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Article

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Review

Financial liberalization and growth in African economies: The role of policy complementarities

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Abstract

This paper examines whether the effect of financial liberalization on economic growth depends on reform complementarities. A non-linear growth regression specification that interacts a proxy of financial liberalization with proxies of reform complementarities is estimated using a panel of 45 Sub-Saharan Africa (SSA) countries. The cross-country, panel-data evidence shows no clear relationship between financial liberalization and growth. The study however finds that financial liberalization is more likely to positively and significantly increase growth across the SSA region if the following complementary reforms are undertaken e.g. improvement in educational attainment, macroeconomic and external stability, and overall governance.

JEL classification: O11; O16; O38; O55

Keywords: Financial liberalization; Growth; Economic reform; Policy complementarity; Africa

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1. Introduction

Financial liberalization is an important catalyst for economic growth (Stiglitz, 2000). At the domestic front, financial liberalization affects growth through the following channels: it reduces quantitative controls, allows interest rates to be market determined; produces higher interest rates and allocates capital toward higher return projects. Market determination of interest rates results in positive real interest rates, which improve financial intermediation and provide incentives for borrowers to invest in more productive activity (Gibson and Tsakalotos, 1994). At the external front, financial openness creates large capital flows and larger financial markets mean cheaper and more credit (Özdemir, 2014). The inflows of foreign savings augment domestic investment and capital-poor economies can free themselves from a binding constraint on economic growth e.g. lack of capital (Levine, 2001). Financial liberalization is also associated with increased domestic competition and technology transfers with a potential positive influence on economic growth (Levine, 2006).

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But, critics assert that its benefits have not been demonstrated mainly because countries have lagged behind in terms of reform complementarities (Williamson, 1993; Rodrik and Subramanian, 2009). For example, the growth effect of financial liberalization can be disappointing if implemented in a context of poor human capital unable to welcome foreign capital inflows and the associated technology (Rodrik, 1999; Edison et al., 2002; Abed, 2003).

Since 1980, growth in Sub-Saharan Africa (SSA) has declined at almost 1% per annum (Collier and Gunning, 1999).[1] The choice of bad policies e.g. financial repression seems to be the main cause of this slow growth (Azam et al., 2002). In order to achieve higher levels of economic growth, financial openness became the appropriate development strategy of SSA countries.[2] Contrary to expectations, after nearly three decades, financial liberalization is not growth enhancing in SSA economies (Reinhart and Tokatlidis, 2003).

The empirical studies on financial openness in SSA focused on its design, difficulties, implementation, and growth effect (Chang and Mendy, 2012; Ahmed, 2013). But, less attention has been given to the role of complementary reforms in the financial liberalization-growth nexus. The aim of this article is twofold: investigate empirically the impact of financial liberalization on economic growth over the sample period of 1970–2010 and then examine whether the growth effect of financial liberalization is contingent on complementary policies. This article is the first study to tackle these questions focusing on the SSA countries. Our findings show no relationship between financial liberalization and growth while the growth effect of financial liberalization is significantly positive if accompanied by improvement in schooling, macroeconomic and external stability, and overall governance.

The rest of the paper is as follows. Section 2 presents the model and data. Section 3 presents and discusses the results and Section 4 concludes.

2. Model specification and data

2.1. Model specification

Financial liberalization is not growth enhancing in the presence of distortions. To test this prediction, we estimate the following equation,

$$\Delta y_{it} = c + \beta_0 y_{it-1} + \beta_1 FL_{it} + \beta_2 CR_{it} + \beta_3 (FL_{it} \times y_{it-1}) + \beta_4 (FL_{it} \times CR_{it}) + \mu_t + \eta_i + \varepsilon_{it} \quad (1)$$

where the subscripts i and t represent country and time period, respectively; y is the log of GDP per capita; y_{t-1} is the level of per capita GDP at the start of the corresponding period; CR is a set of complementary reform variables; FL represents financial liberalization i.e. a dummy indicator or the Chinn and Ito (2008) index to capture the impact of domestic and external financial liberalization, respectively; μ_t and η_i denote unobserved time- and country-specific effects, respectively; and ε is the error term. To allow the growth effect of financial liberalization to vary with the complementary reforms, FL is interacted with CR_{it} one at a time. This strategy allows the derivation of different set of coefficients for 'without' and 'with' policy complementarity. Hence, the coefficient β_1 measures the growth effect of financial liberalization while the pattern of complementarity is captured by $\beta_1 + \beta_4$ when using the dummy and $\beta_1 + \beta_4 \times CR_{it}$ when the Chinn-Ito's index is the measure of financial openness. We expect $\beta_1 + \beta_4 \times CR_{it}$ to be positive for the variable whose increase indicates progress and negative for the variables whose decline denotes improvement (e.g. inflation, size of government, external debt). If β_4 is significant, then the effect of financial liberalization on growth depends on what happens to a given complementary reform variable. The rate of conditional convergence when using the 0–1 dummy or Chinn-Ito's index is measured by $\beta_0 + \beta_3$ and $\beta_0 + \beta_3 \times FL_{it}$, respectively. If β_3 is significant and positive, then a greater financial liberalization contributes to a faster rate of conditional convergence.

We used the system-GMM estimator i.e. we estimate a system of equations in differences and in levels (see Arellano and Bover, 1995; Blundell and Bond, 1998). For the equation in differences and variables measured as period averages e.g. inflation, public infrastructure, government size, trade openness, external debt, and governance index, the instrument is the average of period $t-2$, while for the variables in initial values e.g. per capita GDP and secondary school enrolment, the instrument is the observation at the start of period $t-1$. For the equation in level, the instruments are given by the lagged differences.[3]

2.2. Data

We follow the convention for the studies in this area and focus on the SSA countries, setting aside the North African countries.[4] The sample consists of an unbalanced panel dataset that comprises 45 SSA countries in 1970–2010. To control for business cycles, the dataset is structured as a panel with observations for each country consisting of non-overlapping 5-year averages for each variable. Thus, each country has 8 observations – the averages for 1970–1974, 1975–1979, 1980–1984, 1985–1989, 1990–1994, 1995–1999, 2000–2004, and 2005–2010.[5]

[1] Though economic performance in SSA has markedly improved since the mid-1990s, the low and unsustained level of growth in SSA remains a major challenge to economists.

[2] Beginning in the 1990s, many SSA countries liberalized interest rates, phased out directed credit, moved to indirect monetary policy instruments, restructured and privatized banks, and reinforced banking sector supervision and microfinance. At the external front, they abolished controls on international capital movements. See among others Mehran et al. (1998) for a compact description of the financial reforms in SSA countries.

[3] The system GMM estimates are obtained using the STATA command – xtabond2 – which provides the first-order, second-order, and the Sargan/Hansen test statistics.

[4] The main reason is that the North African countries e.g. Algeria, Egypt, Libya, Morocco and Tunisia are part of a different regional economy – the MENA – with its own distinctive set of economic issues.

[5] The last panel rather consists of a 6-year average spanning the 2005–2010 period. Appendix Table A provides the full list of countries in the sample.

As the dependent variable, we used GDP per capita growth rates i.e. the log difference of real GDP per capita in PPP terms, data are from the Penn World Table 7.1 (PWT7.1). For the independent variables, *initial GDP per capita* is the initial level of log GDP per capita at the start of each 5-year period while *financial liberalization* is measured using a 0–1 dummy for dates of financial liberalization events or the Chinn-Ito's index.[6] We also include gross domestic investment to GDP ratio in constant prices and annual population growth rate, and data are from PWT7.1.

For policy complementarity variables, *education* is the total secondary enrolment, regardless of age, to the population of the age group that officially corresponds to that level of education, observations are from the World Bank World Development Indicators (WDI).[7] We follow Savvides (1995) and use the growth in the *share of government spending in GDP*, observations are from the PWT7.1. *Inflation rate* is the percentage change in the consumer price index (CPI). Following Chang et al. (2009) and in order to take into account the fact that very low or negative inflation rates are also signs of macroeconomic instability, we take the absolute value of annual inflation minus 3%. *Public infrastructure* is proxied by the number of main telephone lines per capita and electricity production in Kwh. *The external stability* is measured by the annual growth rate of the foreign debt/GDP ratio. Data on foreign debt, inflation, and public infrastructure are from the WDI. *Trade openness* is measured as the ratio of exports plus imports to GDP from PWT7.1. *Governance* is captured using the indicators of civil liberties and political rights from Freedom House and range from 1 (maximum rights) to 7 (minimum rights). Both indicators are combined into a composite indicator of governance as follows: [14 − (Civil Liberties + Political Rights)]/14.[8]

Summary statistics of variables as well as the percentage difference in means before and after financial liberalization are in Table 1. The growth rate of GDP per capita, Chinn-Ito's index and control variables vary widely, justifying the use of the panel estimation techniques. The post-liberalization era is not statistically different from the pre-liberalization period in terms of growth rate of GDP per capita, initial GDP per capita, primary school enrolment, growth rate of government size, gross domestic investment or openness to international trade. The remaining differences are statistically significant. Compared to the pre-liberalization, the following variables are significantly higher in the post-liberalization period e.g. Chinn-Ito's index (19.8%), initial secondary enrolment (60.1%), inflation rate (38.8%), main telephone lines per capita (90.8%), electricity (108.4%), and the quality of governance (13.2%). Conversely, the post-liberalization growth rates of foreign debt to GDP and population are respectively 15 times and 22% significantly lower than the pre-liberalization ones.

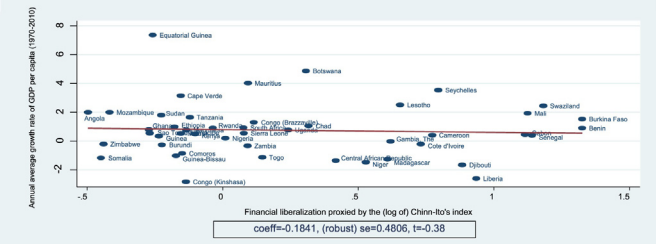

Fig. 1. Correlation between financial liberalization and economic growth in SSA, 1970–2010.

Before turning to econometric results, it is important to recall the main stylized fact that characterizes financial liberalization and growth nexus in SSA. Fig. 1 presents the simple correlation between economic growth and financial liberalization and reveals no apparent relationship between financial liberalization and economic growth. This is a key piece of evidence that is the focus of the evaluation of whether the effect of financial liberalization on growth can be significantly enhanced if some complementary reforms are undertaken.

3. Results

The results of the basic regression with no interaction terms are reported in Table 2. In the basic regression, the Ramsey's RESET test fails to reject the null hypothesis of no omitted variables.[9] In all cases, the Hansen and second order serial correlation tests show that the null hypothesis of correct specification cannot be rejected. This lends support to the estimation results. The results in column [1] show that as expected the initial GDP per capita carries a negative albeit insignificant coefficient. The coefficient on the secondary school enrolment is insignificant corroborating the findings by Savvides (1995).[10] As predicted by the Solow model, the growth of population contributes negatively (and significantly) to economic growth. For example, an increase in the annual growth rate of population by one percentage point reduces real annual per capita income growth by 0.6%. Also, external debt and inflation have negative and highly

[6] See Appendix Table B for the dates indicating the switch toward a more liberal domestic regime in SSA countries. The Chinn-Ito's index is available online at http://www.ssc.wisc.edu/~mchinn/research.html. It is based on four convertibility restrictions reported in the IMF's Exchange Arrangement and Agreements: restrictions on payments for capital account transactions, surrender or repatriation requirements for export proceeds, and the existence of multiple exchange rates. The index is calculated based on the first standardized principal component of the four variables above, and it ranges between −2.66 (full capital controls) and 2.66 (complete liberalization). This indicator of financial liberalization is used in much of the empirical work e.g. Yalta and Yalta (2012) among others.

[7] The stability of the results will be checked using the primary school enrolment ratio.

[8] See Helliwell (1994) for details.

[9] The Ramsey's RESET test rejects with a p-value of 0.057 the null hypothesis of no omitted variables when the public infrastructure variables e.g. main telephone lines per capita and electricity production are included in the estimation model.

[10] This finding should not be interpreted as a lack of importance of human capital accumulation in African growth. Indeed, the secondary enrolment ratio is not a significant determinant of economic growth possibly because of the poor quality of enrolment data and/or the possible collinearity of enrolment indices with physical capital accumulation. The unreported results, but available from the author using the initial primary school enrolment ratio yield a positive (1.141) and insignificant (standard error of 1.045) coefficient.

Table 1
Descriptive statistics (1970/1974 – 2005/2010).

(i) Descriptive statistics for all SSA countries

Variable	Mean	Standard deviation	Minimum	Maximum
Chinn-Ito's index	−0.681	1.055	−1.864	2.439
Growth rate of GDP per capita (%)	0.690	4.297	−22.451	36.198
Initial GDP per capita (in logs)	7.106	0.912	4.033	10.166
Secondary enrolment (in logs)	2.892	0.855	0.055	4.794
Primary enrolment (in logs)	4.191	0.748	−1.561	5.146
Growth rate of government size (%)	0.137	5.369	−18.810	35.737
Inflation (in logs [inflation rate – 3%])	1.630	1.380	−1.087	7.606
Growth rate of trade openness (%)	0.624	5.747	−21.342	31.041
Main telephone lines per capita (in logs)	−0.617	1.349	−3.963	3.402
Electricity production (in kwh, in logs)	21.338	1.885	14.914	26.253
Growth rate of foreign debt/GDP ratio (%)	1.627	20.770	−70.105	203.917
Investment to GDP ratio (in logs)	2.773	0.682	0.379	4.241
Growth rate of population (%)	2.079	0.869	−2.182	8.141
Governance	0.309	0.211	0.000	0.857
Number of observations	319			

(ii) Mean *t*-test comparison

	Pre-liberalization		Post-liberalization		Percentage change in mean[a]
	Mean	Standard deviation	Mean	Standard deviation	
Chinn-Ito's index	−0.794	0.926	−0.596	1.137	19.84**
Growth rate of GDP per capita (%)	0.461	3.445	0.863	4.843	40.16
Initial GDP per capita (in logs)	7.086	0.843	7.121	0.962	3.57
Secondary enrolment (in logs)	2.549	0.930	3.150	0.692	60.09***
Primary enrolment (in logs)	4.198	0.753	4.187	0.747	−1.09
Growth rate of government size (%)	0.065	3.928	0.192	6.249	12.69
Inflation (in logs [inflation rate – 3%])	1.851	1.266	1.463	1.441	−38.79***
Growth rate of trade openness (%)	0.178	6.479	0.960	5.121	78.17
Main telephone lines per capita (in logs)	−1.135	1.146	−0.227	1.361	90.83***
Electricity production (in kwh, in logs)	20.757	1.844	21.841	1.782	108.44***
Growth rate of foreign debt/GDP ratio (%)	10.811	26.717	−4.139	13.057	−1495.04***
Investment to GDP ratio (in logs)	2.722	0.759	2.812	0.618	9.04
Growth rate of population (%)	2.205	0.657	1.985	0.991	−22.00***
Governance	0.233	0.180	0.365	0.215	13.20***
Number of observations	137		182		

[a] A difference of means test between the post- and pre-liberalization periods.
** Denotes significant at 5% level.
*** Denotes significant at 1% level.

significant coefficients, indicating that external and domestic instabilities are harmful to SSA economic growth. An increase in the annual growth rate of foreign debt/GDP ratio by 10% is associated with a decrease of 0.3% in the average annual growth rate of per capita GDP. A similar increase in the average annual inflation rate depresses average annual GDP per capita growth by 6.5%.

The coefficient of investment is positive and highly significant. This indicates the importance of physical capital accumulation for SSA countries: an increase in the investment/GDP ratio by 10% is associated with an increase of 17.6% in the average annual growth rate of real per capita GDP. The coefficient on the institutional quality is positive and statistically significant. This indicates that better institutions have a beneficial impact on economic growth across the SSA region: a 1% increase in the governance index tends to increase annual per capita economic growth by 4.7%. Finally, financial liberalization, proxied by the dummy variable or the Chinn-Ito's index, is associated with slower growth, but the effect is statistically significant only in the former case.

Table 3 Panels A–B presents the results with interaction. The results in column [1] Panel A reveal that the coefficient of the interaction between initial GDP per capita and the dummy is positive and significant, indicating that SSA economies experience more rapid conditional convergence following financial openness. The coefficients on the interaction between financial liberalization and secondary schooling in column [2] and governance index in column [7] are positive and strongly significant. This indicates that financial liberalization boosts economic growth in SSA when accompanied with a stronger human capital basis and good institutions. For example, the results using the financial liberalization dummy show that while governance

Table 2
Basic growth regression system-GMM estimation results.

Variable	Dummy [1]	Chinn-Ito's index [2]
Constant	9.194 (7.085)	7.116 (8.892)
log(initial GDP per capita)	−1.888 (1.381)	−1.468 (1.749)
log(initial secondary enrolment)	−0.385 (1.380)	−0.791 (1.600)
Growth rate of government size	−0.03 1(0.033)	−0.032 (0.037)
log(deviation of inflation rate from 3%)	−0.649*** (0.254)	−0.561*** (0.244)
Growth rate of external debt/GDP ratio	−0.025** (0.014)	−0.024** (0.013)
Growth rate of trade openness	0.026 (0.032)	0.022 (0.032)
log(investment/GDP ratio)	1.764*** (0.698)	1.764*** (0.743)
Growth rate of population	−0.545*** (0.251)	−0.560*** (0.256)
Governance	4.660*** (1.517)	4.292*** (1.501)
Dummy financial liberalization	−1.460** (0.795)	/
log(Chinn-Ito's index)	/	−0.021 (0.454)
RESET[a]	0.738	0.742
2nd order serial correlation test (p-value)	0.226	0.237
Hansen test (p-value)	0.205	0.206
# observations	280	280

[a] Ramsey RESET test, p-value for H0: no omitted variables (based on OLS estimation). The dependent variable is the growth rate of real GDP per capita. Numbers in parentheses are the corresponding robust standard errors.
** Denotes significant at 5% level.
*** Denotes significant at 1% level.

increases per capita growth before financial liberalization by 6.7 times, the increase for the post-liberalization period is 9.8 times. Also, the secondary schooling has no significant effect on growth before financial liberalization and has significant effects on the financial liberalization-growth link.[11] With respect to Chinn-Ito's index, the coefficient on the interaction between financial liberalization and secondary school enrolment shows that a one-standard deviation increase in schooling is associated with a 2.7 percentage points increase in growth rate. Likewise, the coefficient estimate of the interaction between financial liberalization and governance index shows that a one standard deviation increase in the institutional quality is associated with an increase in the GDP per capita growth rate of 15.3 percentage points.[12]

Another interesting pattern of reform complementarity emerges in columns [4] and [6]. Here again, the coefficients on the interaction between financial liberalization and inflation or foreign debt are statistically significant and with the correct sign, that is negative since a decline in both inflation and growth rate of foreign debt denotes improvement. Hence, the growth effect of financial liberalization depends positively on the progress made in lowering price inflation and reducing the growth rate of foreign debt. In the case of dummy financial liberalization, while inflation decreases per capita growth in the pre-liberalization sample by 3% annually, the decrease for the post-liberalization is 7.5% annually. Also, while the growth rate of foreign debt depresses annual per capita economic growth by 0.8% before financial liberalization, the depression following financial liberalization is 10.3% annually. In the case of the Chinn-Ito's index, the quantitative effect is also quite strong. An increase in the inflation rate of 1.4 percentage points (equivalent to a one-standard deviation change) is associated with a 7.9 percentage points drop in the GDP per capita growth rate, while a one standard deviation increase in the growth rate of foreign debt tends to depress annual per capita economic growth by 4.1 percentage points.

Finally, we conducted two robustness checks. Because of space constraint, only the results on the different interactions are presented. First, it is argued in the literature that the growth effect of financial liberalization depends on the countries' level of development as proxied by the level of income. Hence, we include the interaction between financial liberalization proxy and initial GDP per capita in each of the regressions. Table 4 Panels A–B presents results. We continue to observe pattern of complementarity between financial liberalization and schooling, inflation, foreign debt, and governance. This is consistent with the expectation that the beneficial impact of financial liberalization on economic growth is larger when, educational attainment and institutional quality are improved, external environment as measured by the growth rate of foreign debt is stable, and inflation rate is lower.

In the second check, we use the least squares dummy variable corrected (LSDVC) estimator which has been proposed as a suitable dynamic panel data technique in the case of small samples (Bruno, 2005).[13] Table 5 Panels A–B presents the results. All the interaction terms are basically the same: education and governance still exert a positive and significant effect on the financial liberalization-growth link. The coefficients on the interactions

[11] The unreported results using primary schooling are statistically insignificant.
[12] From Eq. (1), the effect of a given complementary reform is given by $\Delta Growth = \beta_{CRV} + \beta_{INT} \times CRV$, where β_{CRV} and β_{INT} are the estimated regression coefficients on a given complementary reform variable and on the interaction between financial liberalization and a given complementary reform variable (CRV), respectively.
[13] The LSDVC estimates are obtained using the Stata commands – xtlsdvc.

Table 3
Economic growth, financial liberalization and reform complementary in SSA.

Panel A	Interaction of dummy financial liberalization with			
	[1] Initial GDP per capita	[2] Schooling	[3] Government size	[4] Inflation
Control variables				
log(initial GDP per capita)	−1.717(1.689)	−1.392(1.921)	−1.392(1.510)	−1.633(1.524)
log(initial secondary enrolment)	−0.495(1.731)	−0.810(1.645)	−0.665(1.382)	−0.745(1.373)
Growth rate of government size	−0.033(0.034)	−0.036(0.036)	−0.111(0.104)	−0.027(0.033)
log(inflation)	−0.617** (0.334)	−0.547** (0.300)	−0.576*** (0.241)	−0.030(0.026)
Growth rate of external debt/GDP ratio	−0.024** (0.014)	−0.024** (0.013)	−0.024** (0.013)	−0.023* (0.014)
Growth rate of trade openness	0.025(0.033)	0.022(0.033)	0.025(0.032)	0.017(0.032)
log(investment/GDP ratio)	1.797*** (0.723)	1.762*** (0.774)	1.699*** (0.744)	1.797*** (0.740)
Growth rate of population	−0.543*** (0.250)	−0.567*** (0.267)	−0.584*** (0.243)	−0.537*** (0.245)
Governance	4.539*** (1.710)	4.133** (2.055)	4.214*** (1.488)	4.358*** (1.493)
Interactions				
log(initial GDP per capita) × Dummy	0.124** (0.063)			
log(initial secondary enrolment) × Dummy		0.134** (0.070)		
Growth rate of government size × Dummy			0.096(0.120)	
log(inflation) × Dummy				−0.045** (0.025)
2nd order serial correlation test (*p*-value)	0.229	0.242	0.188	0.157
Hansen test (*p*-value)	0.122	0.133	0.109	0.205
# Observations	280	280	280	280

Panel A	Interaction of dummy financial liberalization with		
	[5] Trade openness	[6] Foreign debt	[7] Governance
Control variables			
log(initial GDP per capita)	−1.352(1.473)	−1.177(1.535)	−1.753(1.402)
log(initial secondary enrolment)	−0.093(1.702)	−0.731(1.372)	−0.768(1.364)
Growth rate of government size	−0.007(0.042)	−0.030(0.032)	−0.031(0.033)
log(inflation)	−0.651*** (0.219)	−0.469** (0.230)	−0.643*** (0.251)
Growth rate of external debt/GDP ratio	−0.026** (0.015)	−0.008(0.008)	−0.023** (0.014)
Growth rate of trade openness	0.356(0.247)	0.021(0.028)	0.024(0.032)
log(investment/GDP ratio)	2.013*** (0.870)	1.628*** (0.674)	1.853*** (0.745)
Growth rate of population	−0.206*** (0.033)	−0.463*** (0.203)	−0.551*** (0.254)
Governance	3.818*** (1.243)	3.863*** (1.424)	6.708*** (2.402)
Interactions			
Growth rate of trade openness × Dummy	0.080(0.051)		
Growth rate of external debt/GDP ratio × Dummy		−0.095*** (0.032)	
Governance × Dummy			3.113* (1.904)
2nd order serial correlation test (*p*-value)	0.242	0.195	0.221
Hansen test (*p*-value)	0.352	0.141	0.303
# Observations	280	280	280

Panel B	Interaction of Chinn-Ito's index of financial liberalization with			
	[1] Initial GDP per capita	[2] Schooling	[3] Government size	[4] Inflation
Control variables				
log(initial GDP per capita)	−1.894(1.665)	−0.996(1.508)	−3.335(2.769)	−1.326(2.227)
log(initial secondary enrolment)	−0.754(1.506)	−1.265(1.408)	−3.474(2.641)	−0.848(1.662)
Growth rate of government size	−0.033(0.037)	−0.031(0.039)	−0.285** (0.158)	−0.031(0.039)
log(inflation)	−0.652*** (0.247)	−0.563*** (0.233)	−0.986*** (0.439)	−0.546** (0.290)
Growth rate of external debt/GDP ratio	−0.022* (0.013)	−0.024** (0.014)	0.034(0.029)	−0.025** (0.014)
Growth rate of trade openness	0.017(0.032)	0.024(0.032)	0.009(0.070)	0.027(0.054)
log(investment/GDP ratio)	1.701*** (0.691)	1.664*** (0.743)	2.627*** (1.116)	1.723** (0.792)
Growth rate of population	−0.564*** (0.251)	−0.568*** (0.268)	−0.405*** (0.155)	−0.592** (0.301)
Governance	4.783*** (1.623)	4.338*** (1.543)	9.963** (5.003)	4.473*** (1.600)
log(Chinn-Ito's index)	−8.861*** (3.674)	−2.676*** (1.236)	−0.906(0.934)	0.280(1.723)

Table 3 (*Continued*)

Panel B	Interaction of Chinn-Ito's index of financial liberalization with			
	[1] Initial GDP per capita	[2] Schooling	[3] Government size	[4] Inflation
Interactions				
log(initial GDP per capita) × Chinn-Ito	1.230*** (0.536)			
log(initial secondary enrolment) × Chinn-Ito		0.941** (0.529)		
Growth rate of government size × Chinn-Ito			−1.758** (0.965)	
log(inflation) × Chinn-Ito				−0.247** (0.138)
2nd order serial correlation test (*p*-values)	0.285	0.217	0.218	0.291
Hansen test (*p*-value)	0.319	0.103	0.125	0.202
# Observations	280	280	280	280

Panel B	Interaction of Chinn-Ito's index of financial liberalization with		
	[5] Trade openness	[6] Foreign debt	[7] Governance
log(initial GDP per capita)	−1.464(1.736)	−1.540(1.740)	−1.488(1.738)
log(initial secondary enrolment)	−0.693(1.604)	−0.792(1.578)	−0.780(1.585)
Growth rate of government size	−0.034(0.037)	−0.035(0.037)	−0.033(0.037)
log(inflation)	−0.541*** (0.244)	−0.571*** (0.243)	−0.553*** (0.244)
Growth rate of external debt/GDP ratio	−0.024** (0.013)	−0.022(0.014)	−0.024** (0.013)
Growth rate of trade openness	0.021(0.031)	0.022(0.032)	0.023(0.032)
log(investment/GDP ratio)	1.679*** (0.750)	1.793*** (0.746)	1.754*** (0.743)
Growth rate of population	−0.596*** (0.253)	−0.537*** (0.259)	−0.562*** (0.257)
Governance	4.524*** (1.480)	4.366*** (1.564)	4.375*** (1.538)
log(Chinn-Ito's index)	0.057(0.046)	0.012(0.014)	0.103(0.174)
Growth rate of trade openness × Chinn-Ito	−0.065(0.044)		
Growth rate of external debt/GDP ratio × Chinn-Ito		−0.009*** (0.003)	
Governance × Chinn-Ito			0.356*** (0.146)
2nd order serial correlation test (*p*-value)	0.190	0.241	0.235
Hansen test (*p*-values)	0.116	0.200	0.266
# Observations	280	280	280

The dependent variable is the growth rate of real GDP per capita. Numbers in parentheses are the corresponding robust standard errors.
* Denotes significant at 10% level.
** Denotes significant at 5% level.
*** Denotes significant at 1% level.

between financial liberalization and inflation, and growth of foreign debt in columns [4] and [6], respectively remain of the same sign, same statistical significance, albeit of different magnitude. This corroborates the expectation that the lower the inflation rate and the growth rate of foreign debts, the more SSA countries benefit from financial liberalization.

4. Conclusion

In this paper, we have rigorously looked at how complementarities affected the link between both domestic and external financial liberalization and economic growth in 45 Sub-Saharan Africa (SSA) countries in 1970–2010. The empirical analysis used a non-linear growth regression specification that interacts the proxy of financial liberalization (a 0–1 dummy variable and the Chinn-Ito's index for domestic and external financial liberalization, respectively) with proxies of reform complementarities e.g. schooling, inflation stabilization, fiscal policy, trade openness, external stability, and governance.

The empirical work finds no significant effect of financial liberalization on SSA economic growth. Second, human capital positively and significantly affects the financial liberalization-growth link. Finally, the growth impact of financial liberalization is also conditional on macroeconomic and external stability, and a sound institutional framework.

From a policy point of view, the main message of the paper is that financial liberalization could result in higher economic growth across SSA if accompanied by improvement in secondary educational attainment, macroeconomic stability i.e. inflation, stable external environment i.e. foreign debts, and overall governance.

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Table 4
Robustness check to level of development.

Panel A	Interaction of dummy financial liberalization with						
	[1]Initial GDP per capita	[2]Schooling	[3]Government size	[4]Inflation	[5]Trade openness	[6]Foreign debt	[7]Governance
log(initial GDP per capita) × Dummy	0.124** (0.063)	3.951* (2.422)	−0.139 (0.122)	0.025** (0.013)	−0.135 (0.125)	−0.080 (0.119)	0.192*** (0.006)
log(initial secondary enrolment) × Dummy		0.332*** (0.114)					
Growth rate of government size × Dummy			0.080 (0.122)				
log(inflation) × Dummy				−0.417** (0.238)			
Growth rate of trade openness × Dummy					−0.125 (0.088)		
Growth rate of external debt/GDP ratio × Dummy						−0.090*** (0.035)	
Governance × Dummy							3.093*** (1.102)
Panel B	**Interaction of Chinn-Ito's index with**						
	[1]Initial GDP per capita	[2]Schooling	[3]Government size	[4]Inflation	[5]Trade openness	[6]Foreign debt	[7]Governance
log(initial GDP per capita) × Chinn-Ito	1.230*** (0.536)	1.009** (0.591)	1.231*** (0.503)	1.236*** (0.546)	1.208*** (0.526)	1.230*** (0.551)	1.238*** (0.550)
log(initial secondary enrolment) × Chinn-Ito		0.268*** (0.055)					
Growth rate of government size × Chinn-Ito			0.063 (0.054)				
log(inflation) × Chinn-Ito				−0.033 (0.027)			
Growth rate of trade openness × Chinn-Ito					−0.072* (0.043)		
Growth rate of external debt/GDP ratio × Chinn-Ito						−0.019*** (0.005)	
Governance × Chinn-Ito							1.313*** (0.490)

The dependent variable is the growth rate of real GDP per capita. Numbers in parentheses are the corresponding robust standard errors.
* Denotes significant at 10% level.
** Denotes significant at 5% level.
*** Denotes significant at 1% level.

Table 5
Robustness check to estimation method.[a]

Panel A	Interaction of dummy financial liberalization with					
	[1]Schooling	[2]Government size	[3]Inflation	[4]Trade openness	[5]Foreign debt	[6]Governance
log(initial secondary enrolment) × Dummy	0.454** (0.247)					
Growth rate of government size × Dummy		0.124 (0.10)				
log(inflation) × Dummy			−0.282** (0.129)			
Growth rate of trade openness × Dummy				−0.125** (0.071)		
Growth rate of external debt/GDP ratio × Dummy					−0.118*** (0.045)	
Governance × Dummy						0.589*** (0.260)
Panel B	**Interaction of Chinn-Ito's index with**					
	[1]Schooling	[2]Government size	[3]Inflation	[4]Trade openness	[5]Foreign debt	[6]Governance
log(initial secondary enrolment) × Chinn-Ito	0.335*** (0.189)					
Growth rate of government size× Chinn-Ito		0.023 (0.072)				
log(inflation) × Chinn-Ito			−0.385** (0.197)			
Growth rate of trade openness × Chinn-Ito				0.001 (0.038)		
Growth rate of external debt/GDP ratio × Chinn-Ito					−0.031** (0.018)	
Governance × Chinn-Ito						0.363*** (0.112)

[a] Coefficients are estimated for the period 1970/1974–2005/2010. Dependent variable: Growth rate of real GDP per capita. Numbers in parentheses are the corresponding robust standard errors.
** Denotes significant at 5% level.
*** Denotes significant at 1% level.

Appendix.

Table A
Dates indicating the switch toward a more liberal financial domestic regime.

Country	Year	Country	Year	Country	Year
1. Angola	1990	16. Ethiopia	1990	31. Niger	1989
2. Benin	1989	17. Gabon	1990	32. Nigeria	1987
3. Botswana	1991	18. Gambia, The	1986	33. Rwanda	1990
4. Burkina Faso	1989	19. Ghana	1988	34. Sao Tome & Principe	1990
5. Burundi	1986	20. Guinea-Bissau	1989	35. Senegal	1989
6. Cameroon	1990	21. Guinea	1989	36. Seychelles	1990
7. Cape Verde	1990	22. Kenya	1991	37. Sierra Leone	1991
8. Central African Republic	1990	23. Lesotho	1980	38. South Africa	1980
9. Chad	1990	24. Liberia	1990	39. Sudan	1990
10. Comoros	1990	25. Madagascar	1994	40. Swaziland	1990
11. Congo, Republic of	1990	26. Malawi	1988	41. Tanzania	1991
12. Congo, Democratic Republic of	1990	27. Mali	1989	42. Togo	1989
13. Côte-d'Ivoire	1989	28. Mauritania	1990	43. Uganda	1988
14. Djibouti	1990	29. Mauritius	1993	44. Zambia	1992
15. Equatorial Guinea	1990	30. Mozambique	1994	45. Zimbabwe	1991

Source: Reinhart and Tokatlidis (2003).

Table B
Sample of SSA countries.

Country	Study period	Country	Study period	Country	Study period
1. Angola	1985–2010	16. Ethiopia	1980–2010	31. Niger	1970–2010
2. Benin	1970–2010	17. Gabon	1970.2010	32. Nigeria	1970–2010
3. Botswana	1970–2010	18. Gambia, The	1970–2010	33. Rwanda	1970–2010
4. Burkina Faso	1970–2010	19. Ghana	1970–2010	34. Sao Tome & Principe	1985–2010
5. Burundi	1970–2010	20. Guinea-Bissau	1990–2010	35. Senegal	1970–2010
6. Cameroon	1970–2010	21. Guinea	1990–2010	36. Seychelles	1970–2010
7. Cape Verde	1970–2010	22. Kenya	1970–2010	37. Sierra Leone	1970–2010
8. Central African Republic	1970–2010	23. Lesotho	1975–2010	38. South Africa	1970–2010
9. Chad	1970–2010	24. Liberia	1970–2010	39. Sudan	1970–2010
10. Comoros	1985–2010	25. Madagascar	1970–2010	40. Swaziland	1970–2010
11. Congo, Republic of	1970–2010	26. Malawi	1980–2010	41. Tanzania	1970–2010
12. Congo, Democratic Republic of	1970–2010	27. Mali	1990.2010	42. Togo	1970–2010
13. Côte-d'Ivoire	1970–2010	28. Mauritania	1985–2010	43. Uganda	1970–2010
14. Djibouti	1990–2010	29. Mauritius	1970–2010	44. Zambia	1970–2010
15. Equatorial Guinea	1985–2010	30. Mozambique	1980–2010	45. Zimbabwe	1970–2010

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