Bond finance: a growing source of funds for utility and infrastructure companies?

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Abstract

The reform of the infrastructure and utility service industries that has seen liberalization and increased private sector participation can be expected to have led to an increased usage of external finance. One of the key markets that should have become available for these operators is that of the international bond market.

Using a database of infrastructure and utility bond issues made over the period 1996 to 2001, the authors investigate whether there has been a growing usage of the international bond market. While the raw data would suggest that the expectation of greater usage is borne out, a more detailed investigation shows that the story is more complex. Much of the increased usage, especially in the telecommunications industry, is made by companies that have been accessing the markets for longer than the period covered by this sample and that while new companies are gaining access to the market their issuance is small.

An increasing usage of the international bond markets provides useful information for regulatory agencies. When determining allowed revenues, the return on capital is a key input. Within the return on capital, the cost of debt is normally measured as a margin on bonds. The dataset shows that there is an increasing pool of potential comparator companies that can be used to determine these margins. However, the analysis of this data provided in the paper also shows that great care needs to be taken when choosing comparators, many factors have an impact with respect to the determination of the margin and these need to be correctly controlled.

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Any views expressed in this paper are those of the authors and should not be ascribed to their employer.

Introduction

One of the common arguments put forward for increased private participation in infrastructure is the fact that private involvement will allow greater access to external financing. So, as greater private sector participation occurs in the utility and infrastructure sectors, are companies increasingly gaining greater access to alternative sources of finance?[1] An important benchmark source of finance is that of the international bond markets, used by many other markets to provide basic pricing information.[2] In tandem with the growth of private participation in infrastructure, there has been an increasing interest in the operation, and pricing, of the international bond markets by governments, regulators, and operators of utility and infrastructure companies.

Apart from information on the trends in usage of the international bond markets, this paper also provides some initial analysis on subsets of the data. In particular two issues are investigated.

1 Why is there an apparent growth, to the point of dominance, for the telecommunications sector during the period 1996 to 2001?
2 What lessons can be learned about the pricing of bonds, in terms of the risk margin paid to investors in the electricity sector?

From a regulatory perspective this information on margins can be extremely important when determining the allowed forecast cost of debt at price reviews (Green and Pardina 1999; Alexander 1995).

The two questions addressed here provide good examples of the type of research that can be undertaken with this type of dataset. Although there has been a significant amount of academic research into the pricing of bonds, this has tended to be focused on US data and refers to issues by all companies. Some

[1] A measure of the increasing role of private sector participation in these sectors is provided by information published by the World Bank (Roger 1999).

[2] In many countries, especially developing and transitional ones, domestic bond markets are small, illiquid and only open to the government for issuance. The international bond markets, centred around the Eurobond markets, have grown up as a response to this, offering a larger pool of investors and simplified issuance procedures (including basic requirements for listing, etc.).

work in the early 1990s by firms such as OXERA analysed UK utility issues relative to others to establish whether there were specific issues regarding pricing for infrastructure and utility bonds—one thing found was a utility discount. Yet, more general research on non-US infrastructure and utility company bond issues has not been forthcoming.

Detailed analysis of the database on some specific issues is under way and results will be presented at a later date. However, to facilitate greater usage of the database by researchers and practitioners a copy will be made available for downloading from the SAFIR (South Asian Forum for Infrastructure Regulation) web site <www.safir.teri.res.in> from early July 2002.[3] What this paper does not try to do is to address the questions of

- whether greater access to all debt markets occurred, for example, the syndicated credit market and bank financing are extremely important debt markets; and
- whether bond financing was being used to replace other forms of external debt finance.

Both are important issues but they require different information from that contained in this dataset. An investigation of the first issue would help deepen the analysis on the question of whether there was an increasing access to external debt markets, rather than just the international bond markets. The second issue is one that could provide insights into debt structure and corporate decisions on the optimal choice of debt instruments; it is linked to some questions regarding the structure of bond issues highlighted in the paper as requiring further analysis. As such, these are areas that require further research. Further, for the issue of allowed debt margins in regulatory pricing decisions the choice of form of external debt does not matter; the international bond market provides the basic pricing system that all other external debt markets then incorporate. This paper comprises the following sections.

- The dataset
- The spread of bond financing: information on international bond issues
- Analysis of the evidence

[3] Basic conditions of usage will be posted on the web site. Copyright of this version of the database has been vested with TERI on behalf of Ian Alexander and SAFIR and appropriate acknowledgement will be required.

- The dominance of telecommunications
- Margin information from the electricity sector
- Summary.

The dataset

Information on bond issues by utility and infrastructure companies has been collected from newspaper sources (such as the *Financial Times*, which publishes a summary of the previous week's international bond issues each Monday) from 1996.[4] This dataset covers the following sectors.

- Energy (electricity and gas)
- Telecommunications
- Transport (rail, ports, roads, and airports)
- Water and sewerage.

All traded international bond issues, primarily Eurobonds, are captured by these publications. These include bonds issued in niche markets such as index-linked and zero coupon bonds but do not include private placements since they are not traded on a market. For each bond issued, the following published information is collected.

- The currency of the bond
- The total value of the issue (including any expansion of the bond at a later date)
- The date of redemption (so that the maturity of the bond can be calculated)
- The coupon (interest rate) of the bond
- The price of the bond
- The yield to maturity of the bond (a return measure that captures both the interest rate and the price/capital gain)
- The margin of the yield to maturity over an appropriate government security.

This information is only collected at issue; no attempt to track the bond is made.[5]

[4] Every effort has been made to ensure that this database is complete but some bonds are bound to have been missed.

[5] If information on how the bond performs is desired that is available from commercially available sources and the bond database allows you to determine what bonds you might wish to track.

The spread of bond financing: information on international bond issues

A summary of the whole database is provided in Table 1. As can be seen, it encompasses almost 850 bond issues worth in total over Stg 340 billion.[6]

As can be seen from Table 1, while electricity began as the most important sector it was quickly replaced by telecommunications. Further, all sectors experienced growth but it was most marked in the electricity and telecommunications sectors—possibly reflecting the greater speed of liberalization seen in those sectors relative to the other utility and infrastructure sectors. Part of this growth, especially in 1999 and 2000, may have been linked to the opening of a new market – the Euro denominated bond market. This is explored in more detail below.

It is possible to undertake a similar assessment of the bonds issued by companies operating outside North America, Western Europe, Australasia, and Japan. This information is summarized in Table 2.

As can be seen from Table 2, there has been a significant increase in the number of bonds being issued in most of the sectors, although electricity has fallen and no activity has been seen in the water sector.

Table 1 Summary of the bond issues covered by the database

Bond issues	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*
Value of bonds issued (Stg million)						
Electricity	5752.2	8154.1	9887.6	13782.0	6723.8	23554.1
Telecommunications	3243.9	3661.3	18694.3	43751.0	53185.8	89582.1
Gas	283.1	460.5	929.2	6173.8	3077.4	1990.0
Transport	3529.7	3485.7	2968.6	12614.4	3346.1	6474.9
Water	750.0	60.27	1230.0	6095.8	2010.6	6624.6
Total	13558.9	15821.8	33709.7	82416.9	68343.6	128225.6
Number of bonds issued						
Electricity	30	38	30	49	27	59
Telecommunications	16	17	47	87	88	103
Gas	4	4	5	16	6	9
Transport	33	29	16	38	11	30
Water	4	1	6	11	7	25
Total	87	89	104	201	139	226

[6] This number must be treated as approximate. The values presented here have not been adjusted for inflation and, as such, are an understatement of the total issued.

Table 2 Summary of bond issues by companies operating in the 'Rest of the World'

Bond issues	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*
Value of bonds issued (Stg million)						
Electricity	1086.9	1660.5	224.9	637.7	875.5	1588.4
Telecommunications	188.0	410.6	734.0	2572.4	2768.9	6502.5
Gas	0	36.2	0	877.9	132.2	436.6
Transport	31.3	90.4	222.9	874.5	708.9	426.1
Water	0	0	0	0	0	0
Total	1306.1	2197.7	1181.8	4962.6	4485.5	8953.6
Number of bonds issued						
Electricity	10	9	2	3	5	7
Telecommunications	2	3	4	11	6	12
Gas	0	1	0	6	2	2
Transport	1	1	1	4	2	5
Water	0	0	0	0	0	0
Total	13	14	7	24	15	26

When issuing bonds, companies have a choice between those with fixed coupons and those where the coupon is based on a margin above an underlying general interest rate (referred to as variable bonds since the total value of the coupon varies as the underlying interest rate moves). Table 3a summarizes the split of bonds in this database between variable and fixed rate bonds.

From this table, it would appear that although the average size of issue between fixed and variable bonds is similar, there are some discrepancies in some of the sectors. For example, the average size of variable gas bonds is over Stg 1 billion while fixed rate bonds are closer to Stg 200 million. Conversely, fixed bonds

Table 3a Types of bonds issued (all countries)

	Variable rate bonds			*Fixed rate bonds*		
Sector	*Number*	*Value*	*Average*	*Number*	*Value*	*Average*
Electricity	14	3802.7	271.6	219	64051.0	292.5
Telecommunications	50	32192.4	643.9	308	179925.9	584.2
Gas	4	4595.7	1148.9	40	8318.3	208.0
Transport	24	2501.7	104.2	133	29917.6	225.0
Water	12	1665.4	138.8	42	15105.8	359.7
Total	104	44757.9	430.4	742	297318.6	400.7

Table 3b Types of bonds issued (North America, Western Europe, Australasia and Japan)

	Variable rate bonds			*Fixed rate bonds*		
Sector	*Number*	*Value*	*Average*	*Number*	*Value*	*Average*
Electricity	12	3503.7	292.0	185	58276.1	315.0
Telecommunications	48	31942.4	665.5	272	166999.6	614.0
Gas	4	4595.7	1148.9	29	6835.5	235.7
Transport	20	2160.7	108.0	123	27904.4	226.9
Water	12	1665.4	138.8	42	15105.8	359.7

Table 3c Types of bonds issued (Rest of the World)

	Variable rate bonds			*Fixed rate bonds*		
Sector	*Number*	*Value*	*Average*	*Number*	*Value*	*Average*
Electricity	2	299	149.5	34	5774.9	169.8
Telecommunications	2	250	125.0	36	12926.3	359.1
Gas	0	0	0	11	1482.8	134.8
Transport	4	341	85.3	10	2013.2	201.3
Water	0	0	0	0	0	0

appear to have larger average size for the transport and water sectors. To ensure that this discrepancy is not caused by the geographic mix of issues caught in the general dataset, Tables 3b and 3c repeat the analysis but for specific geographic areas.

A first observation that can be made is that variable rate bonds seem to be less popular as a source of finance among emerging market companies, especially in the telecommunications sector. However, the other basic stories remain the same, when just North American, Western European, Australasian, and Japanese companies are considered. The small size of the sample for emerging market companies makes drawing conclusions difficult, but on the whole the evidence there supports the more general evidence.

Why does this difference in the average size of issue arise? Further research focusing on these specific sectors and the reasons for the bond issues is required before answers can be postulated.

Table 4 Average maturity of bonds issued (all bonds)

Sector	*All bonds*	*North America, Western Europe, Australasia, and Japan*	*Rest of the world*
Electricity	10.0	9.9	10.1
Telecommunications	8.5	8.5	7.5
Gas	8.3	8.5	7.5
Transport	11.2	11.4	9.6
Water	14.4	14.4	0

Much of the analysis that can be done with bond information utilizes the fixed rate bonds. Another aspect, which is of interest, is the average maturity of the bonds issued. This is summarized in Table 4.

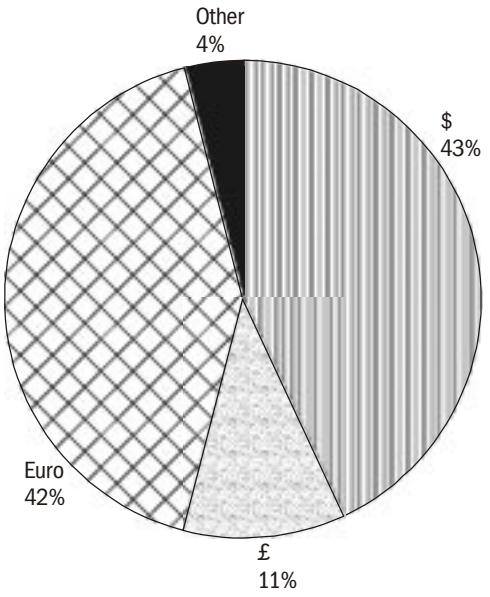
Much of the table conforms to what you would expect, bonds issued by companies in North America, Western Europe, Australasia, and Japan have a longer average maturity than bonds issued by companies operating in the rest of the world. Interestingly, this does not hold true for the electricity sector where there is a slightly longer average maturity.

A final characteristic that should be considered is the currency of issue. Table 5 provides an annual breakdown of issues by the four major currencies, or groupings of currencies.

Table 5 Annual issuance by major currency, value, and number

Annual Issuance	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*
Issuance by value						
Dollar	4877	9490	17572	22468	36270	58153
Sterling	3493	2320	4880	10046	3040	13537
Euro[a]	4024	1923	9911	48453	26056	52811
Other	1166	2088	1346	1449	2977	3725
Issuance by number						
Dollar	28	43	39	61	53	68
Sterling	24	15	22	29	11	55
Euro[a]	18	19	31	97	65	86
Other	17	12	12	14	10	17

[a] This includes issues in individual Euro member currencies prior to 1999.



Note [1]Sterling equivalent values
Figure 1 Total bonds issued by major currency (1996 to 2001)[1]

Figure 1 then provides an overview across the whole time period. As was mentioned earlier, the Euro denominated issues show a vast increase in activity in 1999, the first full year that Euro issues were possible. The issues in currencies that combined to make the Euro are aggregated to provide the comparative data for 1996 to 1998.

Why the explosion in Euro denominated issues? Several reasons can be proposed.

- The emergence of a new market meant firms needed to establish a presence in that market with benchmark issues.
- The new market was more liquid than the previous fragmented single currency markets and so attracted more activity.
- Demand had become pent-up with companies waiting for the new market to come into existence prior to issuing bonds.

It is likely that a mixture of reasons explain this burst of activity. Overall, the evidence would seem to suggest that there has been an expansion of the use of the international bond markets by infrastructure and utility companies over the short period covered by this sample. Clearly, a longer review period would help determine the validity of this evidence, especially given the

turbulence of the markets during some of the years covered by this sample.

A spread in usage?

Has there been greater access to the international bond markets over the past six years? Tables 1 and 2 would suggest that there has been an increasing usage of the bond market for financing, although this has been dominated by the telecommunications sector. But, this growth in usage may reflect many different factors.

In this section, we investigate the 'depth' and 'breadth' of the increase in usage of bond financing. The following section then investigates some of the issues specific to telecommunications.

In the 1980s and early 1990s, the international bond market was perceived as a source of funding for only the 'blue-chip' household name companies. This limited the number of firms accessing this source of funding to a small number of companies. This was confirmed by the work of Mayer and Davis in the late 1980s/early 1990s on a Bank of England database on bond and syndicated credit issues. However, access to this market started to expand as more general financial reform was seen around the world.

For the sample of utility and infrastructure companies captured in the database there are several measures that can be used to consider the greater access to the market. Accessing the international bond market may have become less onerous in terms of financial track record – implying a fall in transaction costs. If this is the case, you would expect to see (1) an increasing number of companies coming to the market rather than just the same companies issuing more bonds and (2) the fall in transaction costs making access to the market viable for companies looking to raise smaller amounts of money.

First, we can consider the profile of issues being made in any one year. Table 6 summarizes the information from the database. It can be seen from Table 6 that the minimum size of issue was falling (noting that these numbers represent nominal values and so the decline would be even more marked where real values are considered). This might be taken to suggest that the transaction costs of issuing small bonds were falling sufficiently to make this a viable source of funding. Further, in three of the six years, the company issuing the smallest bond was from a developing or

Table 6 Information on size of bond issues (Stg million)

Year	*Average size of issue*	*Minimum size of issue*[1]	*Maximum size of issue*	*Number of issues*[2] *under 100 million*
1996	156	31	1059	40
1997	178	19	1014	34
1998	324	13	1924	22
1999	410	11	6254	28
2000	492	30	2463	12
2001	567	26	3152	22

[1] Every care has been taken to ensure that these are stand-alone issues rather than additions to existing issues.
[2] In 1996 and 1997, the largest issues were made by electricity companies; in all other years, telecommunications companies issued the largest bonds.

transitional country – India (1996), South Africa (1997), and Lithuania (2001) – not just an established company accessing a niche part of the market.[7]

The database can also be used to determine (1) how often a company accessed the bond market over the period 1996 to 2001 and (2) the first year of the sample that a company issued a bond.

The first point, relating to repeated issuance of bonds, can help identify whether the growth in usage of the international bond market was just a deepening of access by existing issuers or a real growth in access by new issuers. Table 7 provides some information on the frequency of issue while Table 8 provides information on the first year of the sample in which companies accessed the market.

From Table 7, it can be seen that in total 276 utility and infrastructure companies accessed the international bond market over the period 1996 to 2001. As noted above, they issued almost 850 bonds over this period, suggesting that on average each company issued more than two bonds. However, as the

[7] A good example of the type of niche issues that occur can be seen in the usage of the sterling denominated part of the market for long-dated issues compared to issues made in other currencies (playing to the UK's insurance and pension fund investors seeking 20 year plus investments).

Table 7 Measures of access to the market

Measure	Total sample	Sector					Geographic	
		Electricity	Telecom	Gas	Transport	Water	North America, Western Europe, Australasia, and Japan	Rest of the world
Number of bonds issued by each company								
1	127	46	42	7	26	6	93	34
Between 1 and 5	107	32	42	6	18	9	90	17
Between 5 and 10	34	9	16	2	5	2	31	3
More than 10	8	1	4	0	2	1	8	0
Number of years in which companies issue bonds								
1	177	62	65	9	33	8	138	39
2	48	10	19	5	9	5	38	10
3	28	8	10	1	5	4	25	3
4 or more	23	8	10	0	4	1	21	2

table illustrates, this access to the market was not uniformly distributed. For example,

- over 45% of companies only issued one bond over this period (a proportion that rises to over 60% for the emerging market companies);
- about 15% of companies issued more than five bonds (falling to about 5% of emerging market companies); and
- the sectoral balance was mostly consistent with the average across all sectors.

Something that requires further investigation is the fact that 50 of the companies that made multiple bond issues made all those issues in one year. It is not unusual to see a company issuing more than one bond at a time where it

- issues bonds in a mixture of maturities in the same currency;
- issues bonds in a mixture of currencies; or
- issues bonds in a mixture of maturities and currencies.

This suggests that for up to 65% of companies issuing bonds over this period it was a single point in time when they issued (so almost 20% of the companies may have issued more than one bond at the same time). This is again more marked for the

Table 8 The increasing use of bond finance

	Number of companies that first issue a bond in					
Measure	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*
North America, Western Europe, Australasia, and Japan	45	23	37	50	27	40
Rest of the world	9	6	6	12	10	11
Sector						
Electricity	7	4	2	0	3	5
Telecom	1	1	3	7	5	4
Gas	0	1	0	2	1	1
Transport	1	0	1	3	1	1
Water	0	0	0	0	0	0
Geographic						
Latin America	4	2	1	4	4	2
Africa	0	1	1	0	1	0
Asia	4	2	1	5	2	5
Eastern Europe	0	1	3	2	1	4
Other	1	0	0	1	2	0

emerging market companies where almost 75% of companies accessing the market may have done this at only one point in time over the sample period.

From Table 8, it is possible to see that the profile of these companies when they first accessed the market over the period 1996 to 2001 varies according to where the companies are based and which sector they belong to. For example

- emerging market companies saw an increasing number making first issues as the period progressed;[8] and
- a significant growth in telecommunications first issues happened in the late 1990s/early 2000s, quite a different experience to the other sectors.

[8] The information for 1996 must be treated cautiously. Since it is the first year of the sample, it will capture both those companies that make frequent visits to the international bond market and those that were accessing the market for the first time. It is not possible, based on the information within the dataset to determine the split of companies for this. While this is clearly an issue for later years, the problem is less likely to exist the further into the sample period you move.

In relation to the latter point, there was a general 'blip' in 1999, which might have marked a release of pent-up demand following the East Asian crisis or the opportunities represented by the new Euro-denominated market. Anecdotal evidence suggests that access to the international financial markets became difficult (if not impossible) for all but the blue-chip operators at the time of the crisis and evidence on emerging market spreads suggest that the cost of finance for companies that could come to the market during this period was prohibitive.

Even though the evidence suggests that there is an increasing usage of the international bond markets, does this mean that there is a link with the growing liberalization of the infrastructure and utility operators and increased private participation? The following section investigates this issue in detail for the telecommunications sector. However, prior to that detailed investigation, it is worth considering the ownership of the companies in the emerging markets that are issuing bonds. The information on this is summarized in Table 9.

This information would initially suggest that the spread of private involvement is important for access to the bond markets, but it is not a necessary condition. In fact, this is not surprising. Some of the most active users of the international bond markets are, or were, state-owned enterprises. This was especially true of the French infrastructure and utility companies and was also the case for state-owned companies in Hong Kong. However, what can also be seen among the state-owned companies is that liberalization, in the form of corporatization, is a prerequisite for access. One interesting case is that of a Polish electricity genera-

Table 9 Ownership of companies issuing bonds from emerging markets

	Number of companies	
Region	*State-owned*	*Full or partly private*
All emerging markets	18	36
Africa	2	1
Asia	9	11
Eastern Europe	3	8
Latin America	3	13
Other	1	3

tion company—Elektrownia Turow. It was corporatized in 2000 and then accessed the international bond markets in 2001.

Also, the fact that the regions that have seen the greatest reform are those where the private operators greatly outnumber the state-owned issuers (possibly not surprising given the fact that many of the companies have now been privatized)! While making definitive statements about the link between the reforms of the last decade and the growth in the usage of the international bond markets is not possible, it would appear that there are links and that these require further research.[9]

Overall, many areas relating to the substance of what is occurring within these markets require more detailed investigation and research. For example, as noted above, the choices that companies make when they come to market in terms of the number of bonds and the spread (of both maturity and currency) is something that needs to be better understood.

The dominance of telecommunications

Data in Tables 7 and 8 show that the telecommunications sector was one that saw both, a deepening of usage, as well as, a broadening of access. Table 10 provides some more detail on the issue of deepening.

Table 10 Issuance by five key telecom companies

Telecom company	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*Total*	*%*
Telecom	3244	3661	18694	43751	53186	89582	212118	–
AT&T	1065	–	–	4904	–	11443	17411	8.2
British Telecom	125	1507		1213	6695	6111	15650	7.4
France Telecom	251	85	1546	413	6990	21530	30815	14.5
WorldCom	–	–	3691	–	1289	8204	13183	6.2
Deutsche Telekom	–	–	695	1244	9429	6263	17360	8.3
Sum of 5	1441	1592	5932	7774	24403	53551	94693	
%	44.4	43.5	31.7	17.8	45.9	59.8	44.6	

Note AT&T's total includes Stg 4454 million of AT&T Wireless issues in 2001.

[9] Ideally research into the usage of the international bond markets by the companies captured in this sample while they were state-owned enterprises would be one way of investigating whether reform is opening access to new markets. Alternatively, an investigation of the bond markets in the 1980s when reform was very limited could offer insights into the impact of reform.

Table 11 Concentration of issues

Number of companies	*Value issued*	*% of total telecoms*
5	94693	44.6
10	139795	65.9
20	167696	79.1

From this it can be seen that France Telecom alone accounted for almost 15% of all telecommunications issues over this period, when measured by value. The five largest issuers combined accounted for almost 45% of all issues while the inclusion of the next five largest issuers, shown in Table 11, takes this to over 65%. If the number of companies covered is raised to 20, almost 80% of the value of bonds issued is accounted for.

So, while 104 different telecommunications companies issued bonds on the international markets over this six-year period, the vast majority of the value of issues was captured by the 20 largest issuers. The remaining 80% of the sample accounted for only 20% of the value of bonds issued.

These figures alone do not suggest that this expansion of bond financing was purely a deepening of usage. A consideration of the companies that comprise the largest users show that two of the five, Deutsche Telekom and WorldCom, were both new users of the bond markets. So, some of the concentrated usage can be explained by a newly privatized company (the partial sale of Deutsche Telekom occurred in late 1996).

It is also important to consider what the funds being raised through the international bond markets were being used for. Five of the possible uses are listed below.

1 Merger and acquisition activity within the home or local market; for example, Tecnost raised over Stg 11 billion as part of its acquisition of Telecom Italia and much of the WorldCom debt was raised in relation to acquisitions of companies like MCI
2 Acquisition of overseas assets or funding of overseas operations; Telefonica of Spain was a major user of the bond markets to fund activities in Latin America
3 Costs associated with the 3G licences sold in the late 1990s; British Telecom, France Telecom and Deutsche Telekom were all major acquirers of 3G licences and these often sold for

Table 12 Profile of first bond issues by telecommunications companies

	Number of companies that first issue a bond in					
Region	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*
North America, Western Europe, Australasia, and Japan	11	6	16	19	18	13
Latin America	0	1	1	3	0	0
Africa	0	0	0	0	1	0
Asia	1	0	0	2	1	2
Eastern Europe	0	0	2	1	1	2
Other	0	0	0	1	2	0

billions of pounds and had significant further investments associated with them[10]

4 Roll-out of new fixed line systems, such as cable infrastructure; examples in the UK (NTL, TeleWest, Diamond), Germany (eKable, etc.) account for a significant amount of funding raised
5 Financial restructuring – something seen across all the infrastructure and utility operators in the UK and Western Europe more generally was a discovery that they could operate on debt to equity levels much higher than they had traditionally utilized[11]

Another way of considering the question of access is to consider the profile of first issues by telecommunications companies. Table 12 provides this information.

From Table 12, it is possible to see that there was a clear increase in access to the international bond markets from 1999 onwards. From 1996 to 1998 inclusive, there had been five emerging market companies accessing international bond finance for the first time (within this sample period). From 1999 onwards, 16 new companies issued international bonds.

[10] A recent OECD publication, *Spectrum Allocation: Auction and Comparative Selection Procedures*, January 2002, provides information on the auctions held in this period.
[11] This is probably more marked in the water and electricity sectors. For example, in 2001 almost 30% of the water issues by value were linked to the significant restructuring of Welsh Water's balance sheet by Dwr Cymru.

So, it is possible to argue that, at least in the telecommunications sector, there has been

- a deepening of the usage of the international bond market by companies that traditionally used the market;
- significant usage by new companies in North America, Western Europe, Australasia, and Japan to fund investments and acquisitions; and
- a marked increase in access to the market for emerging market companies (across all continents except Africa) but that this still represents only a small proportion of the overall finance being provided in this market.

Margin information from the electricity sector

From a regulatory perspective, the most interesting information arising from this sort of bond data relates to the margin that operators pay relative to risk-free borrowing. To illustrate the sort of information that can be gleaned from this type of database, one sector, the electricity sector, is considered.

Why is the margin information interesting for regulators? When determining an allowed rate of return during a price-setting exercise, many regulators investigate both the cost of equity and the cost of debt. If trying to set an appropriate cost of debt, the desire should be to consider a forward-looking rate, as captured by the margin on the yield to maturity.[12] However, as seen earlier in this paper, few companies, especially in emerging markets, have issued traded bonds. So, when determining an appropriate debt margin, regulators are often forced to consider the available comparator companies and the debt margins that they pay. This dataset provides both information on the available comparators and the margin paid at issue.

This can be an important source of information when looking to undertake these types of investigations.

Before considering the specifics of the electricity sector, it is worth establishing some overall information for the bond set. Tables 13a, b, and c provide information on the subset of fixed rate bonds for which margin data are available.

So, a little over 80% of the fixed rate bonds are captured with margin data. When compared to the whole dataset, it can be seen

[12] The alternative is a backward-looking historic cost of debt. This has many problems associated with it such as the rapid changes in the markets and the fact that bank-provided debt, etc. may not be the most cost-effective source of finance.

Table 13a Whole dataset

Sector	*Number of bonds issued*	*Total value of bonds issued*	*Average maturity of bonds issued*
Electricity	181	57005.7	10.6
Telecommunications	264	155594.0	9.8
Gas	37	8113.2	8.8
Transport	92	25358.4	13.7
Water	29	8416.6	18.4

Table 13b North America, Western Europe, Australasia, and Japan

Sector	*Number of bonds issued*	*Total value of bonds issued*	*Average maturity of bonds issued*
Electricity	153	52744.3	10.6
Telecommunications	236	147631.7	10.0
Gas	26	6630.4	9.3
Transport	88	24110.3	13.9
Water	29	8416.6	18.4

Table 13c Rest of the world

Sector	*Number of bonds issued*	*Total value of bonds issued*	*Average maturity of bonds issued*
Electricity	28	4261.5	10.8
Telecommunications	28	7962.5	8.0
Gas	11	1482.8	7.5
Transport	4	1248.1	8.0
Water	0	0	0

that the electricity sector continues to be the only one where emerging market companies have a slightly higher average maturity.

If we now focus on the electricity sector, Figures 2a, b, and c provide information on the average margin and average maturity of bonds issued each year. Figure 2a covers the whole dataset while 2b focuses on North America, Western Europe, and Japan, and 2c focuses on the rest of the world.

The figures illustrate average maturity alongside the average margin since it is known that longer dated bonds carry a higher

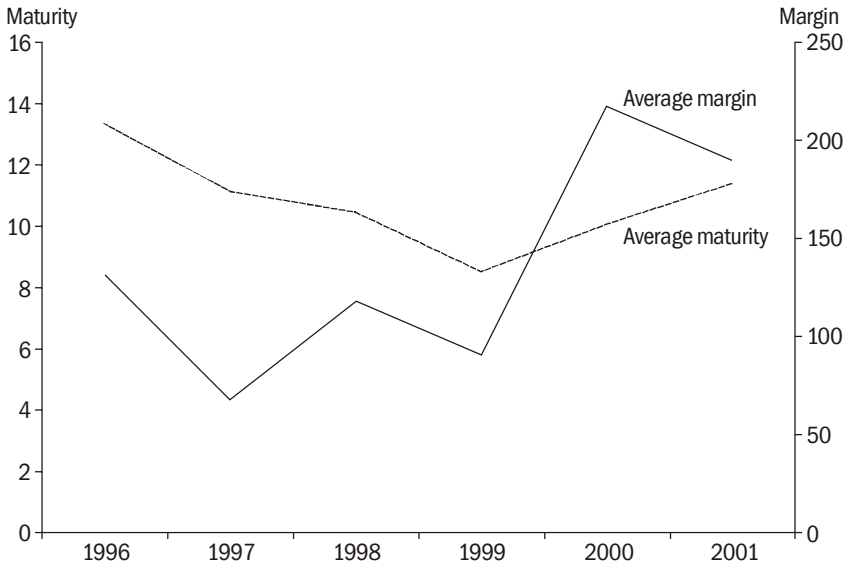


Figure 2a Evolution of maturity of bond issues and margins for all electricity companies

margin (owing to the greater perception of risk). By considering these two measures together, it is possible to introduce some control for the impact of the maturity variable. Of course, maturity is not the only variable that has an impact on the margin, many other explanatory variables would need to be considered. This is discussed later in this section. However, the comparison with maturity provides an opportunity to undertake a partial investigation into the expected relationships.

From Figure 2a, it is possible to see that the average margin paid by electricity companies hit a low point in 1997 and peaked in 2000. Yet, the trend for the average maturity of bonds issued by electricity companies over this period was downwards (at least until 1999 and the average maturity never regains the 1997 starting point). So, was this increase in the average margin a reflection of the increasing risk of investing into the electricity sector? Before being able to answer that question, it is important to consider the impact of where the companies are based, as shown in Figures 2b and c.

Figure 2b shows that a different relationship is seen for North American, Western European, Australasian, and Japanese companies. Here, the average maturity of bonds was rising at the same time as the increase in average margin (more in line with what would be expected) although the significant increase in 1999 at the same time as a fall in average maturity would suggest

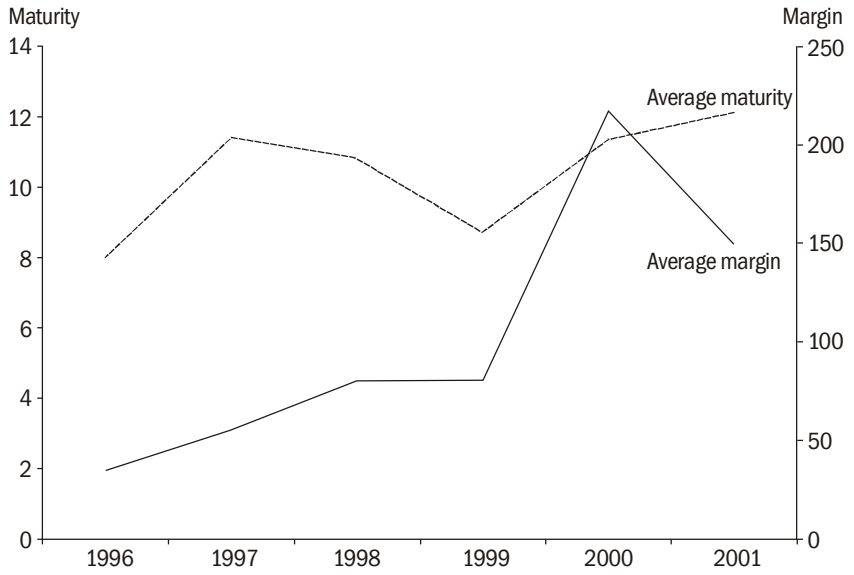


Figure 2b Evolution of maturity of bond issues and margins for electricity companies in North America, Western Europe, Australasia, and Japan

that other factors are also at work. A partial explanation is likely to come from consideration of general corporate bond margins (available from credit-rating agencies) reflecting the impact of the various economic crises occurring at that time.

Figure 2c shows a much more confused story. There is an inverse relationship at the beginning of the period covered, possi-

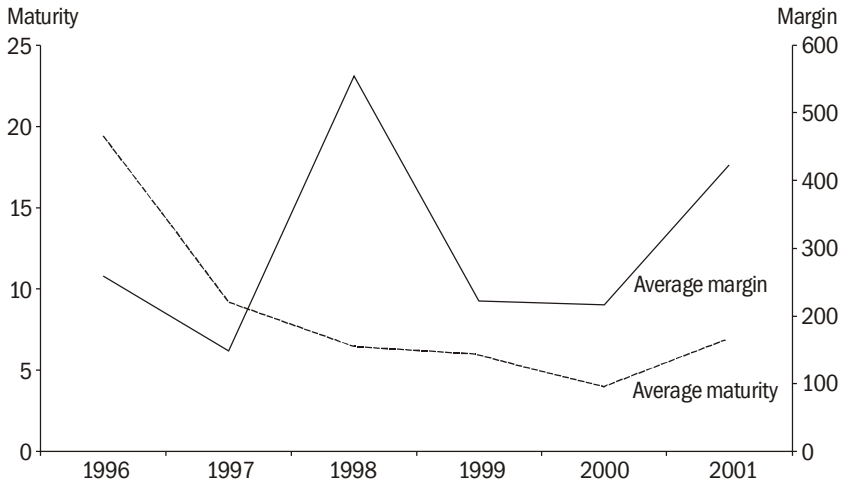


Figure 2c Evolution of maturity of bond issues and margins for electricity companies in rest of the world

bly reflecting greater access to the international bond market attracting newer higher risk companies. This then reverses in the middle of the period – new issues at that time may have been limited to those companies with stronger track records or greater ability to offer guarantees. The final few years then correspond to the expected relationship.

What does all this mean? Without a more systematic investigation of the data it is difficult to say, but what can definitely be said is that when choosing comparators for establishing the cost of debt great care must be taken to ensure that issues such as maturity are carefully controlled for. More systematic work would need to consider, among other things,

- the set of bonds being considered (what elements of the supply chain do the companies operate in, etc.);
- the definition of average margin (here we use a margin weighted by the number of bonds, issues such as value of bonds also need to be considered); and
- general economic conditions (factors such as the East Asian crisis, etc. will have an impact on the margin being paid by a company, the length of the impact of such crises needs to be considered).

Ideally, in principle, the margin should be investigated using the following approach.

$$\text{Margin} = f(\text{Country}) + g(\text{Business}) + h(\text{Company}) + i(\text{Issue}) + j(\text{Market})$$

where the margin is a function of

- country issues relating to the country(ies) in which the company operates;
- business risks associated with the sectors/activities in which the company operates;
- company factors, such as ownership structure, financial structure, and size;
- the specifics of the issue, such as size of the issue, maturity, and the form of insurance or guarantee if any; and
- the conditions prevailing in the market at the time of issue (or the time at which the margin is measured).

This sort of approach has been undertaken for single countries—a significant amount of academic work in the US has focused on this and some work was undertaken for the utility

companies on these issues in the UK in the early 1990s. These sorts of approach have also been used to consider the determination of credit ratings.

Apart from the issues relating to gathering the appropriate data, always magnified when doing international comparisons, there are also significant issues relating to the determination of the appropriate functional relationship. For example, with a measure like gearing (the standard measure of the financial structure of a company), is it the absolute value or the value relative to the industry average that matters? Also, a simple linear relationship would seem too simple – gearing really becomes important when abnormally high levels are reached but should this be captured through a quadratic function of some form of 'elbow-point' measure?

The existing dataset provides a good starting point for this sort of analysis but much more information would also be needed prior to being able to undertake a full analysis like the one described above.

Summary

This paper has sought to start understanding whether the expected increase in access to the international financial markets that was expected to accompany the deregulation and privatization of service provision in the infrastructure and utility sectors actually has occurred. Through an analysis of an international bond issuance database, it has been possible to determine that

- there has been a marked increase in the usage of the international bond markets by infrastructure and utility service providers;
- few of the issuers are based in emerging markets, although the number has been growing significantly over the period covered by the database; and
- the vast majority of emerging market companies access the market only once during the sample period, although when they do access the market they may issue more than one bond.

An investigation of the telecommunications sector, which was the fastest growing sector and accounted for over 50% of bond issues by value each year from 1998, shows that

- 80% of the value of bonds issued are accounted for by 20% of the companies accessing the market;

- of the 20 largest issuers, 19 are based in North America and Western Europe and are heavily involved with the merger and acquisition activity that occurred late in the 1990s or the 3G licence auctions; and
- a growing number of emerging market telecommunication companies are accessing the bond market with a significant increase in companies gaining their first access to the market but, even in 2001 the year with the greatest value of emerging market company issues, they only accounted for just over seven per cent of the total issues made in the telecommunications market.

So, while the evidence suggests that there is an increasing usage of the international bond markets, the usage does not fully support an argument of greatly increased access for companies. Further, the evidence should be placed in context

- information on earlier periods would help determine whether this trend is new; and
- the impact of the shocks in the period covered by the dataset requires further consideration.

Finally, it is possible, from an analysis of the margin information contained within the database to consider some of the issues that are relevant to regulators when determining an allowed rate of return. A consideration of the data for the electricity sector identified the following points of interest.

- Great care should be taken when choosing comparators – the evidence on margins and how they move for emerging market companies would seem to be different to that of other companies.
- General macro-economic impacts can clearly have a major impact (even on the spread paid by companies) and this again may differ between emerging market companies and others (although for this to be properly assessed it would be better to track margins of existing debt issues since many companies may choose to not issue new debt during a market crisis).
- While crises are occurring the average maturity of issued bonds falls – again, this was especially marked for emerging market companies. This could have an important impact on the reality of assumptions made by regulators regarding the maturity of any funding available to companies being assessed at that time.

Evidence presented in this paper should be treated as illustrative. Some interesting points are raised but more detailed research is needed before even the relatively simple questions posed in the introduction are adequately answered. As such, some of the areas that could benefit from further research were noted in the text. Four of the key issues, reported in no particular order, are listed below.

1 What explanation is there for the high incidence of multiple bond issues by a single company at a single time? Further, what explains the mix of currencies and maturities contained within these packages of bonds?
2 What further information on the impact of different explanatory factors on the determination of the risk margin paid at issue can be gained from this dataset?
3 If the coverage of the dataset is expanded, by the inclusion of earlier years, do the tentative conclusions drawn in this paper hold? Also, how much impact does the East Asian crisis and the launch of the Euro have on the results?
4 Has bond finance been replacing other forms of external debt finance or is the growth in the use of bond finance mirrored in a growth of syndicated credits, bank lending, etc.?

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