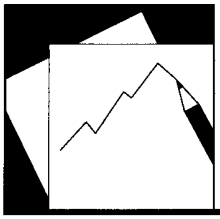
WP/09/213



IMF Working Paper

What Determines Bond Market Development in sub-Saharan Africa?

O. Janet Adelegan and Bozena Radzewicz-Bak

INTERNATIONAL MONETARY FUND

© 2008 International Monetary Fund WP/09/213

IMF Working Paper

MCM

What Determines Bond Market Development in sub-Saharan Africa?

Prepared by O. Janet Adelegan and Bozena Radzewicz-Bak[1]

Authorized for distribution by S.Kal Wajid

September 2009

Abstract

This Working Paper should not be reported as representing the views of the IMF.
The views expressed in this Working Paper are those of the author(s) and do not necessarily represent those of the IMF or IMF policy. Working Papers describe research in progress by the author(s) and are published to elicit comments and to further debate.

This study empirically analyzes the determinants of bond market development in a cross section of 23 sub-Saharan African (SSA) countries between 1990 and 2008. It considers the stage of development and the size of the bond market, as well as the historical, structural, institutional and macroeconomic factors driving bond market development in SSA. The study finds that the savings constraint is a key impediment to domestic bond markets development as well as financial market deepening, as it results in a low level of financial intermediation by the banks. Overall, the results show that a confluence of factors matters for the development of domestic bond markets in SSA; these include structure of the economy, investment profile, law and order, size of the banking sector, the level of economic development, and various macroeconomic factors. Policy implications include increased efforts to strengthen the investment environment and the need for a regional approach to bond market development.

JEL Classification Numbers: G15; G20; O16; R11

Keywords: Bond market development, government bonds; corporate bonds, macroeconomic factors; sub-Saharan Africa.

Author's E-Mail Address: oadelegan@imf.org , bradzewiczbak@imf.org

[1] We gratefully acknowledge comments received from S. Kal Wajid and Bernard Laurens, Inutu Lukonga, and other MCM and IMF colleagues.

Contents Page

I. Introduction 3

II. Debt Markets in sub-Saharan Africa: An Overview 4

III. Macroeconomic and Financial Issues in the Development of Debt Markets in sub-Saharan Africa.....7

IV. The Role of Institutional Investors in Bond Market Development 12

V. Is Government Debt Market Crowding Out the Corporated Debt Market? 14

VI. What Drives Bond Market Development in sub-Saharan Africa? 17
A. Methodology 17
B. Empirical Analysis 20

VII. Conclusions, Recommendations, and Policy Implications 23

References.....31

Tables
1. Domestic and External Debts to GDP 4
2. Average Domestic Debt, 1990–08.....6
3. Cross-Country Comparison of Financial Systems.....7
4. Financial Sector Depth and Domestic Depth, 2008.....8
5. Assets of Nonbank Institutional Investors 13
6. Overall Savings and Investment Balances in sub-Saharan Africa, 1991–08.....15

Figures
1. Domestic and External Debt (1980–08) 5
2. Financial Sector Depth and Domestic Debt, 2008.....9
3. Ratio of M2 to GDP and Domestic Bonds as a Share of GDP 10
4. Stock Market Capitalization and Domestic Bonds as a Share of GDP.....11
5. Private Savings and Domestic Debt as a Share of GDP 12

Appendix
I. Statistical Data.....25

Appendix Tables
7. Overall Savings and Investment Balances, 1991 25
8. Current Account Balances, 1991–08 26
9. Regression Results.....27
10. Correlation of Explanatory Variables.....28
11. Multivariate Analysis.....29
12. Sensitivity Analysis 30

I. INTRODUCTION

The financial markets in most sub-Saharan African (SSA) countries are shallow, and have inadequate access to finance. As a result, mobilization of domestic resources as an alternative source of financing is becoming increasingly important in SSA, with SSA governments focusing on domestic markets in order to avoid renewed or unsustainable external indebtedness. Easy access to concessional financing had reduced the need to develop domestic bond markets in many SSA countries. Prior to the ongoing financial crisis, many SSA countries enjoyed relatively simple access to external donor funds, predominantly in the form of multilateral and bilateral loans and grants secured on concessional terms. Despite a long history of fiscal deficits and a growing need for developmental and structural investments, with the one exception of South Africa, bond markets in SSA have remained shallow, illiquid, and inefficient.

As the global financial crisis persists, concerns have emerged that donors' funds may turn out to be scarcer and therefore having sufficiently liquid domestic bond markets is becoming increasingly important. In the wake of the global financial crisis, the need for the development of domestic and regional bond markets, as part of the response to the crisis, becomes more discernible. This is based on the view that there has been over-reliance on the banking sector for funding, with many banks being subsidiaries of foreign banks with the attendant contagion effects. The financial sector of many SSA countries is vulnerable to swings in global market sentiment and foreign investors' risk aversion. The development of the domestic bond market will improve financial intermediation and help to channel more funds into domestic investment and, therefore, finance development needs.

Promoting domestic bond market development is becoming also important due to benefits stemming from improved efficiency in its functioning. Domestic bond markets enhance capital allocation by directing savings towards assets with a higher return, provide alternative sources of financing, and facilitate risk management through distributing risk among different groups of investors. The development of the domestic bond market as subsegment of financial market contributes to the growth of a country's financial system.

Developing SSA bond markets has also become an important policy focus of multilateral financial institutions. A joint initiative of the IMF and World Bank has been launched to assist, inter alia SSA countries, in building up bond markets by developing effective medium-term debt management strategies that are consistent with the goal of maintaining debt sustainability. The question is whether this initiative will have the desired effect in terms of bond market development. While there are conflicting views on the determinants of bond market development, most argue that fundamentals such as stable macroeconomic policies, improved regulation, enhanced transparency, and stronger investor protection are particularly important.

This study empirically analyzes the determinants of bond market development in a cross-section of SSA countries. It will answer the following key questions:

- What drives bond market development in SSA?

- Is the government bond market facilitating or crowding out the corporate bond market in SSA?

In answering these questions, we consider the stage of development and the size of the bond market as well as the historical, structural, institutional, and macroeconomic determinants of bond market development in SSA countries.

The rest of the paper is structured as follows. Section II presents an overview of debt markets in SSA and discusses their current state of development. Section III discusses the macroeconomic and financial issues influencing the development of the domestic bond market. Section IV presents the role of institutional investors in bond market development, while section V provides an empirical analysis of whether the government debt market is crowding out the development of the corporate debt market. Section VI presents the methodology and empirical analysis of the determinants of bond market development in SSA, and section VII concludes with a discussion of policy recommendations.

II. Debt Markets in sub-Saharan Africa: An Overview

This section discusses the current state of debt market development in the SSA region and reviews ongoing reforms in this area.

The debt relief under the Heavily Indebted Poor Countries (HIPC) Initiative has helped to improve SSA's external debt situation. Thirty-three SSA countries were considered HIPC and a large number of them have benefited from the Multilateral Debt Relief Initiative (MDRI) and the bilateral debt cancellation measures, which were launched in 1996. As a result, SSA external debt has fallen considerably from an average of 103 percent of GDP in 1995–2000 to about 34 percent of GDP in 2001–08. By the end of 2008, external debt to GDP had dropped to its lowest level since 1980, constituting 20.4 percent of GDP.

In contrast, the domestic debt market is growing rapidly. SSA's domestic debt as a share of GDP has doubled to about 22.4 percent between 2001 to 2008 from an average of about 11 percent between 1980 and 1989 (Table 1 and Figure 1).

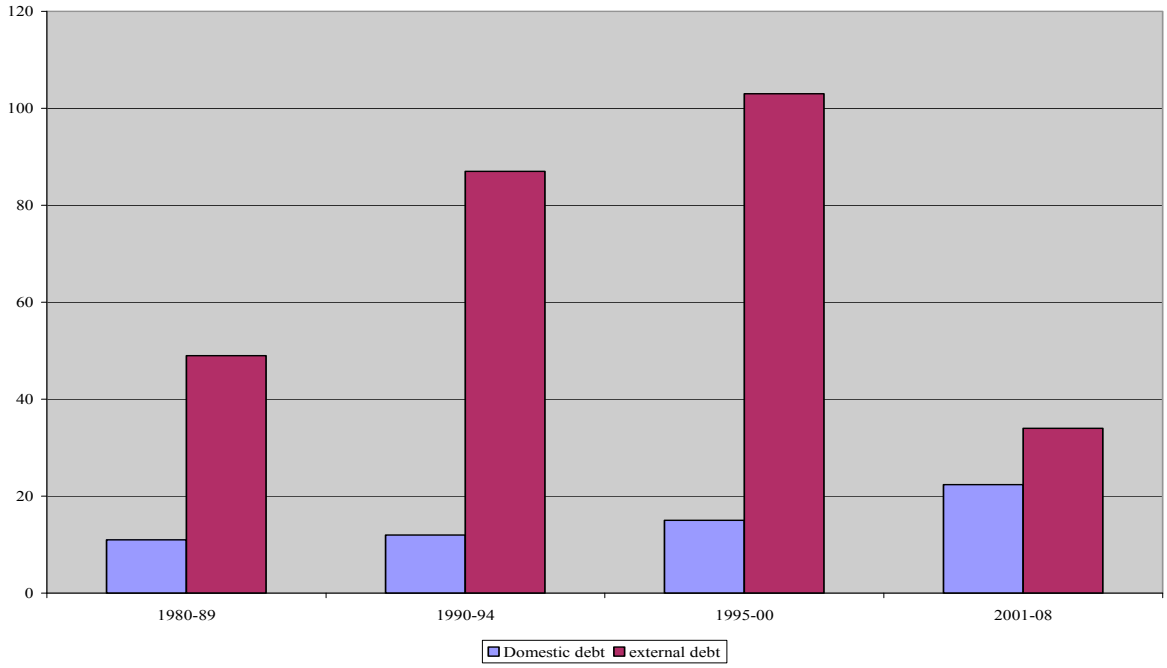
Table 1. Sub-Saharan Africa: Domestic and External Debts to GDP (1980–08)

Year	Domestic Debt/GDP	External Debt/GDP
1980–1989	11	49
1990–1994	12	87
1995–2000	15	103
2001–2008	22	34

Sources *IMF IFS Government Finance Statistics, AFDB External Sector Economic Indicators*, AFR Country desks

As of end-2008, domestic debt accounted for about 20 percent of GDP. However, this is still much lower than debt market capitalization to GDP for Asia (45 percent of GDP) and emerging markets (39 percent), and developed countries (139 percent).

Figure1. Sub-Saharan Africa: Domestic and External Debt (1980–08)



Sources: *IMF IFS Government Finance Statistics, AFDB External Sector Economic Indicators,* AFR Country desks.

The regional aggregates disguise considerable variation in domestic debt market size across countries (e.g.: domestic debt accounts for 110 percent of GDP in Eritrea; 29 percent in The Gambia; and just 1 percent in Burkina Faso). Table 2 presents the developments in domestic debt for selected SSA countries for the period 1980–08. An increasing number of countries are becoming more domestically indebted, and the number of countries with debt-to-GDP ratios exceeding 20 percent almost doubled from five between 1980 and 2000 to ten between 2001 and 2008.

There is a wide disparity in the size of domestic debt to GDP across SSA countries. A group of countries have high domestic debt to GDP. These are Eritrea, Mauritius, Namibia, Seychelles, and South Africa. On the other hand, some others have not used or only recently started to develop their debt markets. These include the WAEMU countries:[2] Botswana,

[2] They are Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo.

Central African Republic, Comoros, and Rwanda. In between the two extremes is a group of countries that have small domestic debt markets and moderate domestic debt.

Table 2. Sub-Saharan Africa: Average Domestic Debt, 1990–08

(In percent of GDP)

	1990–2000	2001–2008
No debt		
Cameroon		0
Guinea-Bissau	0	0
Mali	0	0
Niger	0	0
Low		
Botswana	0	5
Benin	0	2
Burkina Faso	0	1
Burundi	4	6
Central African Republic		23
Comoros		4
Côte d'Ivoire	0	2
Ethiopia	15	23
Gambia, The	18	29
Ghana	16	24
Guinea		20
Kenya	23	18
Lesotho	7	10
Malawi	9	15
Nigeria	23	14
Rwanda	7	5
Senegal	0	1
Sierra Leone	6	16
Average	8	12
High		
Eritrea		110
Mauritius	31	47
Namibia	14	38
Seychelles	57	70
South Africa	41	33
Average	36	60

Sources: *IMF IFS Government Finance Statistics, AFDB External Sector Economic Indicators,* AFR Country Desk.

In terms of the composition of external finance, most SSA countries rely less on the domestic bond market than on the banking sector. Appendix 1 Table 3 compares the relative importance of the banking sector, stock market and domestic debt market for a group of SSA countries in 2008. While there is considerable variation among countries, the banking sector is particularly important for external finance in almost all SSA countries. The stock market is important for South Africa, Nigeria, Mauritius, and Kenya. The domestic debt market is the least important of these three sources of finance in SSA countries.

Table 3. Sub-Saharan Africa: Cross-Country Comparison of Financial Systems

	Banking Industry			Stock Market	Domestic Debt			
	Private Sector Credit/GDP	Banking Assets/Total Financial Sector	Assets of Bank/GDP	Market Capitalization/ GDP	Domestic Debt/GDP	Issued by Government	Corporate Bond	Municipal Bond
Botswana	18.6	49	32	57	13	3.4	3.7	
Ghana	29.7	75	66	18	26.1			
Kenya	26.8	58	19	63	30	13.7	0.5	
Malawi	25	65	26	60	50			
Mauritius	24.2	92	220	88	47	56.2		
Namibia		49	75	11	54	56.1	18.4	
Nigeria	26	96	39	75	25	9.7	0.2	0.3
South Africa	37	37	112	327	18	40.0	10.7	2.1
Tanzania	7	39	31	20	45	11.2	0.4	
Uganda	6	82	14	2	58	0.0		
Zambia	12.8	80	26	44	60	5.6	1.2	
Swaziland		73.0	30	7	3.5			
WAEMU		88	29	17	3.5	4.4		

Sources: Country authorities and IMF staff estimates.

III. Macroeconomic and Financial Issues in the Development of Debt Markets in sub-Saharan Africa

This section discusses the macroeconomic and financial issues constraining bond market development in SSA.

The literature suggests that a government will tend to finance a deficit with debt issued at the domestic market if domestic savings are high and the domestic banking and financial system is developed. The depth of the financial sector dictates the scope for the expansion of the domestic debt market, which is measured in the literature as the ratio of broad money to GDP. Table 4 presents the ratio of broad money to GDP in SSA. In 8 out of 28 countries (i.e., 29 percent of SSA countries in the sample) broad money to GDP exceeds 50 percent of GDP. These are countries with the "deepest" financial sectors in SSA, namely Botswana, Cape Verde, Eritrea, Ghana, Kenya, Mauritius, Seychelles, and South Africa.

The small size of the financial sector is a limiting factor to the scope of expansion of domestic debt in most countries. Table 4 also presents the ratio of domestic debt to broad money. There is a wide disparity in the ratio of domestic debt to broad money for many SSA countries (Table 4 and Figure 2). The Central African Republic (CAR), Ethiopia, and Seychelles had a very large ratio of over 100 percent between 2000 and 2008. Other countries with a high ratio include The Gambia, Malawi, Namibia, Senegal, Sierra Leone, Uganda, and Zambia. In contrast, some countries, including the WAEMU countries, had a very low ratio of domestic debt to broad money. The scope for expanding the domestic debt market is limited by the small size of the financial sector. For countries that already have

high external debt, a further expansion of domestic debt could increase the scarcity of commercial bank resources, and consequently curb credit to the private sector.

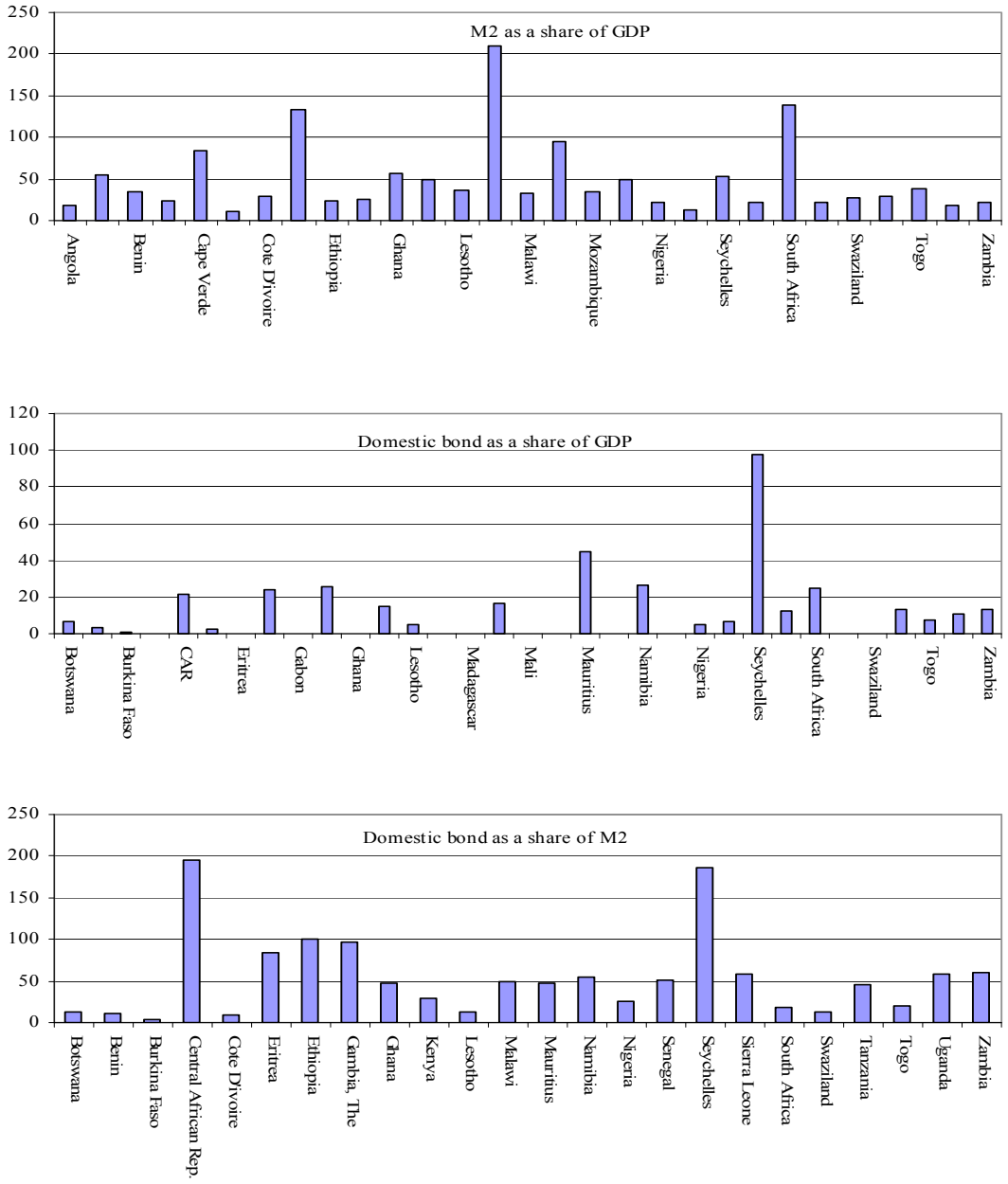
The research confirms that SSA relies less on domestic bonds and more on banks. This is a distinctive characteristic of SSA's financial systems.

Table 4. Sub-Saharan Africa: Financial Sector Depth and Domestic Depth, 2008

Country	M2 (In percent of GDP)	Domestic Debt (In percent of GDP)	Domestic Debt (In percent of M2)
Angola	18	n.a	n.a
Botswana	55	7	13
Benin	34	4	11
Burkina Faso	23	1	3
Cape Verde	84	n.a	n.a
Central African Rep.	11	22	195
Côte d'ivoire	29	3	10
Eritrea	132	109.9	83
Ethiopia	24	24	101
Gambia, The	26	26	97
Ghana	56	26	47
Kenya	50	15	30
Lesotho	36	5	13
Malawi	34	17	50
Mauritius	94	45	47
Mozambique	34	n.a	n.a
Namibia	48	26	54
Nigeria	21	5	25
Senegal	14	7	51
Seychelles	52	97	186
Sierra Leone	22	13	59
South Africa	139	25	18
Sudan	22	n.a	n.a
Swaziland	28	4	13
Tanzania	29	13	45
Togo	38	7	19
Uganda	18	10	58
Zambia	22	13	60

Sources: IMF *IFS Government Finance Statistics, AFDB External Sector Economic Indicators*, and AFR Country desks.

Figure 2. Sub-Saharan Africa: Financial Sector Depth and Domestic Debt, 2008

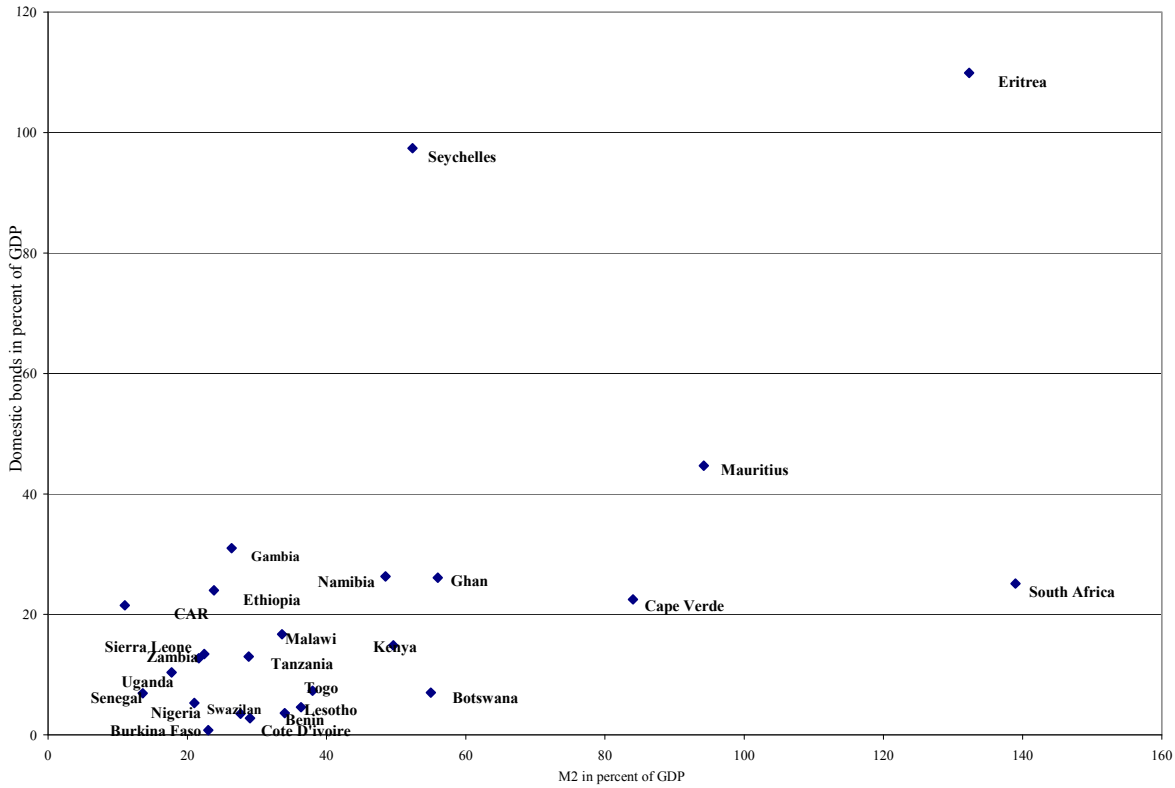


Sources *IMF IFS Government Finance Statistics, AFDB External Sector Economic Indicators,* AFR Country Desk.

If the domestic banking and financial systems are developed, and domestic savings are high, a government that needs to finance a given deficit will tend to rely more on domestic markets. The study considers the correlation between the share of domestic debt to GDP and M2 to GDP, which is a measure of the domestic financial development base, on the premise that a large banking sector will help the government sell its debt domestically. This premise is confirmed by Figure 3, which shows a positive correlation between domestic debt as a share of GDP and M2 to GDP.

Figure 3. Sub-Saharan Africa. Ratio of M2 to GDP and Domestic Bonds as a Share of GDP

(In percentage points)



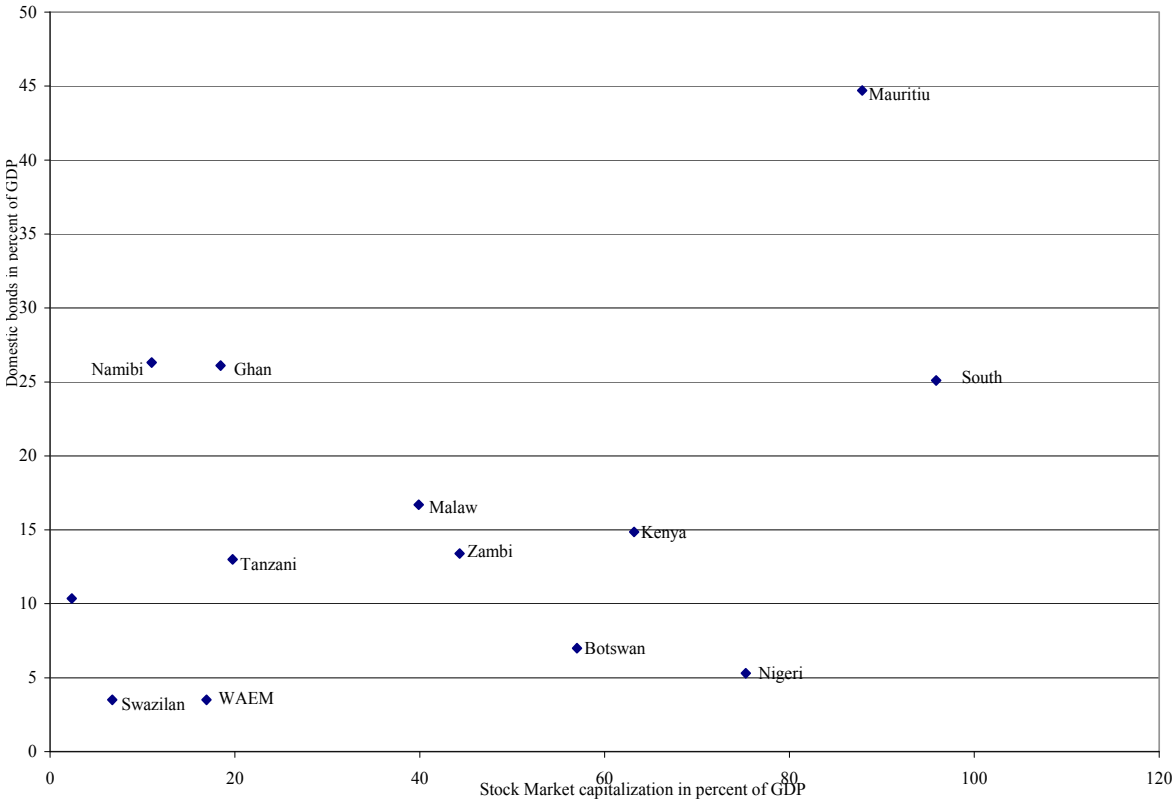
Sources: *IMF IFS and World Development Indicators* database.

Note: average M2-to-GDP ratios and domestic debt as a share of GDP were computed for the 2004–07 sample.

Another measure of financial development is stock market capitalization as a share of GDP (MCAPGDP). Figure 4 presents the correlation between domestic debt as a share of GDP, and stock market capitalization as a share of GDP.

Figure 4. Sub-Saharan Africa. Stock Market Capitalization and Domestic Bonds as a Share of GDP

(In percentage points)



Sources: *IMF IFS and World Development Indicators* database.

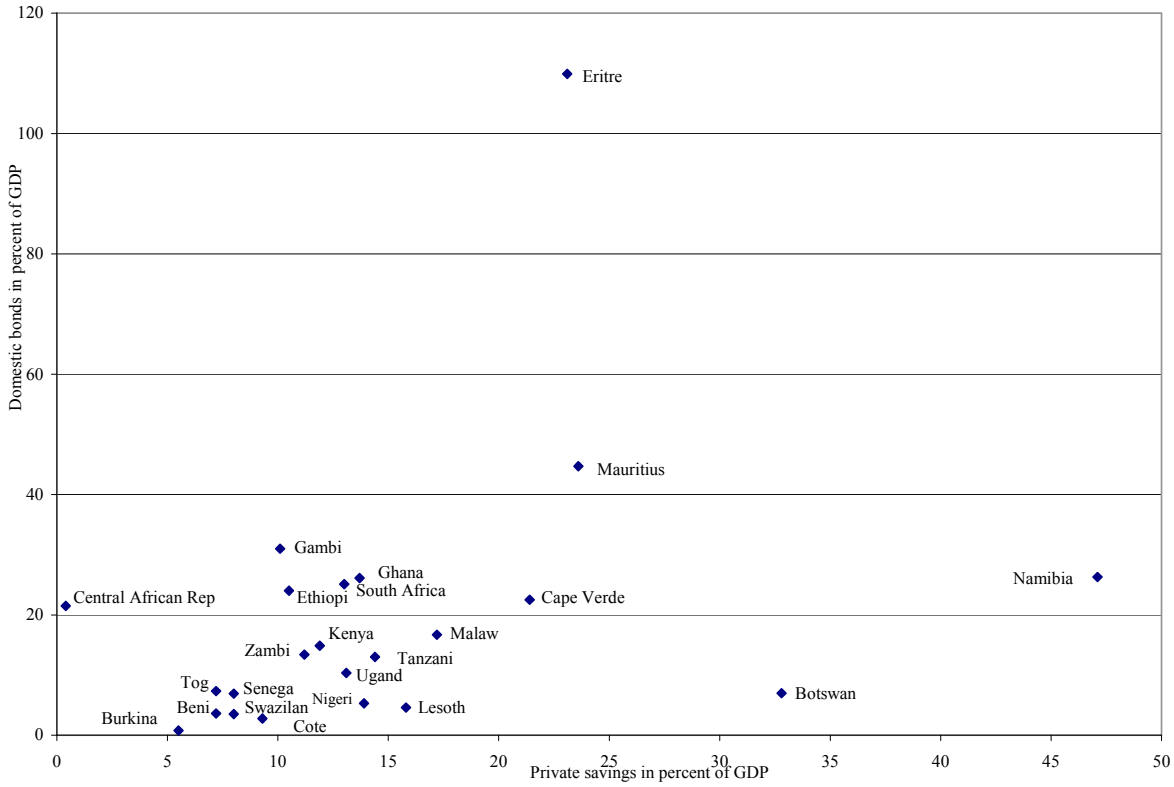
Note: The ratios of stock market capitalization to GDP and domestic debt as a share of GDP were computed for the 2004–07 sample.

There is a positive correlation between the share of domestic debt to GDP and stock market capitalization as a share of GDP. This result is consistent with findings in Claessens et al (2003), and Jeanne and Guscina (2006).

Figure 5 shows the correlation between the share of domestic debt as a share of GDP and private savings to GDP for SSA countries. Contrary to findings in Jeanne and Guscina (2006), there seems to be a positive correlation between domestic debt as a share of GDP and private savings to GDP.

Figure 5. Sub-Saharan Africa. Private Savings and Domestic Debt as a Share of GDP

(In percentage points)



Sources: IMF IFS and World Development Indicators database.

Note: the average private savings rate as a share of GDP and domestic debt as a share of GDP were computed for the 2004–07 sample.

IV. The Role of Institutional Investors in Bond Market Development

Commercial banks dominate the financial system in SSA countries and, given their relatively large size compared with other segments of the financial sector as well as the role that they play as market makers for primary issues, they remain the largest group of investors for government papers, including government bonds. Nevertheless, over the last few years, assets of nonbank institutions (particularly pension funds) have started to grow rapidly in a number of countries, at a pace exceeding growth in banking sector assets.[3] Although their assets are still smaller as a proportion of GDP than in developed economies, nonbank

[3] Although the reasons for this are different across countries, in some cases recently undertaken reforms in pension fund systems allowing for the establishment of funded schemes have contributed to this development (e.g., Nigeria, Zambia).

institutions are starting to play a more significant role in the domestic bond market, particularly at the long end of the yield curve (see Table 5).

Table 5. Sub-Saharan Africa: Assets of Nonbank Institutional Investors

(As percentage of GDP)

	Insurance Companies	Pension Funds	Mutual Funds
G7 countries	61.2	34.7	47.3
EM countries in Asia	8.5	12.6	10.3
EM countries in CCE	5.6	4.7	5.4
EM countries in LA	7.3	17.4	10.9
SSA countries	16.7	40.2	14.0

Sources: IMF FSAPs, OECD, national authorities.

Nonbank financial institutions are widely regarded as being critical for bond market development given their long–term investment strategies. If bond markets are underdeveloped, both pension funds and insurance companies are forced to hold short-term securities, which do not correspond to the liability side of their balance sheet and therefore expose them to maturity mismatches. In order to meet the growing demand for longer dated securities from nonbank institutional investors, several countries (e.g., Kenya, Nigeria, Tanzania, and Zambia) have pursued strategies to lengthen the maturities of their government bonds up to 10 and 15 years. Longer-term instruments help pension funds manage some risks, as well as provide useful benchmark for pricing long-term assets.

A number of SSA countries have recently decided to upgrade the investment guidelines for nonbank financial institutions, recognizing the significance of soundness rules for promoting bond market development. It is important that rules governing portfolio investments for nonbank financial institutions aim at: (i) limiting risks and mismatches, which may occur on the balance sheets of these institutions; and (ii) setting sound principles for investments. On the other hand, it is also essential that institutional investors should not be compelled to hold the majority of their portfolios in government bonds because it may lead to creation of "captive" markets. Principles governing investments in credit quality papers and foreign currency denominated securities, as well as accounting rules requiring mark to market valuations, are yet to be established by SSA countries.

There is still potential for further growth of investments by institutional investors in domestic bond markets. Further reforms in the pension fund system, in particular the shift toward funded schemes, are likely to have a positive impact on the assets of the pension sector and

further strengthen their role in domestic bond markets. This is also important from the financial stability standpoint, as some emerging country experiences show that investment of pension funds in the domestic government bonds may are more stable, and can act countercyclical when other investors are withdrawing from the market, thereby adding stability to the market.[4]

V. IS GOVERNMENT DEBT MARKET CROWDING OUT THE CORPORATED DEBT MARKET?

If government debt becomes sizable, it can crowd out private sector credit and this will have negative consequences for private sector investment. This section examines ways in which government debt may be crowding out the private sector from the bond markets in SSA. Table 6 presents the regression results of private sector credit on domestic debt for 45 SSA countries over the period 1990–08. The dependent variable is domestic debt as a share of M2 and the independent variable is private sector credit as a share of M2.

The regression results found support for the crowding-out hypothesis, where private sector credit has a statistically significant parameter estimate. On average across countries, a 1 percent expansion in domestic debt relative to broad money caused private sector lending as a share of broad money to decrease by 0.31 percent between 1990 and 2008. This is consistent with Christenson (2004) that finds, using data from 1980 to 2000, that a 1 percent expansion of domestic debt caused a 0.15 percent decline in lending to the private sector.

We estimated variants of the same model varying the years, and found negative and statistically significant parameter estimates for private sector credits. From the regression results, the negative parameter estimate for private sector lending was 0.43 for for years between 1990 to 2000; 0.13 from 2001 to 2008, and 0.096 from 2003 to 2008. Debt relief, which took place in 1996 as a result of the introduction of the HIPC initiative and the MDRI. helped reduce the average external debt as a share of GDP from a peak of 74 percent in 1994 to 48 percent in 2003. As a sequel to this, there is also a reduction in the magnitude of the negative parameter estimates on private sector lending in the regression using data from 2003 to 2008. On average across countries, a 1 percent expansion in domestic debt relative to broad money caused private sector lending as a share of broad money to decrease by 0.096 percent.

The private savings rate and ratio of private sector lending to broad money were very low for Togo and Guinea-Bissau. This coincided with low domestic borrowing, as the ratio of domestic debt to broad money was less than 20 percent. The small size and slow growth of the bond markets will make corporate borrowers excessively dependent on bank financing, which has a short-term horizon. A shock to confidence can result in the economies being very vulnerable to a disruptive credit crunch.

[4] See: Capital Markets in Chile: From Financial Repression to Financial Deepening, BIS Papers No. 11, 2002.

Table 6. Sub-Saharan Africa: Overall Savings and Investment Balances, 1991–08

	2008		Average	
Countries	Savings	Investment	Savings	Investment
Angola	33.8	12.7	28.3	11.9
Benin	12.4	20.7	12.4	19.2
Botswana	51.0	40.9	43.9	33.4
Burkina Faso	7.1	18.1	10.0	19.0
Burundi	8.7	19.7	4.4	11.9
Cameroon	19.4	19.1	14.9	17.8
Cape Verde	30.7	43.0	28.1	39.0
Central African Republic	3.0	11.6	5.6	9.9
Chad	3.3	15.7	6.1	23.5
Comoros	4.2	13.5	7.4	11.4
Congo, Democratic Republic of	6.5	21.9	9.4	15.4
Congo, Republic of	15.2	22.0	16.8	25.5
Côte d'Ivoire	12.6	10.1	10.4	11.3
Djibouti	7.5	46.7	12.0	20.9
Equatorial Guinea	36.5	26.7	35.1	39.2
Eritrea	8.2	10.9	18.3	20.5
Ethiopia	17.8	21.8	16.5	20.3
Gabon	41.5	24.2	35.9	24.4
Gambia, The	-2.5	14.6	6.6	16.7
Ghana	16.4	34.6	19.3	28.6
Guinea	5.5	17.2	12.2	18.2
Guinea-Bissau	10.0	24.8	8.8	32.7
Honduras	23.0	33.9	20.1	29.8
Kenya	9.5	16.2	14.5	15.4
Lesotho	25.2	28.4	24.4	36.8
Madagascar	10.8	35.1	11.9	22.2
Malawi	20.3	26.5	14.7	21.2
Mali	12.4	20.4	15.2	22.1
Mauritania	5.7	21.0	21.1	28.2
Mauritius	21.1	29.8	23.3	25.7
Niger	13.9	26.4	8.7	16.3
Nigeria	29.2	24.7	28.1	23.9
Rwanda	15.5	22.7	14.0	19.4
Senegal	17.9	30.2	15.2	22.4
South Africa	15.4	22.1	15.4	18.2
Sudan	13.5	22.8	11.5	22.0
Swaziland	11.0	17.3	15.7	17.7
Tanzania	21.4	31.8	16.1	23.1
Togo	5.7	12.4	6.8	11.8
Uganda	20.3	23.6	16.4	20.3
Zambia	16.2	23.6	14.1	22.7
Zimbabwe	22.2	23.6	11.1	11.8
Average	18.1	27.3	16.8	22.7
Minimum	-5.5	10.1	4.4	9.9
Maximum	51.0	46.7	43.9	39.2
Median	14.5	22.4	14.8	20.7

Sources: *International Financial Statistics, World Economic Outlook, authors'* calculations.

On the other hand, Central African Republic, Ethiopia, and The Gambia had a very low ratio of private sector lending to broad money. This coincided with a strong domestic borrowing as the ratio of domestic debt to broad money was 195 percent, 101 percent and, 97 percent, respectively. Although many of the countries had a low ratio of domestic debt to GDP, domestic debt accounted for a relatively large proportion of broad money given the relatively underdeveloped financial sector. These included the Central African Republic, Ethiopia, The Gambia, Malawi, Sierra Leone, Tanzania, Uganda and Zambia (see Table 3 and Figure 5).

The savings constraint is a key impediment to financial market deepening and development of domestic bond markets. Low savings will result in low level of financial intermediation by the banks. On average, gross savings as a share of GDP for SSA countries was 18.1 percent in 2008, while gross investment as a share of GDP was 27.3 percent (see Appendix Table 10). On average, private savings as a share of GDP was 9.8 percent in 2008, and 11 percent between 1991 and 2008. The regional aggregates disguise considerable variation in private savings as a share of GDP across countries. Only five SSA countries.(i.e., 11 percent) had private savings greater than 20 percent of GDP; 17 countries (i.e., about 40 percent) had private savings that were less than 10 percent of GDP in 2008. Private dis-savings[5] as a share of GDP is as low as about negative 21 percent for the Republic of Congo. On the other hand, private savings was as high as about 40 percent for Botswana in 2008. The median savings ratio as a share of GDP in 2008 was 9.9 percent.

On average, 44 SSA countries (i.e. 94 percent) had a negative savings-investment gap between 1991 and 2008.[6] Only the resource rich countries—Angola, Botswana, Gabon, Namibia, and Nigeria—experienced positive savings-investment balances in 2008 (Appendix Tables 10 and 11). Foreign savings is therefore an important source of development finance for SSA countries. Thus, SSA countries run current account deficits as they expand domestic investment beyond the resources available from domestic savers through reliance on foreign savings (Adelegan, 2008).

Typically the savings shortfall pertains to both the public and private sectors, but the savings-investment gap is wider for the public sector (see Appendix Tables 10 and 11). The public sector shortfall tends to crowd out investment in the private sector by limiting the flow of private savings available for domestic intermediation. Fundamentally, very low domestic savings is a major constraint on domestic bond market development in SSA countries.

A number of policies can be considered to address this problem of low domestic savings.

- **Fiscal policy measures.** Fiscal policy measures can be used to correct the public sector's negative current account balances, as well as the imbalance between savings and investment in the private sector. A useful policy handle is savings incentives in

[5] Negative savings.

[6] With the exception of Botswana, Gabon, and Namibia.

terms of an interest rate policy that will encourage savings. Private savings can be mobilized through increases in interest rates.

- **Broader access to financial services.** Generally, poor domestic savings is a major constraint confronting SSA countries. There is a need to access capital from elsewhere to finance growth and innovation and deepen the market. Bond market development is expected to make an important contribution to economic growth through improving access for firms (Adelegan, 2008). Modern development economists have emphasized that broader access to financial services should be a central development agenda of financial sector reforms (Demirguc-Kunt and others, 2008).

- Promotion of growth. For a number of low-income countries, consumption and growth are low. Any increase in income is diverted towards greater consumption. Policies that are geared towards promoting growth will also promote savings and facilitate financial market deepening.

- **External financing.** The role that the external sector can play in financial market deepening is also crucial. The reason that external financing increased was because of low savings and the unavailability of local finance. External finance potentially has a role to play in deepening the financial market and facilitating the development of the bond market.

VI. WHAT DRIVES BOND MARKET DEVELOPMENT IN SUB-SAHARAN AFRICA?

This section presents the methodology and multivariate analysis. Empirical findings on the historical, structural, institutional and macroeconomic determinants of bond market development in SSA are also presented.

A. Methodology

The panel comprises 23countries.[7] The data set covers the period 1990 to 2008 at an annual frequency for a maximum of 394 year observations.[8] Data were selected according to data availability for all the relevant variables.

Adopting the model in Eichengreen and Pipat, 2004, we ran the following regression:

$$y_{it} = \alpha_i + \beta_1 EcSize_{it} + \beta_2 Open_{it} + \beta_3 BankSize_{it} + \beta_4 Intrate_{it} + \beta_5 X_{it} + \varepsilon_{it} \text{.....(1)}$$

[7] The countries are; Botswana, Benin, Burkina Faso, Central African Republic, Cote D'Ivoire, Ethiopia, Gambia, Guinea-Bissau, Ghana, Kenya, Mali, Malawi, Mauritius, Namibia, Niger, Nigeria, Senegal, Seychelles, South Africa, Tanzania, Togo, Uganda, and Zambia.

[8] See Table 7 for the list of variables.

Where: the dependent variable is bond market capitalization as a share of GDP. The independent variables include measures of economic size (EcSizeit), natural openness (Openit), size of the banking sector (BankSizeit), and interest rate (Intrateit).

Economic size is measured as GDP at purchasing power parity (EcSizeit). This variable has been used in the literature to measure country size. Small size is a determinant of the inability of developing countries to have a deep and liquid bond market and they are characterized by price volatility as buyers and sellers exit. Small countries may also not have a deep and liquid bond market because they lack efficiency of scale for deep bond markets, the amount raised from issuance may be too small to attract multinationals and transnational companies, potential foreign issuers, portfolio managers, and justify inclusion by leading investment banks in global bond markets indices.

Natural openness is measured as the ratio of exports to GDP. More open economies do less to suppress the securities market because established interests may not be able to insist on policies that suppress competing sources of supply when the economy is exposed to international competition (Rajan and Zingale, 2001). Although there is considerable variation among countries, the banking sector is particularly important for external finance in almost all the SSA countries. Banks are likely to prevent their dominant market share from being eroded by competition from securities markets.

Banking system size, measured as domestic credit provided by the banking sector to GDP, is also a determinant of bond market development. Banks serves as dealers and market makers and their presence is needed for the development of a liquid and functioning bond market. On the other hand, banks and bond markets compete in providing finance, and well-developed banking systems can deprive bonds of market share.

The level of interest rates is measured by interest rate spread (lending rates minus LIBOR). High interest rates tend to have a depressing impact on issuance and bond market development, since few firms can service debts when interest rates are high. Interest rate variability is measured as a standard deviation of interbank interest rates. Where interest rates are variable, investors will have little appetite for long-term fixed-rate notes because there is high risk that the purchasing power of long-term fixed-rate assets will be eroded. Investors' limited appetite for long-term bonds will limit the demand for securitized debt. On the other hand, high interest rate volatility may be an indication of lack of market liquidity, as long as returns are affected by the entrance and exit of a few buyers and sellers. A negative relationship is expected between nominal interest rate volatility and bond market development.

Exchange rate volatility is proxied by a fixed exchange rate dummy and standard deviation of log of exchange rates. In the literature, greater exchange rate flexibility should encourage the development of domestic bond markets. Pegged exchange rates encourage foreign investors to underestimate the risk of lending to banks and corporations, and the resulting foreign competition may slow the development of domestic intermediation.

The vector X_{it} in equation (1) includes the following additional regressors commonly found in the literature discussed below.

The legal system is documented in the literature as a determinant of bond market development. Legal traditions differ in the priority they attach to minority investor protections. British common law systems offer stronger investor protection and are expected to promote financial market development better than French civil law systems. When investor rights are weak, savers prefer to channel their savings through the banking sector rather than bonds because politically connected banks may be able to enforce their claims. On the other hand, weak enforcement of investor rights may also facilitate demand for bonds rather than stock by creditors (Sharma, 2000, Eichengreen and Luengnaruemitchai, 2004).

Resource endowment, which is also a determinant of bond market development, is expected to have a positive relationship with bond market development.

Investment profile is an assessment of the factors affecting the risk to an investment. This is proxied by a risk rating, which is the sum of three subcomponents. The subcomponents are contract viability, profit repatriation and payment delays. Each subcomponent has a maximum score of four and minimum of zero. A score of 4 points to very low risk, while a score of zero points to very high risk. Bond market capitalization is expected to rise as investment risk declines.

Law and order is measured by the International Country Risk Guide's (ICRG) measure of law and order. The law and order indexes are assessed separately on a scale of zero to three for each subcomponent. The law subcomponent is an assessment of the strength and impartiality of the legal system, while order assesses popular observance of the law.

The corruption index is also measured by an index that ranges from zero to six, where a higher score indicates a lower degree of corruption. A high level of corruption that undermines law enforcement will be negatively related to bond market development.

The developmental stage of the economy is measured by GDP per capita. Economic development is expected to have a positive relationship with bond market development. Underdeveloped countries have a volatile investment environment, domination of government in commercial activities, weak creditor rights, lack of transparency and poor corporate governance. These are captured by GDP per capita.

Public sector funding needs is also a determinant of bond market development. The government debt market promotes a class of dynamic and profitable fixed income dealers, and provides a benchmark yield curve for an active and liquid corporate bond market. If government has modest funding requirements, there may be a limited need to develop an active and liquid bond market and little regular issuance to maintain a well-defined yield curve. This is measured by the relationship between private and public sector bond market capitalization.

Bureaucratic quality is a measure of the institutional strength and quality of the bureaucracy. High points are given to countries where their bureaucracy has the strength and expertise to govern without drastic changes in policy or interruptions in government services. Regulatory enforcement measures how clear and consistent regulations are implemented proxied by bureaucratic quality. Bureaucratic quality is expected to have a positive relationship with bond market development.

Fiscal policy, which is expected to be important for bond market development, is measured as a three-year moving average of past budget balances. Other measures in the literature are the public debt as a share of GDP and the past year's budget balance as a percentage of GDP. The three-year moving average of past budget balances measure is preferred because the budget balance in a single year will tend to be dominated by transient factors, while public indebtedness is likely to be a spuriously strong parameter estimate given that the public debt is itself a major component of bond market capitalization (Eichengreen and Luengnaruemitchai, 2004).

The study tested for the importance of the above factors using multivariate regression analysis of annual data from 1990 to 2008. The equation was estimated using generalized least square (GLS) with correction for heteroscedasticity and panel specific autocorrelation. Data were obtained from the *International Financial Statistics* and *World Economic Outlook* databases, the World Bank's *World Economic Indicators* and *African Indicators*, the World Bank's Doing Business, Political Risk Services' International Country Risk Guide, Emerging Market data base, and from AFR's country desks.

B. Empirical Analysis

Table 7 presents the list and correlation coefficients of the explanatory variables.

The empirical analysis is based on the multivariate analysis presented in Table 8.
Table 8 presents the regression results of the importance of historical, structural, financial, developmental, and macroeconomic factors in bond market development in SSA. The first two columns show the effects of structural characteristics of countries on bond market development. Country size (GDPPPP) is positively related to bond market development in SSA. This is consistent with findings in Eichengreen and Luengnaruemitchai, 2004. Openness (Exports to GDP) is negatively related to bond market development. This implies that the lower the level of natural openness, measured by exports to GDP, the lower the level of access to external funding and the greater the development of the local bond market. This is contrary to findings in Rajan and Zingales, 2001 and Eichengreen and Luengnaruemitchai, 2004 on developed and Asian markets.

The English common-law legal tradition is also positively related to bond market development. This is consistent with expectations that English common-law systems offer stronger investor protection than the French civil law tradition, and it is expected to promote financial market development. Overall these results support structural explanations for bond market development in SSA.

Column 3 presents the regression results of the impact of the developmental stage of the economy on bond market development in SSA. This is proxied by the safety of the investment environment (i.e., contract viability, profit repatriation, and payment delays), an index of the reliability of the enforcement of law and order, and per capita GDP as a summary measure of development. While per capita GDP has the expected positive statistically significant parameter estimate, investment risk and rule of law and order enter with negative and statistically insignificant parameter estimates.

Columns 4 and 5 present the regression results of governance and regulation of the corporate and financial sectors. Column 4 shows a negative relationship between corruption and bond market development. This implies that the lower the level of corruption, the larger the domestic bond market. Columns 4 and 5 show a positive relationship between bureaucratic quality and bond market development. This implies that countries ranking higher in bureaucratic quality have a larger bond market. This is interpreted as efficiency and reliability of regulations.

There is also a negative significant relationship between the size of the banking sector and bond market development. Countries with a more developed banking sector rely less on bonds and have a less developed bond market. Banks and bond market intermediation appear to be substitutes rather than complements.

Column 6 considers macroeconomic factors. There is a negative significant relationship between bond market development and both volatility of interest rates and inter-bank rates minus LIBOR. This suggests that higher interest rates and interest rate volatility are associated with a smaller bond market. The parameter estimate of volatility of changes in exchange rates is also negative and statistically significant. Capital controls dummy (where a value of one indicates an open capital account) has a negative and statistically significant parameter estimate. This suggests that controls aid bond market development.[9]

Column 7 shows a negative statistically significant relationship between fiscal balances and bond market development. Stronger fiscal balances measured by a three-year moving average of past budget balances are negatively associated with bond market capitalization.

Column 8 considers the entire range of variables. Structure, investment profile, law and order, the size of the banking sector, and the level of economic development measured by per capita income, all matter for domestic bond market development in SSA. Similarly, macroeconomic factors such as interest rates, exchange rates and the presence or absence of capital controls also matter.

Table 9 presents the results of the robustness checks of the effect of all the explanatory variables on bond market development, as well as a test of the impact of the factors on public debt and private debt.

[9] Two types of IMF binary capital control measures used pointed in the same direction.

Column 1 shows that the confluence of influences of many variables drive the level of development of domestic bond markets in SSA. These include law and order, the level of economic development, the bureaucratic level, the volatility of changes in the exchange rate, capital controls, and fiscal policy.[10]

Column 2 presents the relationship between private debt (debt issued by both nonfinancial corporate firms and financial institutions) and the explanatory variables. The level of economic development measured as the GDP per capita; size of the banking sector measured by domestic credit provided by the banking sector; the volatility of interest rates and volatility of changes in the exchange rate, capital control variables, and fiscal balance explain private debt market issuance in SSA. Governments that run deficits have significantly more public debt, and the public sector deficit encourages private debt issuance. This is because strong fiscal policies create a stable investment environment and create an ample supply of sovereign securities for constructing the yield curve. However, on the negative side, they can crowd out private debt issues (MacCauley and Remolona, 2000; Eichengreen and Luengnaruemitchai, 2004).

Column 3 shows the relationship between public debt and explanatory variables. The developmental stage of the economy measured by the safety of the investment environment such as contract viability, profit repatriation and payment delays; bureaucratic quality; level of interest rates and volatility of changes in exchange rates, capital controls and fiscal balances explain the level of development of the public debt market in SSA. Governments that run deficits have significantly more public debt and the public sector deficit encourages public debt issuance.

In disaggregating private and public debt, the following points need to be made:

- The safety of the investment environment is a matter for public debt market development, but not for private debt market development.
- GDP per capita and size of the banking system matter mainly for the capitalization of private debt markets. This implies that there is a substitution effect between the development of the banking sector and the development of the private debt market. In contrast, both GDP per capita and size of the banking system are not statistically significant for public debt market development.
- Interest rate volatility is important for the private debt market, while the level of interest rates is a strong determinant of public debt.
- Stability of the exchange rates, capital control variables and fiscal balances are statistically significant determinants of private and public debt markets.

[10] SSA governments have tended to run deficits, with a few years of prominent exceptional surpluses (Botswana, for most years; Nigeria, 2004 to 2008; South Africa, 2006 and 2007; Cote d'Ivoire, 2004 to 2006 and 2008).

- The impact of capital controls is more pronounced on the volume of public debt. Governments that liberalized their capital account have better access to finance due to credibility effects and by selling debt to foreigners.

VII. Conclusions, Recommendations, and Policy Implications

This study empirically analyzes the determinants of bond market development in a cross-section of 23 SSA countries between 1990 and 2008. It answers the following questions: What drives bond market development in SSA? Is the government debt market crowding out the corporate debt market in SSA? The study considers the stage of development and the size of the bond market, and also the historical, structural, institutional, and macroeconomic determinants of bond market development in SSA countries.

The study finds that the savings constraint is a key impediment to financial market deepening and development of the domestic bond market. Low savings result in a low level of financial intermediation by banks. On average across countries, an expansion in domestic debt has a crowding-out effect on private debt.

Overall, the results show that a confluence of many variables drives the level of development of the domestic bond market in SSA, and that no single class of variables is wholly responsible for the underdevelopment of the domestic bond market. Structure, investment profile, law and order, size of the banking sector, and level of economic development measured by per capita income all matter for domestic bond market development in SSA. Similarly, macroeconomic factors such as interest rates, exchange rates, the presence or absence of capital controls, and fiscal balances also matter.

In disaggregating private and public debt, the variables have differing effects on private and public debt market development. The level of economic development measured as GDP per capita, the size of the banking sector measured by domestic credit provided by the banking sector, the volatility of interest rates and of changes in the exchange rate, capital controls, and the fiscal balance explain private debt market issuance in SSA.

The factors that explain the level of development of the public debt market in SSA are the developmental stage of the economy measured by the safety of the investment environment, such as: contract viability, profit repatriation, and payment delays; bureaucratic quality; level of interest rates and volatility of changes in exchange rates, capital controls, and fiscal balances.

The following recommendations arise from the findings:

- **A regional approach to bond market development should be considered.** Structural factors, such as the size of the economy, its openness, and the origin of its legal system may be difficult to change. However, other factors such as the small size may be overcome through a regional approach to domestic bond market development.

- **The investment environment should be improved.** Greater efforts and increased funding would strengthen the safety of the investment environment to ensure contract viability, ease of profit repatriation and minimization of payment delays, and reliability of enforcement of law and order. These improvements will raise the level of economic development and ultimately bond market development.

- **Competition should be encouraged.** SSA countries can also accelerate the development of their bond market by encouraging competition in financial intermediation and a reduction in their bureaucratic practices.

- **Governments should implement appropriate macroeconomic policies.** The level and volatility of interest rates, the volatility of changes in the exchange rate, and capital controls are important in domestic bond market development.

While these recommendations are designed to promote development of bond markets in SSA, care must be taken. For example, capital account liberalization prior to domestic market development offers risks as well as rewards. In addition, governments seeking bond market development need to adhere to international standards by securities issuing firms and encourage growth and competition in banking so as to minimize the substitutability of banks and bond market intermediation, and promote complementarity between the banking system and bond market development.

The authorities will also need to follow stable macroeconomic policies to make it attractive to hold domestic currency denominated debt instruments and thereby develop a deep and liquid domestic debt market.

Appendix I. Statistical Data

Table 7. Sub-Saharan Africa: Overall Savings and Investment Balances, 1991–08

(In percent of GDP)

	Public Sector				Private Sector			
	2008		Average		2008		Average	
Countries	Savings	Investment	Savings	Investment	Savings	Investmen	Savings	Investment
Angola	23.2	10.8	19.1	9.1	10.6	1.9	9.2	2.7
Benin	4.6	4.7	5.2	5.3	7.8	16.0	7.2	13.9
Botswana	10.7	10.6	11.1	9.7	40.2	30.3	32.8	23.7
Burkina Faso	5.7	6.4	4.5	7.6	1.4	11.7	5.5	11.4
Burundi	0.3	10.5	-0.9	7.1	8.4	9.2	5.3	4.8
Cameroon	6.1	4.2	2.7	2.4	13.3	14.9	12.2	15.4
Cape Verde	13.0	6.8	6.7	5.4	17.8	36.2	21.4	33.6
Central African Republic	2.9	4.5	5.3	5.0	0.1	7.1	0.4	4.9
Chad	14.4	7.5	6.5	7.8	-11.0	8.2	-0.5	15.7
Comoros	1.0	9.3	2.4	6.2	3.2	4.2	5.0	5.2
Congo, Democratic Republic of	7.3	3.7	5.6	2.7	-0.8	18.2	3.8	12.6
Congo, Republic of	36.0	9.4	13.3	7.6	-20.8	12.5	3.5	18.0
Côte d'Ivoire	2.6	3.0	1.1	3.7	9.9	7.1	9.3	7.6
Djibouti	2.3	15.9	-0.4	8.3	5.2	30.8	12.4	12.6
Equatorial Guinea	32.1	16.8	29.6	13.7	4.4	9.9	5.4	25.5
Eritrea	-3.1	9.1	-4.8	15.6	11.3	1.7	23.1	4.9
Ethiopia	6.6	6.1	6.0	8.4	11.3	15.7	10.5	11.9
Gabon	17.5	4.5	9.6	5.2	23.9	19.6	26.3	19.2
Gambia, The	-9.9	9.3	-3.5	8.8	7.4	5.2	10.1	7.9
Ghana	3.7	15.6	5.6	11.5	12.7	19.0	13.7	17.1
Guinea	4.1	2.4	2.3	3.7	1.5	14.8	9.9	14.5
Guinea-Bissau	-10.0	12.0	-8.4	13.2	20.1	12.8	17.2	19.5
Honduras		5.1	2.7	5.4		28.8		24.4
Kenya	4.9	3.0	8.6	4.3	4.6	13.2	11.9	11.1
Lesotho	8.1	11.0	9.2	11.2	17.1	17.4	15.8	25.6
Madagascar	7.2	9.5	-2.5	8.5	3.5	25.7	2.7	13.8
Malawi	-4.6	8.5	3.3	9.1	24.8	18.0	17.2	12.2
Mali	3.3	5.3	1.1	7.3	9.0	15.1	11.9	14.8
Mauritania	-4.7	12.2	-0.2	18.6	10.4	8.8	20.0	9.6
Mauritius	2.0	5.0	4.6	7.4	19.1	24.8	23.6	18.4
Niger	11.6	6.7	14.2	6.4	2.3	19.8	4.1	9.9
Nigeria	12.3	6.4	6.5	8.0	16.9	18.3	13.9	15.9
Rwanda	11.4	10.2	7.2	8.0	4.0	12.5	7.5	11.4
Senegal	5.5	10.0	2.4	8.0	12.4	20.2	8.0	14.4
South Africa	3.5	3.7	1.7	2.8	11.9	18.4	13.0	15.4
Sudan	1.7	6.6	7.6	5.1	11.8	16.2	9.8	16.9
Swaziland	9.2	9.3	1.7	7.3	1.8	8.0	8.0	10.4
Tanzania	0.0	10.9	-0.3	6.9	21.4	20.9	14.4	16.3
Togo	2.5	3.5	3.3	2.6	3.2	8.9	7.2	9.2
Uganda	3.3	5.5	2.9	5.2	17.0	18.1	13.1	15.1
Zambia	1.2	3.7	11.7	6.5	15.0	19.9	11.2	16.2
Zimbabwe	23.4	23.6		11.8	-1.2	0.0	-0.6	0.0
Average	8.3	12.2	5.8	8.1	9.8	15.1	11.0	14.5
Minimum	-10.0	2.4	-8.4	2.4	-20.8	0.0	-0.6	0.0
Maximum	36.0	23.6	29.6	18.6	40.2	36.2	26.3	33.6
Median	4.6	7.2	4.5	7.4	9.9	15.4	10.1	14.1

Sources: *International Financial Statistics, World Economic Outlook,* authors' calculations.

Table 8. Sub-Saharan Africa: Current Account Balances, 1991–08

(In percent of GDP)

Countries	2008	1991–08
Angola	21.2	-2.1
Benin	-8.3	-6.2
Botswana	7.0	8.8
Burkina Faso	-11.0	-8.1
Burundi	-11.1	-5.7
Cameroon	0.4	-2.4
Cape Verde	-12.3	-9.3
Central African Republic	-8.6	-4.5
Chad	-11.4	-18.2
Comoros	-9.2	-8.1
Congo, Democratic Republic of	-15.4	-4.6
Congo, Republic of	-6.8	-10.5
Côte d'Ivoire	2.4	-2.7
Djibouti	-39.2	-7.0
Equatorial Guinea	9.8	-26.5
Eritrea	-2.7	-2.0
Ethiopia	-5.8	-3.1
Gabon	17.3	8.9
Gambia, The	-17.1	-6.8
Ghana	-18.2	-6.9
Guinea	-10.3	-5.5
Guinea-Bissau	-2.0	-10.1
Kenya	-6.7	-1.8
Lesotho	-3.2	-19.4
Liberia	-26.3	-21.9
Madagascar	-24.4	-8.5
Malawi	-6.3	-8.4
Mali	-8.2	-5.3
Mauritania	-15.7	-9.3
Mauritius	-8.7	-1.7
Mozambique	-12.6	-16.1
Namibia	2.3	4.5
Niger	-12.6	-6.8
Nigeria	4.5	-0.2
Rwanda	-7.2	-6.6
São Tomé and Príncipe	-32.8	-21.3
Senegal	-12.3	-6.7
Seychelles	-32.1	-11.2
Sierra Leone	-8.4	-4.7
South Africa	-7.4	-1.7
Sudan	-9.3	-18.8
Swaziland	-6.4	-1.7
Tanzania	-9.7	-6.7
Togo	-6.6	-5.4
Uganda	-3.2	-4.8
Zambia	-7.4	-8.2
Zimbabwe		-3.7
Average	-1.9	-2.1
Minimum	-39.2	-26.5
Maximum	21.2	8.9
Median	-8.3	-6.6

Sources: *International Financial Statistics, World Economic Outlook,* authors' calculations.

Table 9. Sub-Saharan Africa: Regression Results

(In percent of GDP)

	Panel Estimation Fixed Effects		Panel Estimation Random Effects			
	Private Sector Credit	Constant	Private Sector Credit	Constant	Hausman	Observations
1990-2008	-0.311	0.539	-0.204	0.497	2.24	
	(2.28)**	(9.01)*	(1.76)***	(6.91)*	(0.135)	215
1990-2000	-0.428	0.611	-0.253	0.54	2.55	
	(2.39)**	(6.94)*	(1.78)*	(6.16)*	(0.11)	
2001-2008	-0.131	0.392	-0.206	0.428	1.17	
	(3.41)*	(5.95)*	(-1.64)	(5.50)*	(0.28)	
2003-2008	-0.096	0.31	-0.153	0.379	2.37	
	(3.79)*	(-0.06)	(-1.05)	(4.22)*	(0.124)	

Source: Authors' Computation using Stata version 10.

Note: Absolute value of z-statistics in parentheses.

*, **, and *** represent significance at 1 percent, 5 percent and 10 percent, respectively.

Table 10. Sub-Saharan Africa: Correlation of Explanatory Variables

	GDP, PPP	Exports to GDP (%)	Dummy for English Legal Origin	Investment Profile	Law and Order	GDP per Capita, PPP	Corruption	Bank Credit	Bureaucracy Quality	Interest Rate Volatility	Interest Rate Spread	Exchange Rate Volatility	Budget Balance 3-Year Moving Average
GDP,PPP	1												
Exports to GDP (%)	0.4414	1											
Dummy for English legal origin	-0.2061	0.2079	1										
Investment profile	0.163	0.2476	0.4914	1									
Law and order	0.2402	0.4677	0.4481	0.3029	1								
GDP per capita, PPP	0.2917	-0.106	0.0452	0.0748	-0.1211	1							
Corruption	0.1178	-0.1246	0.3375	0.5062	0.3308	0.2017	1						
Bank credit	-0.0925	0.2287	0.0170	-0.1989	-0.2602	0.1249	-0.2217	1					
Bureaucracy quality	0.0459	0.2401	0.6327	0.4063	0.0809	0.0366	-0.032	0.0911	1				
Interest Rate Volatility	-0.0784	-0.0575	-0.2307	-0.5179	-0.0868	-0.0957	-0.4067	0.1901	0.1082	1			
Interest Rate Spread	-0.1693	-0.0932	-0.2726	-0.5694	-0.0913	-0.163	-0.4659	0.1495	0.0438	0.9507	1		
Exchange Rate volatility	-0.0087	0.1876	0.4224	0.3753	0.3144	0.0084	0.2443	0.1012	0.304	-0.1128	-0.1639	1	
Budget Balance 3-Year Moving Average	-0.0519	-0.2111	-0.2818	0.0082	-0.0927	0.1906	0.229	-0.016	-0.2342	0.185	0.1702	-0.1173	1

Source: Authors' computation using Stata version 10.

Table 11. Sub-Saharan Africa: Multivariate Analysis

	1	2	3	4	5	6	7	8
GDP,PPP (current international billion $)	0.0545	0.005						-0.0504
	(3.44)*	(3.17)*						(1.140)
Exports to GDP (%)	-4.663	-4.483						-0.458
	(3.54)*	(3.42)*						(0.020)
Dummy for English legal origin		14.99						
		(1.99)***						
Investment profile			-22.41					0.0116
			(-0.750)					(1.67)***
Law and order			5.752					-0.035
			(0.110)					(4.76)*
GDP per capita, PPP (current international $)			0.0873					-0.0002
			(2.55)**					(4.42)*
Corruption					-8.000			-0.0007
					2.42**			(-0.080)
Domestic credit provided by banking sector (% of GDP)				-0.0847	-0.904			43.370
				(2.73)*	(2.96)*			(5.20)*
					129.987			
Bureaucracy quality				92.37				-0.0008
				(2.40)**	(3.18)*			(-0.020)
Standard deviation of inter-bank interest rates						-0.0058		0.0046
						(1.92)***		(5.09)*
Interest Rate Spread (Inter-bank minus LIBOR)						0.0213		-0.0067
						(1.87)***		(-1.440)
Standard deviation of change in log of exchange rates						-0.060		-0.0583
						(1.98)**		(-0.850)
IMF Capital Controls Dummy variable						-0.059		-0.0859
						(1.98)*		(3.24)*
Fiscal Balance (% of GDP) 3-Year Moving Average							-19.206	
							(3.59)*	
Constant	56.209	-49.928	150.65	36.77	17.84	0.292	91.29	0.151
	(1.190)	(-0.630)	(0.770)	(0.460)	(1.82)***	(7.28)*	(2.73)*	(3.18)*
Observations	153	153	153	168	168	93	173	173
Number	18	18	18	18	18	17	18	18

Source: Authors' Computation using Stata version 10.

Notes: Absolute value of z-statistics in parentheses.

*, **, and *** represent significance at 1 percent, 5 percent and 10 percent, respectively.

Table 12. Sub-Saharan Africa: Sensitivity Analysis

	1	2	3
	Total	Private	Public
GDP,PPP (current international billion $)	-0.0138	0.3978	0.00087
	(-0.17)	(0.02)	(0.55)
Exports to GDP (%)	0.00012	50.41	-0.0102
	(0.28)	(0.04)	(-0.11)
Dummy for English legal origin			
Investment profile	-0.0157	-0.624	9.7604
	(-1.2)	(-0.18)	(2.25)**
Law and order	-0.0379	-0.992	-1.061
	(2.44)**	(-0.21)	(-0.29)
GDP per capita, PPP (current international $)	0.00023	-48.713	0.0023
	(2.38)**	(3.86)*	(0.77)
Corruption	-0.0112	23.923	2.8485
	(-1.43)	(0.83)	(0.61)
Domestic credit provided by banking sector (% of GDP)	-92.182	0.00517	-0.176
	(-0.71)	(2.21)**	(-0.5)
Bureaucracy quality	0.2404	-15.766	-37.82
	(2.82)*	(-0.8)	(3.51)*
Standard deviation of inter-bank interest rates	-0.0011	-66.31	-0.1112
	(-0.48)	(2.21)**	(-0.4)
Interest Rate Spread (Inter-bank minus LIBOR)	-0.0066	72.73	-2.2598
	(-0.98)	(0.59)	(1.88)***
Standard deviation of change in log of exchange rates	-0.345	44.391	49.369
	(3.78)*	(2.26)**	(1.66)***
IMF Capital Controls Dummy variable	0.29823	17.853	238.82
	(5.78)*	(2.41)**	(3.87)*
Fiscal Balance (% of GDP) 3-Year Moving Average	-0.0079	13.136	1.449
	(3.11)*	(2.05)**	(1.73)***
Constant	0.2204	34.53	-34.92
	(2.91)*	(1.932)***	(-0.88)
Observations	173	38	44
Number	18	7	7

Source: Authors' Computation using Stata version 10.

Notes: Absolute value of z-statistics in parentheses.

*, **, and *** represent significance at 1 percent, 5 percent and 10 percent, respectively.

REFERENCES

Abba, S. and J. Christensen, 2007, "The Role of Domestic Debt Markets in Economic Growth: An Empirical Investigation for Low-income Countries and Emerging Markets," IMF Working Paper 07/127 (Washington: International Monetary Fund).

Adelegan, O.J, 2008, "Can a Regional Approach Accelerate Stock Market Development? Empirical Evidence from Sub-Saharan Africa," IMF Working Paper 08/281 (Washington: International Monetary Fund).

Agca, S G. De Nicolo and E. Detragiache, 2007, "Financial Reforms, Financial Openness, and Corporate Borrowing: International Evidence," IMF Working Paper 07/186 (Washington: International Monetary Fund).

Bank for International Settlements, 2002, The Development of Bond Market in Emerging Economies, BIS Papers No. 11 (Switzerland, Bank for International Settlements).

Christensen, J.E., 2004, "Domestic Debt Market in Sub-Saharan Africa," IMF Working Paper 04/46 (Washington: International Monetary Fund).

Demirguc-Kunt, A., T. Beck, and P. Honohan, 2008, *Finance for All? Policies and Pitfalls in Expanding Access*, A World Bank Policy Research Report, (Washington: The World Bank).

Eichengreen, B and P. Luengnaruemitchai, 2006, "Bond Markets as Conduits for Capital Flows: How Does Asia Compare?" IMF Working Paper 06/238 (Washington: International Monetary Fund).

Eichengreen, B and P. Luengnaruemitchai, 2004, "Why Doesn't Asia have Bigger Bond Market?" NBER Working Paper No. 10576 (Cambridge, Massachusetts: National Bureau of Economic Research).

Freire, M, J. Peterson, M. Huertas, and M. Valdez, 2004, Sub National Capital Markets in Developing Countries From Theory to Practice, The World Bank and Oxford University Press.

Harrabi, S, L. Bousrih, and M. Salisu, 2007, "Debt Relief and Credit to the Private Sector in *African Countries,"* African Development Bank, Blackwell Publishing Ltd., pp. 469–480.

Jeanne, O and A. Guscina, 2006, "Government Debt in Emerging Market Countries: A New Data Set," IMF Working Paper 06/98 (Washington: International Monetary Fund).

McCauley, R and E. Remolona, 2000, "Size and Liquidity in Government Bond Markets," *BIS Quarterly Review* (December), pp. 89–98.

Shah, H., A. Jobst, L. Valderrama-Ferrando, and I. Guerra, 2007, "Public Debt Markets in Central America, Panama, and the Dominican Republic," IMF Working Paper 07/147 (Washington: International Monetary Fund).

Sy, A, 2007, "Local Currency Debt Markets in the West African Economic and Monetary Union," IMF Working Paper 07/256 (Washington: International Monetary Fund).

Szilagyi, P.G and J.A. Batten, 2003, Disintermediation and Bond Market Development in Japan, in Choi, J and T. Hiraki ed. 'The Japanese Finance: Corporate Finance and Capital Markets in Changing Japan, Elsevier.

The World Bank and The IMF, 2001, *Developing Government Bond Market* (Washington: The World Bank and International Monetary Fund).