show that private domestic banks promote higher levels of growth than government owned banks by being able to identify and extend credit to profitable economic projects without exclusively relying on debtor's ability to provide collateral.

[5] See Aghion, P., Howitt, P.,and Mayer-foulkes (2005), "The Effect of financial Development on Convergence: Theory and Evidence," for details of the model.

The study uses a sample of 12 Caribbean islands between 1980 and 2004. Four measures of financial sector development are used in estimation. These measures include the asset size of the sector, the value of liquid liabilities, the value of credit extended to the private sector, and excess credit supply. The data and its sources are listed in Table 1 of the appendix. The United States is used as the global technology leader, such that GDP growth in the U.S outlines the frontier growth rate, and the difference in the percentage growth of real GDP per capita between the sample countries and the US will measure distance from the technology frontier growth rate. The growth rate of GDP is calculated over five year periods such that there are 60 observations. Table 2 of the appendix displays the average of each variable over the sample period. Other control variables which could possibly influence economic growth in each country include country openness, the level of infrastructure, the size of the government, economic stability, and the rule of law.[6]

Figure 1 displays the average level of GDP per capita and its growth rate for each country. With the exception of Haiti and The Bahamas, Caribbean islands included in the sample are upper-middle income countries (according to income classification by The World Bank). Haiti is a lower-middle income country with GDP per capita of US$2,000. The Bahamas however is a high income country, in which national income per capita was above US$18,000.

All countries are on average behind the technology frontier growth rate. The growth rate in GDP per capita in Caribbean region is on average slower than the technology leader by 0.6%. Haiti, The Dominican Republic and Jamaica are the countries with growth rates furthest behind that of the U.S, displaying an average yearly growth in real GDP per capita of below 1% over the time period 1980 to 2004.

The region has displayed a general increase in the level of financial development throughout the time period. Most countries show a steady increase in the value of credit issued to the private sector and the asset size of commercial banks. Figure 2 shows a bar chart of the average level of financial development in each country averaged over the sample period. The value of credit relative to GDP issued to the private sector is comparable to that of the U.S in 2004. Deposit banks in the U.S issued loans to the private sector equal to approximately 53% of its GDP, comparable to that issued in the Caribbean region in the same year of 47%.

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[6] Human capital endowment is also important for economic growth, but due to data limitations this variable is no directly included in empirical estimation.

A preliminary analysis of observed relationships displays the positive relationship between financial development and economic growth in the Caribbean countries. Table 3 ranks each country based on the measures of financial development. The best fitted line through the scatter diagram of Figure 3 shows that countries with the lowest rank of financial development also have the lowest growth rate in real GDP per capita. St. Kitts and Antigua, the two countries with the highest ranking of financial development, display the highest average growth rate in GDP per capita over the period. These observations are also supported in table 4 and figure 4.

The above discussion described some anecdotal evidence of the positive relationship between financial sector development and economic performance for Caribbean islands. The study will use econometrics to conduct a more precise identification of the finance and growth relationship by accounting for other factors that impact growth, and controlling for possible endogeneity in the level of financial development.

Methodology

Aghion et al. (2006) extend the Aghion et al. (2005) model such that local producers can acquire frontier technology from a foreign producer at a lower cost. As a result, foreign investment can increase the convergence rate to the frontier growth rate. Given the fact that capital accumulation via foreign direct investment (FDI) is significant in the Caribbean this hypothesis is included such that equation (1) is the estimated equation.

$$g_i - g_1 = \beta_0 + \beta_1(y_i - y_1) + \beta_2 F_i + \beta_3 F_i * (y_i - y_1) + \beta_4 FDI_i + \beta_5 FDI_i * (y_i - y_1) + \beta_6 X_i + \varepsilon_i$$

The left hand side represents the difference in the growth rate of GDP per capita from the technology leader, that is, the distance behind the frontier growth rate. The level of financial development is represented by F_i. The technology gap from the frontier is represented by $(y_i - y_1)$ where y_i represents initial log GDP per capita of country i. A subscript of 1 represents the technology leader. FDI is the value of foreign direct investment received as a share of GDP. The possible influence of financial development and foreign direct investment on the speed of convergence to the frontier growth rate is modeled by including interaction terms $F_i * (y_i - y_1)$ and $FDI_i * (y_i - y_1)$ respectively. Other control variables that could possibly impact

economic growth are captured by x_i. These factors include the extent of trade openness, the tax burden, the level of physical capital, the level of governance, and the inflation rate.

The convergence rate to the frontier growth rate is given by the convergence parameter in equation (3).

$$\gamma_i = \beta_1 + \beta_3 F_i + \beta_4 FDI_i \qquad (2)$$

The convergence parameter describes the effect of the technology gap, that is, the initial relative income, on the speed of convergence to the frontier growth. This speed of convergence is modeled as being dependent on the level of financial development and the amount of FDI received. Furthermore, for financial development to have a positive effect on the speed of convergence to the frontier growth rate, then it is expected that $\beta_3 < 0$. If an increase in foreign investment reduces the growth gap from the frontier then $\beta_4 < 0$. Two hypothesis are of interest in this study. Whether financial development increases steady state levels of real income per capita, and thus reduces the gap behind the frontier growth rate, that is $\beta_2 < 0$. Secondly, financial development may increase the speed at which the growth rate of per capita income approaches the frontier growth rate that is $\beta_3 < 0$.

Equation (1) is estimated using White's heteroscedasticity-corrected standard errors procedure. Unobservable country specific and time specific fixed effects are removed, and the slope coefficients are restricted to be the same for each country. Sensitivity analysis is conducted by controlling for possible simultaneity in the relationship between economic development and growth. Simultaneity in the finance and growth relationship may arise because economic growth leads to a higher demand for and the provision of financial services, and hence greater financial development. Studies typically use either GMM dynamic panel techniques (Levine et al. 2000), or instrumental variables techniques. This study uses the unexplained portion of banks' credit supply function, that is, the portion of credit supply not explained by its deterministic components.[7]

Additional sensitivity analysis is conducted by accounting for possible omitted variables bias in the estimation of equation (1). Research has established that the level of human capital is a primary factor influencing economic growth. This study uses the literacy rate as the measure of human capital. Due to limitations on the literacy rate data, human capital is accounted for by

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[7] The derivation of this alternate measure of financial development is excluded from this draft of the paper.

dividing the sample into two groups. Those countries with literacy rates above the regional average and those with literacy rates below the average. Three countries have literacy rates below the regional average, The Dominican Republic, Haiti, and Jamaica. Omitted variables bias is then controlled for by estimating the growth model for the sample of countries with literacy rates above the regional average.

Results

The empirical results are displayed in tables 5 and 6. The estimation controlling for omitted variable bias by using sample of nine countries with above average literacy rates will be used to describe the results. The results show that β_3 is insignificant, implying that for Caribbean countries, financial development does not influence the speed of convergence to the frontier growth rate as proposed in Aghion et al. 2005. Financial development is still important for growth however. β_2 is negative and significant across all measures of financial development, which implies that increasing the level of financial development reduces the gap from the frontier growth rate. The coefficient estimate of financial development in the first column of table 6 implies that a 1% increase in the level of private credit to GDP will reduce the growth gap from the frontier growth rate by 0.239%. The size of this effect is consistent across measures the different measures of financial development.

Conclusion

The small island nations of the Caribbean are a very interesting group of countries on which to conduct economic research. Changes in the global economy due to increased competition from globalization, changes in trading agreements, and warfare, creates a host of uncertainties for the future prosperity of these islands. Banking in the Caribbean is fairly homogenous, however there is considerable disparity in economic performance since the 1980's. Some islands have experienced growth spurts in income per capita exceeding 15%, for example Antigua & Barbuda in the late 1980's, and Trinidad & Tobago in 2003. Some islands located very closely never experience double digit growth and in fact are ladened with negative growth of real GDP per capita.

This study uses measures of financial development to confirm whether financial development is significant in its contribution to economic growth in the Caribbean islands. Data

from a representative sample of 12 Caribbean islands over the period 1980-2004 is used to estimate a model developed by Aghion et al. (2005). The results show that banking sector is effective for expansionary policy and should be used tool for economic growth. Policy makers should continue to ensure, and aim to improve on the availability of efficient banking services in the region. Future work should identify the major factors determining the disparity in economic performance of a fairly homogenous set of countries, and identify the role for economic policy.

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Table 1

<u>Data Description and Source</u>

FDI	Foreign direct investment comprises of capital provided for equity, and reinvested earnings, and inter-company debt transaction. IMF's International Financial Statistics database (IFS) line 78.
GDP per capita PPP adjusted	Penn world Tables version 6.3
Difference from frontier growth (g_i- g_1)	Growth rate of GDP per capita in country i - U.S Growth rate of GDP per capita. The growth rate of GDP is calculated as the difference in log real GDP per capita at the end of each five year period minus log of real GDP per capita at the start of the period.
Relative Output	Log GDP per capita PPP adjusted of country i – Log GDP per capita of the U.S
Private Credit	Credit issued to the private sector by deposit money banks. Deposit money banks are financial institutions with liabilities that are included in the national definition of broad money. Financial Structure Data Set by Thorsten Beck.
Liquidity	Ratio of liquid liabilities to GDP of deposit money institutions. Liquid liabilities include broad money liabilities. Financial Structure Data Set by Thorsten Beck.
Bank Assets	Claims by deposit money banks on the domestic non-financial sector as a share of GDP. Financial Structure Data Set by Thorsten Beck.
Excess Credit Supply	The residual of the estimated credit supply function for each country.
Trade Openness	Sum of country imports and exports as a share of GDP. Penn world Tables. For Haiti 2001-2004 taken from IFS line 70 +71
Inflation	The percentage change in the GDP deflator with the exception of Grenada, 1993 to 2004, and The Bahamas, 1980 to 2004, for which inflation is calculated as the percentage change in CPI. IFS line 99.
Log Telephone lines per 1000	The number of telephone Lines per 1000 persons. World Bank's World Development Indicators 2008 (WDI). Missing values are included by using the value of the nearest observed value. Is used to proxy for the level of physical capital
Government Expenditure	Expenditure by the general government on individual goods and services and collective services. IFS line 91.
Governance	Average governance score form the World Bank's Governance Matters 2008 . The governance indicators are created by combining the views of various sources. Among the institutions which contribute to index are the Economic Intelligence Unit, the Freedom House, the World Economic Forum, and the Global Integrity Index . Governance indicators include. The index includes rating perception on political stability, government effectiveness, control of corruption, rule of law, and regulatory quality.

Table 2

Variable Averages (1980-2004)

	Antigua	Bahamas	Barbados	Dominica	Dominican Republic	Grenada	Haiti	Jamaica	St. Kitts	St. Lucia	St. Vincent	Trinidad
GDP per Capita (US$)	10,796	18,486	14,406	6,453	5,091	4,633	2,060	4,285	10,076	5,875	5,637	11,634
Growth Rate of GDP per Capita (%)	4.75	0.43	0.73	3.08	2.79	2.67	0.79	0.60	4.59	2.46	4.21	2.46
Difference from Frontier Growth	-0.43	-0.18	-0.29	-0.65	-0.75	-0.79	-1.13	-0.81	-0.47	-0.69	-0.71	-0.39
Private Credit to GDP	0.65	0.45	0.45	0.45	0.24	0.51	0.12	0.23	0.58	0.55	0.45	0.30
FDI share of GDP	0.09	0.02	0.01	0.07	0.02	0.08	0.00	0.03	0.14	0.10	0.09	0.06
Inflation Rate (%)	4.27	4.03	4.70	4.27	19.44	-3.48	14.83	21.05	4.92	4.00	4.04	5.69
Government Expenditure share of GDP	0.20	0.14	0.20	0.22	0.01	0.19	0.22	0.15	0.20	0.17	0.20	0.17
Telephone Lines per 1000	222	268	289	141	51	140	7	71	200	132	106	133
Governance	0.65	1.11	1.17	0.58	-0.24	0.51	-1.34	-0.03	0.33	0.46	0.43	0.38

Table 3

Ranking Based on Average Financial Measure (1980-2004)

	Private Credit to GDP	Bank	Bank Assets to GDP	Liquidity to GDP	Excess Credit Supply	Average Rank
St. Kitts	2	1	2	1	8	1
Antigua	1	5	1	4	10	2
St. Lucia	3	2	3	5	5	3
Grenada	4	8	5	2	3	4
St. Vincent	7	3	6	3	7	5
Barbados	5	6	4	6	4	6
Dominica	6	7	7	7	6	7
Bahamas	8	4	8	8	2	8
Trinidad	9	9	9	9	9	9
Jamaica	11	11	10	10	1	10
Dominican Rep	10	10	11	12	---	11
Haiti	12	12	12	11	---	12

Bank is another measure of financial development used in the literature, and is the share of deposit money bank claims on the non financial sector to that of the sum of deposit money bank and central bank claims. Ranking is on a scale of 1 to 12 with 1 being the most financially developed. Countries with higher values of the above measures are given higher rank.

Table 4

Average Economic Growth Rates based on the Percentile Rank of Credit to GDP

The positive relationship between finance and growth seems apparent when comparing economic growth over the percentile distribution of credit to GDP. Table 5 shows that average GDP growth rates increase based on a country's relative credit to GDP percentile rank.

	<30% (Dominican Republic, Haiti, Jamaica, Trinidad)	*30-70%* (Bahamas, Barbados, Dominica St. Vincent)	*>70%* (Antigua, St. Kitts, St. Lucia, Grenada)
Percentile Rank of Domestic Credit to GDP (1980-2004)			
GDP per Capita (1980-1989)	-0.91%	3.53%	4.77%
GDP per Capita (1990-2004)	-2.94%	1.17%	2.84%

Table 5

The Effect of Financial Development on Growth Convergence

This table presents the coefficient estimates of White's heteroscedasticity-corrected standard errors procedure of GDP growth convergence to the frontier growth rate. The regressions controlled for both country and time specific fixed-effects regressions. F-tests could not reject the hypothesis of no time specific fixed effect. The estimation included other control variables such as trade openness, the number of telephone lines, the inflation rate, the size of government, and rule of law, but the estimates of those coefficients are not reported. The column headings display the measure of financial developed used in each regression.The T-statistics of the null hypothesis that the parameter estimates = 0 are reported in parenthesis. Each column reports the regression estimates for different measures of financial development. *** significant at the 1% level, **significant at the 5% level, * significant at the 10% level.

	Private Credit to GDP		Bank Assets to GDP		Liquid to GDP		Excess Credit Supply	
Constant	6.520	10.925	6.658	12.225	7.149	17.355	18.902	25.112
	(0.817)	(1.303)	(0.901)	(1.433)	(0.742)	(1.653)	(1.157)	(1.342)
Initial Technology Gap	-0.228***	-0.200***	-0.281***	-0.253***	-0.345***	-0.222*	-0.557***	-0.611***
	(-3.136)	(-3.646)	(-5.051)	(-4.635)	(-2.857)	(-1.787)	(-5.990)	(-5.579)
Finance Development	-0.164	-0.363***	-0.078	-0.241***	-0.019	-0.237	-0.156	-0.149
	(-1.597)	(-4.791)	(-1.022)	(-3.906)	(-0.133)	(-1.353)	(-0.660)	(-0.433)
Tech. Gap*Fin. Dev	-0.089	-0.412***	0.000	-0.219*	0.155	-0.190	-0.199	-0.150
	(-0.811)	(-2.219)	(0.003)	(-1.822)	(1.038)	(-0.965)	(-0.550)	(-0.262)
FDI to GDP		1.424***		1.441***		1.334**		0.707***
		(3.527)		(4.096)		(2.193)		(3.312)
FDI to GDP*Fin. Dev.		1.833**		1.772***		1.591*		1.086
		(2.569)		(2.763)		(1.857)		(1.571)
R Squared	0.631	0.665	0.626	0.658	0.632	0.653	0.684	0.705
Durbin-Watson Statistic	1.876	2.042	1.914	2.101	1.971	2.095	1.667	1.822

Table 6

The Effect of Financial Development on Growth Convergence

(controlling for possible omitted variables bias)

This table presents the coefficient estimates of White's heteroscedasticity-corrected standard errors procedure of GDP growth convergence to the frontier growth rate. The regressions controlled for both country and time specific fixed-effects regressions. The independent variable is the difference from the frontier growth rate. The sample uses the 9 countries with a high measure of human capital, such that the total number of observations is 45. F-tests could not reject the hypothesis of no time specific fixed effect. The estimation included other control variables such as trade openness, the number of telephone lines, the inflation rate, the size of government, and rule of law, but the estimates of those coefficients are not reported. The column headings display the measure of financial developed used in each regression. The T-statistics of the null hypothesis that the parameter estimates = 0 are reported in parenthesis. Each column reports the regression estimates for different measures of financial development. *** significant at the 1% level, **significant at the 5% level, * significant at the 10% level.

	Private Credit		Bank Assets to GDP		Liquid to GDP		Excess Credit Supply	
Constant	6.710	1.793	-5.33	6.234	2.838	19.680	46.205	54.425
	(0.573)	(0.088)	(-0.377)	(0.328)	(0.163)	(0.869)	(1.707)	(1.524)
Initial Technology Gap	-0.554***	-0.548***	-0.677***	-0.609***	-0.672***	-0.549***	-0.576***	-0.608***
	(-6.508)	(-5.305)	(-5.303)	(-5.842)	(-5.509)	(-5.451)	(-3.933)	(-4.229)
Finance Development	-0.239***	-0.435***	-0.127*	-0.289***	-0.131***	-0.288**	-0.515**	-0.519*
	(-3.168)	(-5.823)	(-1.888)	(-5.860)	(-3.211)	(-2.095)	(-2.643)	(-1.938)
Tech. Gap*Fin. Dev	-0.056	-0.090	0.188	-0.032	0.241	-0.027	-0.563**	-0.541
	(-0.275)	-0.418	(0.855)	(-0.287)	(1.307)	(-0.184)	(-2.036)	(-1.599)
FDI to GDP		0.779***		1.093**		0.851		0.302
		(4.525)		(2.547)		(1.073)		(0.692)
FDI to GDP*Fin. Dev.		1.309**		1.564**		1.191		0.738
		(2.081)		(2.659)		(1.441)		(0.910)
R Squared	0.694	0.659	0.752	0.779	0.757	0.769	0.736	0.756
Durbin-Watson Statistic	2.308	2.101	2.259	2.324	2.145	2.078	1.726	1.839

Figure1

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Average GDP per Capita
1980-2004 (US$)

Average Growth Rate of GDP per Capita
1980-2004 (%)

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Figure 2

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Average Financial Development (1980-2004)

□ Private Credit to GDP   ▓ Bank   □ Bank Assets to GDP   ■ Liquidity to GDP

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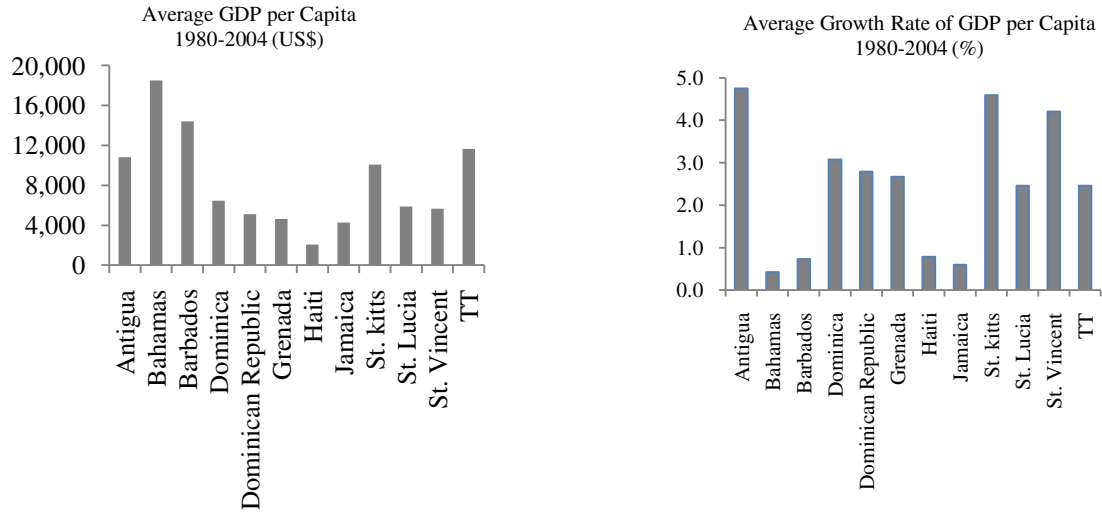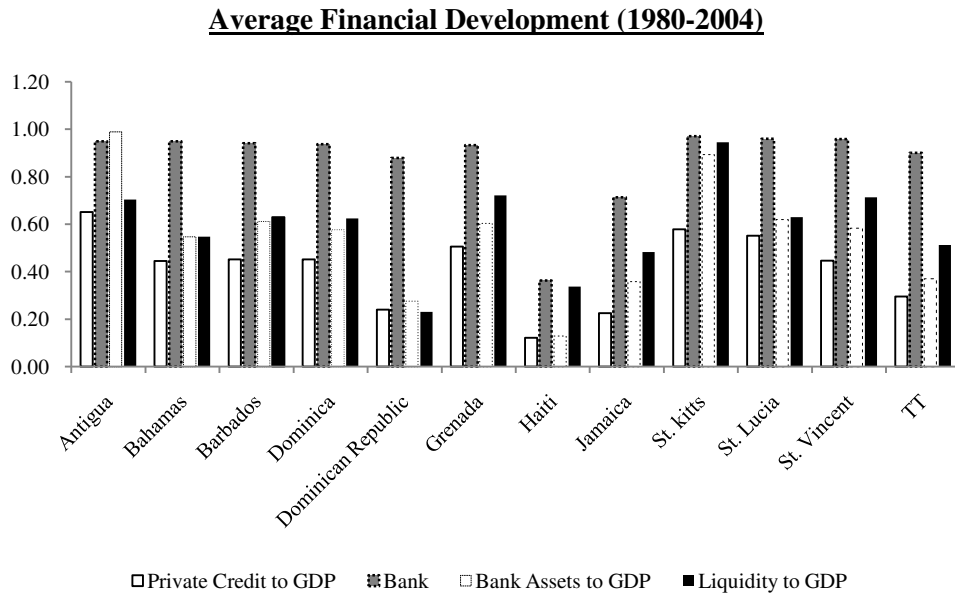
*TT represents Trinidad and Tobago

Figure 3
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Growth Rate GDP per Capita (%) vs Rank of Financial Development
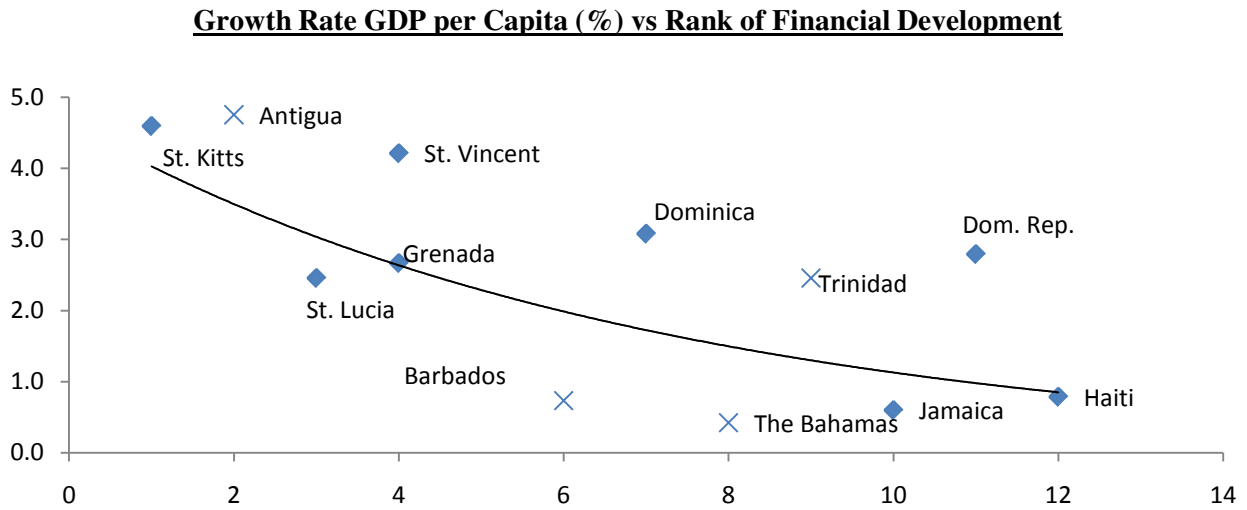
x- Represents countries in the 70% percentile of technology gap. (That is countries with the lowest difference in growth rate from the frontier growth rate, the smallest average frontier growth gap is that of Antigua with a technology gap of 0.433).

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Figure 4
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Difference in Growth Rate from the Technology Leader (%) vs Credit to GDP
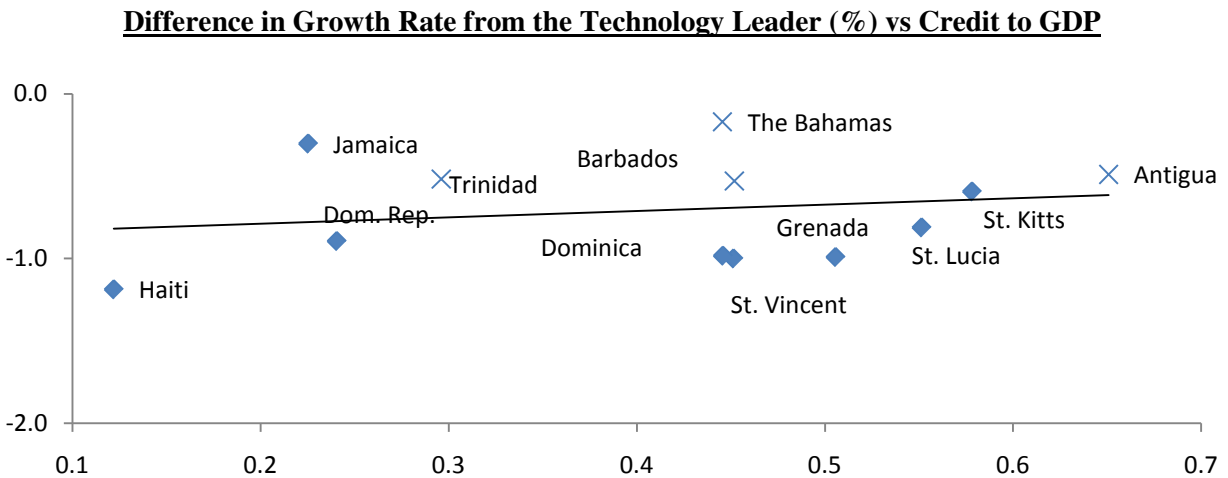

Figure 2 also supports the hypothesis as it shows slight positive relationship between financially development and closeness to the frontier growth rate. x- Represents countries in the 70% percentile of technology gap. Theory states that the growth gap from the frontier should be lowest for countries with a higher ration of credit to GDP.

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