

Financing Infrastructure Development: Time to Unshackle the Bonds?

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Abstract

Purpose

This paper considers the merits of using projects bonds to finance infrastructure investment projects and considers the pricing of such bonds and the level of risk premium demanded by the market.

Design/methodology/approach

The research used a mix of qualitative and quantitative methods with desk based study and interviews. Interviews were held with policy makers, local authority staff, planners, developers, investors, fund managers and academics. Infrastructure bond data was obtained from the Bloomberg¹ database on all project bonds issued in four Asian countries -Malaysia, China, Taiwan and India - over the period 2003 to 2014.

Findings

The analysis indicates investor appetite for project bonds and suggests that a risk premium of between 150 to 300 basis points over the comparable government bond is appropriate depending on the sector and the degree of government involvement in underwriting the issue.

Practical implications

The paper argues that the introduction of project bonds would be an important innovation, assisting the financing of infrastructure investment at a time when bank lending is likely to remain fragile. The current conditions in the sovereign debt market, where strong demand has forced down yields, has opened up the opportunity to introduce project bonds offering a higher yield to satisfy institutional investment demand for long term fixed income products.

Originality/value

The originality of this paper stems from the analysis of the merits of using projects bonds to finance infrastructure investment projects, the pricing of such bonds and the level of risk premium demanded by the market.

Keywords

Infrastructure, finance, project bonds, risk premium, institutions, investment.

¹ www.bloomberg.com

1. Introduction

Cost estimates project global infrastructure requirements at more than US\$50 trillion over the next 25 years, with emerging countries including China and India at the forefront of infrastructural modernisation which is intended to project their economies into global leadership positions (Urban Land Institute/ Ernst & Young, 2010). The Organisation for Economic Co-operation and Development (OECD) series of reports entitled 'Infrastructure to 2030' highlight the growing global need for infrastructure investment and conclude that the task will run beyond the capacity of national governments alone and that the private sector has an important role to play in funding the development of essential services (Adair et al., 2011).

The scale of the challenge in financing infrastructure development allied with capital budget constraints has meant that the appetite for innovative finance instruments has gained considerable momentum. According to Strickland (2013), the need for international finance and development is a consequence of the economic crisis, which has resulted in reduced inward income of public sector funds. Most OECD countries have reduced public expenditure in an attempt to curb public debt, resulting in budget cuts (Merk et al., 2012). Consequently there has been a reduction in traditional funding routes for infrastructure and regeneration development projects and a clear need to explore alternative routes (Strickland, 2013).

Bonds are one possible alternative option for funding infrastructure and their applicability is the focus of this paper. Bond financing has the potential to be particularly desirable given the current economic climate where global savings rates are high (the 'global savings glut' described by Bernanke, 2005), access to conventional financing vehicles for sizeable public projects is restricted, while demand for development is firmly on the rise. The paper therefore investigates whether the effective use of infrastructure bonds would facilitate the matching of available savings with demand for infrastructure finance.

The provision of modern infrastructure is often the precursor to successful property development. While traditionally the financing of infrastructure has not been viewed as a main stream real estate issue and has not received much coverage in the literature, this would

appear to be an omission as the construction of roads, railways and airports and the provision of utilities, such as electricity, gas, water, telecoms and sewerage are enablers of property development schemes and underpin their success. To understand the most efficient way for this infrastructure to be financed seems to be an important consideration for both the real estate and finance industry across the world. Real estate alternatives are a growing field of interest for investors and infrastructure is part of the alternatives sector. Traditionally investment in real estate has been in the form of equity, but bond investment is worthy of detailed consideration.

In the UK, there has been devolution of financial power from central to local government presented as an aspect of the localism agenda with increasing financial responsibility passed onto local government. This shift can be viewed as an opportunity for local authorities to use innovative financial instruments, such as Tax Incremental Financing (TIF), as they become more financially autonomous (Hutchison et al., 2012). The restructuring of financial responsibility has driven increased participation of private actors in real estate development and “more innovative and entrepreneurial modes of infrastructure provision” (Strickland, 2013, p.387). However in the UK, Regional Development Agencies previously “tasked with shaping innovation policy below national level” were disbanded after the 2010 Conservative-led coalition government came to power and replaced with Local Enterprise Partnerships, which continue to be unfunded with the majority of the RDA functions (inward investment, sector leadership, business support, access to finance, innovation) being lead at a national level instead of by the LEPs (Crowley, 2011).

The London Development Partnership’s Private Finance Working Group report ‘London’s Leverage’, identified that the challenge is not to increase availability of public financing for development; rather it is to stimulate private finance (Carter, 2006). According to Carter (2006) changes to the investment process in the UK is welcomed and much needed with increased flexibility and innovation, both important aspects for attracting private sector investment in infrastructure. However industry organisations, such as the British Property Federation (2008), suggest that new funding mechanisms in England and Wales such as the Community Infrastructure Levy (CIL) are insufficient to finance infrastructure in areas that urgently need regeneration.

Against this background of the perceived need to attract alternative funding for infrastructure and regeneration development projects, the research presented in this paper has two clear aims. First, to consider the merits of using bond finance to fund specific infrastructure investment projects, hereafter known as project bonds. Second, to consider the pricing of project bonds and the level of risk premium demanded by the market, based on evidence from selected countries. The paper is structured as follows. Section 2 provides background on the bond market and institutional investment requirements. Section 3 explains the methodology adopted in the research while Section 4 details the results of the interviews and of the analysis of project bonds in selected countries. Section 5 offers conclusions and recommendations.

2. Innovative Finance, Institutional Investment and Project Bonds

Within Europe there is a momentum for cities to generate new initiatives to help leverage private sector finance for infrastructure and real estate development, as well as meet the increasing demand for modern communications and services (Siemens, PriceWaterhouseCoopers and Berwin Leighton Paisner, 2014). Moreover, from the public sector there has been a greater use of financial instruments and mechanisms within the European Union budget between 2007 and 2013 (Spence et al., 2012). Innovative finance has gained international significance with promotion at both global and European levels (Sandor et al., 2009). The World Bank broadly defines innovative finance for real estate development as involving non-traditional forms of funding through private mechanisms, solidarity mechanisms, public-private partnerships mechanisms and catalytic mechanisms (Grishankar, 2009). However, innovative finance for infrastructure development is not to be viewed as an alternative to traditional forms of finance, but should be seen as complementary. The European Union (EU) defines innovative financing as those measures providing financial support to address one or more policy objectives through the use of loans, guarantees, equity or quasi-equity investment, or other risk-bearing tools – that can be combined with grants and involve risk-sharing with financial institutions to boost investment in large infrastructure projects. (Spence et al., 2012). Bond instruments thus fall within the possible mix of funding opportunities.

To place UK institutional bond investment in context, the last 50 years has witnessed a shift in the proportion of institutional money in fixed income investments (Adair, 2007). In the early 1960s pension funds allocated over 50% of their assets in bonds and this fell steadily until 1993 to a low of 10%. Since 1994, the proportion has been on a rising trend, with the figure around 40% in 2013 (UBS, 2013) and there appears to be a continuing appetite for long dated bonds, both from those unsettled by equity market volatility and those seeking to match long term debt to long term cash flow.

There are many examples of bonds having been used to finance major public sector development schemes most notably in the UK, the £5.2 billion Channel tunnel rail link where the government agreed to guarantee £3.75 billion of debt issued by London and Continental Railways (Bayley, 2003). Indeed, the use of bonds in the infrastructure phase of development was promoted in an Investment Property Forum (IPF) sponsored research project in 2006 that investigated the necessary conditions for institutional investment in regeneration (IPF, 2006, Adair et al., 2007).

The necessary conditions for institutional investment in project bonds and the appropriate legal structure need to be understood. First, it is important to recognise that the bond market is global and institutional investors are sensitive to legal, political and regulatory risks and seek jurisdictions with a robust legal framework and minimum government interference in pricing or regulation, to prevent instability in the market and the prospect of volatility in capital value. It is argued that investors are reassured by a well-functioning, consistent and predictable regulatory framework and a stable sovereign debt market, against which project bonds are benchmarked (Brealey et al, 1996).

Second, within this framework, infrastructure bonds require the creation of a legally and financially self-contained entity (SPV) against which all contracts are written and the distribution of risk and return formally agreed. According to Ehlers et al. (2014) this type of debt finance is normally non-recourse with the default risk based on the specific project viability and not on the creditworthiness of the corporation, which would be the case with corporate bonds. Once infrastructure projects reach the post construction phase and move into the operational phase with stable cashflows, the projects become relatively

straightforward fixed income securities. Ehlers et al. (2014) found that where default does occur, the recovery rate on infrastructure bonds is higher than with defaulted corporate debt. In part this may be because infrastructure projects tend to be high profile with the potential for government support should difficulty arise and partly because default may occur earlier in infrastructure bonds with less chance of the project having depreciated, thus aiding recovery. The legal structure, risk/return balance and sector directly impacts on the level of risk premium demanded by the market and this along with default rates will be analysed later in Section 4.

Institutional investors are attracted to bonds due to the matching of long-term debt to long-term cash flows of the project. In considering a bond, investors seek inflation hedging, some form of additional income appropriate to the risk profile (which maybe low if government or local authority backed), a level of security, long term cash flow, a degree of liquidity and low correlation with other asset classes (Hutchison et al., 2011). As the risk premium for project bonds is a margin over government issued stock it is important to understand the volatility surrounding the sovereign debt market since 2008. In the period post the Global Financial Crisis (GFC), the Gross Redemption Yield (GRY) on UK gilts fell sharply as investors fled to the safety of government issued stock. For example, the GRY on two year conventional gilts fell from 5.77% to 0.96%, from June 2007 to March 2010, while 10 year gilt yields fell from 5.46% to 3.9% over the same period - the lowest level for at least 30 years. Over the period 2007 to 2010, the yields on all maturities of gilts - short, medium and long - fell sharply but with different degrees of volatility (Hutchison et. al., 2011). In June 2015 the GRY on two year conventional gilts was 0.60%, with the GRY on 10 year gilts at 2.10% - historically low levels.

However, in the UK (and in some major countries in Western Europe) the relatively low level of current gilt yields poses a dilemma for investors who believe that the current market is not 'normal'. In May 2015, the Governor of the Bank of England suggested that UK inflation is likely to climb above 1% by the end of 2015 (Bank of England, 2015) and there is an expectation that gilt yields are going to rise over the next five years as the economy recovers, allowing the Government to taper their QE programme. Such a yield shift will result in a fall in capital value on an asset, which is traditionally classified as low risk, forcing investors to question their level of exposure to gilts. This scenario presents a window of opportunity for

discrete, low correlation vehicles, offering a higher level of income return for those investors prepared to accept a higher level of risk.

Up to the early 1990s, commercial real estate offered investors a 25 year FRI lease with 5 yearly upward only rent reviews and was a particularly attractive opportunity for institutional investors seeking stable, long term income return. However, in the last 30 years has seen a gradual decline in the gilt yield, the same time period has witnessed some significant structural changes in the UK commercial market. For example, average lease length has fallen, holding periods have reduced and break clauses are now common. The UK Lease Events Review (2014) published by the British Property Federation, Strutt & Parker & IPD reported that the average lease length of all new leases in 2014 (unweighted) was 6.8 years, with less than 7% of leases over 10 years in length, compared to 20% 10 years ago. Overall around 30% of leases have break clauses. This reduction in lease length has occurred over a period when the demand for long term income stream has remained constant and investors are looking for alternative investments to replace the 25 year cash flow offered previously by the commercial real estate market. Thus at the present time, as result of the 'non-normal' market conditions in the gilt market combined with the changing investment characteristics of the commercial real estate market, there is an opportunity to satisfy investment demand for long term income products by introducing some form of infrastructure or development bond.

Infrastructure or property development debt is viewed as a sub sector of the main debt market and is seen as distinct entity in its own right – an uncorrelated asset class with the possibility of stable, predictable cashflows. The main risk to the cashflows is a specific risk, and relates to the characteristics of the individual project and sector. There are a range of options along the risk curve with some projects viewed as low risk, such as government regulated utilities with built in RPI (Retail Price Index)/CPI (Consumer Price Index) uplifts, through to, for example, the transportation sector, where cashflow could be exposed to traffic sensitivities and onto relatively high risk real estate development in regeneration projects (Adair et al, 2007). In that respect investors seeking a decent level of diversification, need to know which part of the infrastructure or development market they are involved with and require understanding of the specific risk sensitivities and whether or not there are any government guarantees. For example, where the infrastructure bond is used to finance say,

investment in utilities and the returns are government backed and RPI/CPI linked, there is security of income flow but no control over consumer pricing. The key downside being that the investor would not benefit from any general uplift in capital values as they could in a real estate development related project. While project issues affect the cash flow risk, the required return is the product of market forces. Changes to market interest rates feed directly through to bond pricing. However, where investors plan to hold until redemption, price volatility may not be the key concern.

For those involved in raising finance, the infrastructure or development bond model has significant appeal at a time when the tightening of the regulatory regime following Basle III and Solvency II has resulted in higher solvency levels and less conventional lending in the market (Maxted & Porter, 2014). The issuing vehicle or entity of a bond is very important. Whether the bond is government, local authority or corporate backed has a direct impact on the pricing and success of the bond issue. A bond issue guaranteed by central or local government would provide comfort to the investor and as governments are major winners in regeneration developments, it is argued that they have an interest in underwriting the risk. Indeed, if the local authority was underwriting the bond, the coupon payments could be funded out of a TIF model (Adair et al., 2011). However, it is questionable in the current market in the UK, where an austerity regime is in place and public sector cuts are the flavour, whether the UK Treasury would be willing to underwrite any further commitments. Where a government guarantee is not forthcoming then a bond insurance or wrapper can be bought and priced into the investment equation (Adair, 2007).

3. Methodology

This paper forms part of a wider research project which investigated innovative finance for real estate development in pan-European regeneration following the GFC. The financing of infrastructure emerged as a recurring theme during the research. The research used a mix of qualitative and quantitative methods with desk based study and interviews. Semi-structured interviews either by telephone or Skype were carried out with experts experienced in finance and real estate development. The selection of interviewees took the form of a snowball method to enhance the number of potential good quality interviewees (Denzin and Lincoln, 2007), with respondents asked to recommend further contacts useful to the research. The

method of investigation was predicated upon a 'retroductive' process whereby semi-structured interviews were undertaken and the results of this process fed into the analysis and further questioning of other participants in the study (Naoum, 2013; Mason, 2002). The interviews, 17 in total, embraced policy makers, local authority staff, planners, developers, investors, fund managers and academics. To give the scope of interviewee institutional affiliation, interviews were carried out with leading relevant organisations. Institutions included RICS UK, RICS Brussels, Composition Capital Partners, Buildings Performance Institute Europe (BPIE), Consilia Capital, AEDES Dutch Association of Social Housing Organisations, CECODHAS Housing Europe, Battersea Power Station Development Company Ltd, The Commercial Real Estate Finance Council Europe (CREFC Europe), Royal Bank of Canada, Fédération de l'Industrie Européenne de la Construction (FIEC), British Property Federation (BPF), European Association for Investors in Non-Listed Real Estate Vehicles (INREV), LaSalle Investment Management, European Investment Bank (EIB), AMP Capital, Winchester Partners, Leipziger Platz Development Berlin, and Malmendier Hellriegel Rechtsanwälte Partnerschaft. All interviewees were at a senior level with the majority of input from professional roles as Directors from their respective organisations. Bias from a more director oriented 'elite' expertise and opinion was accepted, as was any snowball research method when further contacts were recommended from interviewees as the research iteratively progressed (Bryman, 2012). Despite these biases, it was believed that the greater informed professional expertise provided a rich qualitative understanding of the cases and subject matter when extracting information (Denzin and Lincoln, 2007). The survey work was undertaken during 2014.

Infrastructure bond data was obtained from the Bloomberg² database on all project bonds issued in European and Asian countries over the period 2003 to 2014 in order to make a cross-continent comparison. For the purpose of this analysis, 2003 was chosen as the start date, as data are very limited prior to this. Also, due to the paucity of data on project bond issuance in Europe, a cross-continent comparison was not possible and instead the top four Asian countries based on the number of project bonds issued over the period 2003 to 2014 were selected for analysis. The countries chosen were Malaysia, China, Taiwan and India.

² www.bloomberg.com

In the first instance the following were examined: (i) the size of the bond markets in terms of number of bonds issued, (ii) the composition of the markets with respect to various industrial sectors (namely communications, consumer discretionary, energy, healthcare, industrials and utilities), (iii) the over-time change in coupon rate and maturity across different infrastructure sectors in the sample countries.

Secondly, the historical performance of the government issued bond market was examined in each of the selected countries over the period of 2003 to 2014. The data were obtained from DataStream³. Within this second stage, particular attention was paid to the temporal relationship between the given project bonds' coupon rates and the GRY on government issued bonds. To conduct the analysis on a like-for-like basis, project bonds that had a lifespan of around 10 years⁴ were compared with 10-year government debt. Conceptually, the difference between the project bond's coupon and the corresponding redemption yield on government issued bonds represents the risk premium demanded by the market when the project bond was issued. The higher the risk premium, the higher the perceived risk of the project bond over government issued stock. Zero-coupon bonds were excluded from the study due to their lack of comparability, since they do not pay coupons. In addition, a correlation test was performed to further scrutinise whether there was co-movement/co-variation between a project bond's coupon and government issued bonds.

An integral part of this study was an explicit examination of the manner in which infrastructure projects were financed by project bonds before and after the GFC: given the significant drop in market interest rates and the fact that investors sought the safety of domestic government bonds, the authors surmise that the amount of risk premium that was applied to the project coupons should have adjusted correspondingly against the respective GRY of government-issued debts. Nonetheless, depending to a large extent on how adverse and persistent the impact of the crisis had on the specific country in general and the industry

³ www.thomsonreuters.com

⁴ Given the limited number of project bonds with exact maturity of 10 years, bonds that have a lifespan between 9 to 11 years were also considered.

in particular, the project bonds might have exhibited different risk profiles reflective of the actual business operating environment and the cost of borrowing.

4. Results

Interviews

The consensus from those interviewed was that due to the nature of the schemes any infrastructure/development bond would require to have a lifespan of 20 years plus. Indeed the shift to long-term institutional capital was seen to have become more commonplace, given difficult relationships with banks and restrictions on lending (interviewee 7).

Given the transparent nature of the long-term fixed income market and the clear risk characteristics, it was argued that the pricing of such a bond would be relatively straightforward comprising gilts plus a risk premium. For example, given a corporate credit rating of single A, it was suggested that a risk premium of say 150 to 300 basis points over the comparable gilt may be appropriate (interviewee 17). By offering a vehicle attractive to private sources of finance, the need for public sector involvement is reduced along with the risk to the public purse. Moreover, where blended public-private finance deals are proposed as a solution, striking the right balance in the sharing of risk between the public and private sectors was perceived to be an ongoing concern (interviewee 3).

While the UK Treasury may be reluctant to underwrite schemes, the European Investment Bank (EIB) is committed to supporting project bonds through its Project Bond Credit Enhancement Initiative that seeks to provide partial credit enhancement to projects in order to attract capital market investors (EIB, 2012; EIB, 2014). The EU is encouraging its grant funding to be used more efficiently, given that EU block grant funding is unlikely to increase in the near future. Moreover, there is anticipation that the number of projects seeking finance is going to increase, especially when it was stated by one interviewee that:

‘The number of projects calling for finance is going to increase significantly. So using the grants to leverage in additional sources of funding will be important. We’ll probably see EU national grants blended with EIB loan products more in the future’ (interviewee 1).

The EIB currently provides a subordinated facility to enhance the quality of the senior bonds and therefore increase the credit rating. For example, the Greater Gabbard⁵ bond issuance in November 2013, where the EIB's involvement enabled the bond to be rated A3 by Moody's, a notch higher than would have previously been the case without enhancement. Moreover the issue pricing at 125 basis points over gilts on a 19-year facility was seen to be very competitive and much cheaper than a bank facility which would likely have been priced at 200 to 225 basis points (interviewee 17). The issue was three times oversubscribed and while largely placed with a wide selection of the UK investor community, also attracted strong interest from Canadian and Euro investors, thus demonstrating the appetite for this type of product. Presently, the EIB Project Bond Initiative is targeted only at transport, energy, broadband, and information and communication technology.

It was suggested that a range of different bond structures could be adopted within an infrastructure or development scheme. Specific bonds might be by area, project or sector - similar to the widening opportunities via the Tax Increment Financing (TIF) bond mechanism to include affordable housing (possibly social housing) as well as transport infrastructure in the UK, as has been experienced in the United States (Squires and Hutchison, 2014). As most regeneration projects are mixed use, a project specific bond might include a number of sectors thus providing diversification benefits. Several interviewees underlined the emerging demand for higher risk mixed-use bond financing. Arguments raised included:

'40% of the funds are in offices, 40% in retail and the balance of 20% spread between residential large blocks often mixed use and infrastructure investment (Interviewee 14)...Increasingly the commercial developers are looking at residential or mixed use schemes (Interviewee 5)...Mixed-use projects will affect the financing because different aspects of the scheme will have different returns, risk and lease profiles. So for an office block in London a developer might want an institutional lease for 10 – 15 years if they can get it, but a 5 – 10 year lease for retail because what's right today

⁵ The Grater Gabbard Offshore Transmission project is a joint venture between Balfour Beatty and Equitix working with AMP Capital Investors and connects the Greater Gabbard Wind Farm to the UK grid.

might not be right in 5 – 10 years' time, and this will have an effect on the financing structure (Interviewee 2)...In some instances the mixed-use finance model on a project can involve a Tax Increment Financing (TIF) element, infrastructure element, and largely using the security of the residential exchanges to fund the overall project' (Interviewee 16).

A mixed use project bond is clearly higher up the risk curve than say, a 'utility focused' infrastructure bond, and in such a scenario where a higher return is demanded, it was suggested that issuers may wish to consider the prospect of a participating project bond, where investors benefit from both an income return and a share in rental value uplift and capital value appreciation (interviewee 17). The UBS Participating Real Estate Mortgage Fund, which was launched in January 2014, is an example of how this might work (UBS, 2014).

In such a participating bond, the investors would benefit from rental value appreciation and capital value shift, whether this was achieved through specific asset management practice and/or general uplift in the overall market. Uplift in value and 'value capture' more specifically is placed as important to financing via bonding mechanisms, for example it is was stated that:

'People tend not to talk about value capture, but it's going to become a very important funding mechanism and a way of securing advances for real estate development. It's a very important mechanism, and is important to make sure there is an appreciation of assets and that the public sector gets its share in the uplift which is created' (interviewee 1).

The capital value return can only be realised following a disposal and thus for this model to work it requires the fund to have multiple assets and have clear liquidity events. The fund may well need to be of significant size to achieve this and it was proposed by the interviewees, that a minimum fund size of £200 million would be appropriate.

The lack of liquidity of infrastructure bonds in the UK was highlighted, but it was advised that the majority of investors tended to hold to maturity as a matter of strategy, although that

may have been a consequence of the illiquid secondary market giving them no option (interviewee 17).

It was suggested by several of the respondents that project bonds would have a pan European appeal. While in the UK there has been a marked shift from Defined Benefit (DB) to Defined Contribution (DC) pension schemes this has not been the case in continental Europe where there remains a large number of DB schemes. Inflation linked project bonds were highlighted by one interviewee as an attractive option for institutional investors:

‘Inflation linked bonds might be what investors should be looking at. If pension fund and insurance companies are providing the debt then as long as they are getting a return protected from inflation and perhaps underwritten by government then this should be attractive’ (Interviewee 14).

Given that pension finance schemes require asset liability modelling, the project bond would help to match the long-term stream of liabilities. For instance, if the bond was a euro denominated issue, the liabilities would be currency hedged and if the coupon was RPI linked, would provide a perfect fit for their expected outgoings – and hence generate different levels of risk premium.

Level of Risk Premium

In order to gain insight into the effect of the subprime mortgage crisis on the use of project bonds, the period of analysis was divided into two sub-periods: 2003 to 2007 and 2008 to 2014. Table 1 below shows the overall average risk premium across all sectors, while Table 2 provides a breakdown of background characteristics by industrial sector of the project bonds issued in the four Asian countries.

Country	Number of projects⁶	Average Risk Premium (Basis points)
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⁶ Only project bonds with maturity of around 10 years were considered.

Years	2003-2007	2008-2014	2003-2014	2003-2007	2008-2014	2003-2014
Malaysia	132	113	245	330	149	250
China	58	433	491	137	190	180
Taiwan	168	102	270	63	41	53
India	23	29	52	160	170	165

Table 1: Overall Average Risk Premium: 2003-2014

In Malaysia, 245 project bonds were issued during the total sample period. The project bond market was dominated by the utilities and industrial sector, which together accounted for over 90% of the total project bond issuances. The average maturities of the bonds ranged from about 3 years for the consumer and energy sectors, to over 11 years for utilities. The impact of the financial crisis can be seen in the substantial fall in the average coupon of the project bonds post 2007. For example, the utilities sector experienced a sharp decrease in average coupon, resulting in a significant drop in average risk premium of individual projects from 295 to 149 basis points over government debt.

China, said to be the most active project bond market in Asia, had 491 infrastructure projects funded by project bonds during the same period. The popularity of project bonds increased significantly post 2007 as indicated by less than 60 projects financed by bonds before 2008 and more than 430 thereafter. Upon closer examination, the industrial sector, utilities and energy were the leading market players in adopting project bonds all through the sample period. Contrary to the findings for other countries, China experienced a rise in both coupon rates and risk premiums after 2007 across all sectors, which is worthy of further investigation. For instance, the average coupons for industrials and utilities were 4.81% and 4.86% before 2007, and then grew to 5.69% and 5.50% respectively thereafter. Their corresponding risk premiums increased from around 150 basis points to about 200 basis points during the same period.

In the case of Taiwan, the utilities sector had been prevailing in the project bond market almost exclusively with over 97% total market share in terms of the number of project bonds issued. A significant reduction in the number of projects was observed, from 167 during the

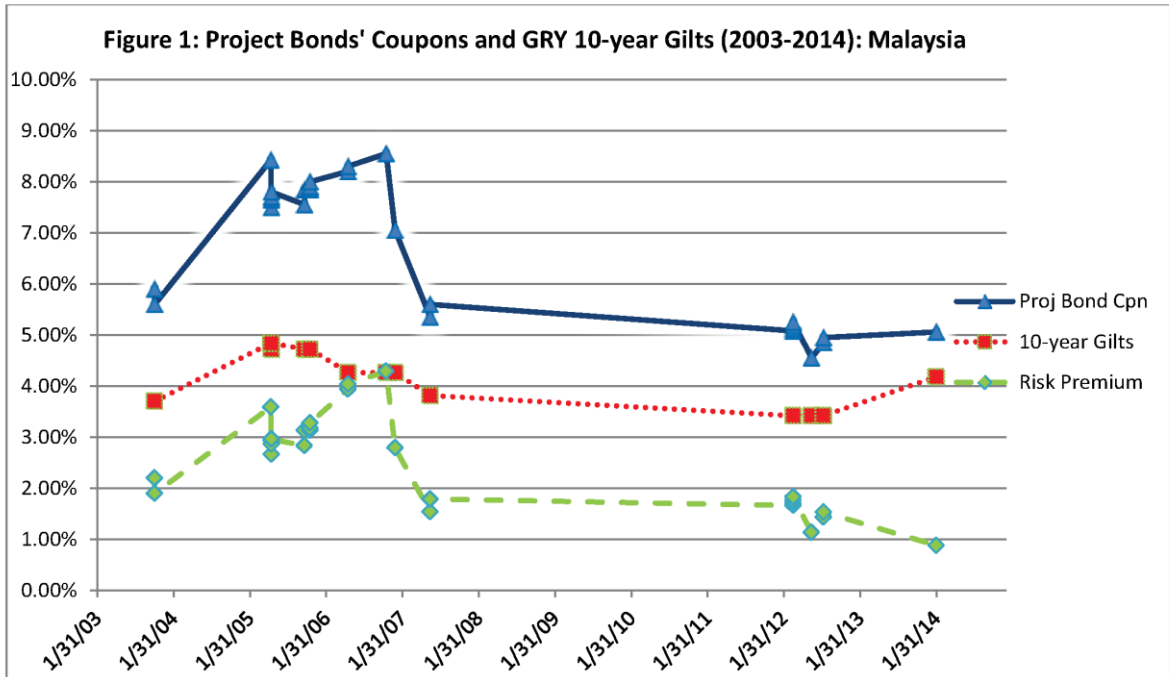
first sub-period to just 95 during the second sub-period. The contraction of the project bond market for the utilities sector saw a slight drop in average coupon, from 2.05% to 1.72% during the same period. The average risk premium also fell in tandem by a small margin from 63 to 42 basis points.

India, by contrast and despite population size and demand for infrastructure development, has a relatively small infrastructure bond market. The utilities industry had been the largest project bond-issuing sector with 36 issuances during the sample period, followed by the industrial sector and energy. Average maturities for the different sectors ranged from 8.5 to 11.9 years. Unlike the other three sample countries, the average coupon for all sectors in India had remained at a fairly stable level of around 9% pre- and post GFC, while the average risk premium for all sectors was around 160 basis points.

The historical correlation between the projects' coupons and the corresponding government bond with roughly 10-year maturity over the period of 2000-2014 for the four countries was also calculated (See Figure 1 to 4). We found that Malaysia has the highest correlation (88.20%), followed by Taiwan (82.32%) and India (74.29%). China's infrastructure bond market seemed to move at a different pace from the government debt market, given the relatively low level of correlation between the project coupons and government bonds (42.93%).

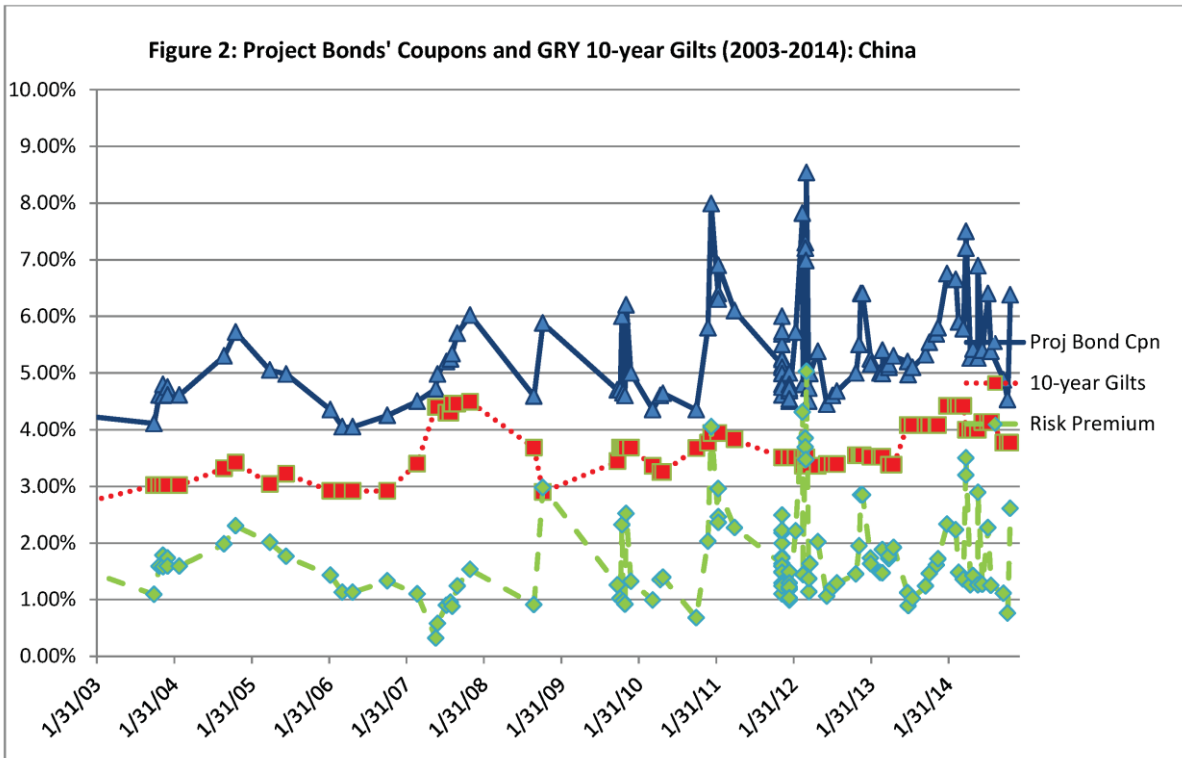
Country	Sector	Number of Projects			Average Maturity	Average Coupon			Average Risk Premium (Basis Points)		
		2003-2007	2008-2014	2003-2014	2003-2014	2003-2007	2008-2014	2003-2014	2003-2007	2008-2014	2003-2014
Malaysia	Utilities	66	94	160	11.31 years	8.37%	5.64%	6.77%	295	149	258
	Energy	0	1	1	3.50 years	nil	2.5%	2.5%	nil	nil	nil
	Industrials	59	12	71	8.74 years	5.95%	4.93%	6.15%	nil	nil	nil
	Consumer Discretionary	3	6	9	3.23 years	5.57%	4.29%	4.75%	nil	nil	nil
	Healthcare	4	0	4	5.00 years	4.66%	nil	4.66%	nil	nil	nil
	Communications	0	0	0	nil	nil	nil	nil	nil	nil	nil
	Overall	132	113	245	10.13 years	7.47%	5.64%	6.52%	330	149	250
China	Utilities	23	121	144	8.78 years	4.86%	5.50%	5.40%	154	202	192
	Energy	14	85	99	7.90 years	4.75%	5.74%	5.60%	113	166	151
	Industrials	19	186	205	8.00 years	4.81%	5.69%	5.61%	151	190	184
	Consumer Discretionary	1	39	40	6.35 years	5.25%	6.80%	6.61%	nil	nil	nil
	Healthcare	0	0	0	nil	nil	nil	nil	nil	nil	nil
	Communications	1	2	3	5.00 years	1.20%	2.90%	2.33%	nil	nil	nil
	Overall	58	433	491	8.06 years	4.76%	5.74%	5.64%	137	190	180
Taiwan	Utilities	167	95	262	6.63 years	2.05%	1.72%	1.93%	63	42	54
	Energy	0	6	6	7.33 years	nil	1.98%	1.98%	nil	nil	nil
	Industrials	1	0	1	5.00 years	0	nil	5.00%	nil	nil	nil
	Consumer Discretionary	0	1	1	5.00 years	nil	5.00%	5.00%	nil	nil	nil
	Healthcare	0	0	0	nil	nil	nil	nil	nil	nil	nil
	Communications	0	0	0	nil	nil	nil	nil	nil	nil	nil
	Overall	168	102	270	6.63 years	2.05%	1.74%	1.94%	63	41	53
India	Utilities	16	20	36	9.63 years	8.91%	9.23%	8.93%	103	200	188
	Energy	2	1	3	8.33 years	14.38%	12.00%	13.58%	nil	nil	nil
	Industrials	3	8	11	11.87 years	5.25%	7.52%	7.72%	nil	nil	nil
	Consumer Discretionary	0	0	0	nil	nil	nil	nil	nil	nil	nil
	Healthcare	0	0	0	nil	nil	nil	nil	nil	nil	nil
	Communications	2	0	2	8.50 years	9.12%	nil	9.12%	nil	nil	nil
	Overall	23	29	52	9.99 years	9.48%	8.87%	8.98%	160	170	165

Table 1: Descriptive statistics of project bonds of the four sample countries: 2003 to 2014

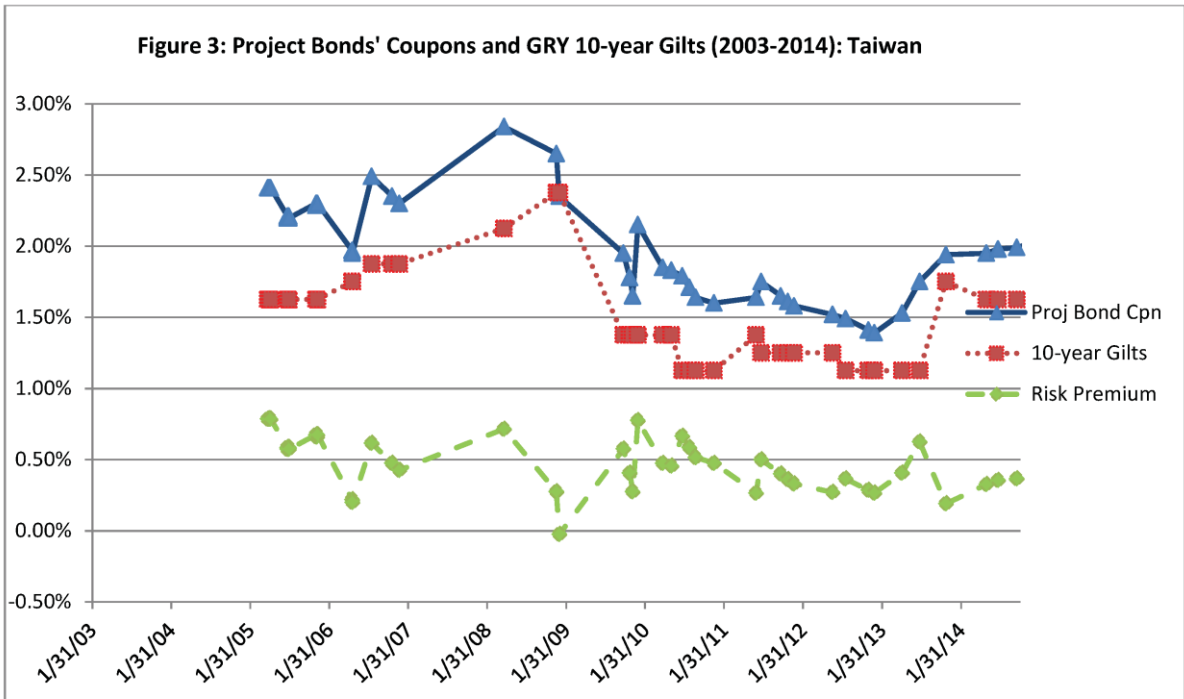


Correlation (Project Bonds' Coupons, Govt Bonds) = 88.20%

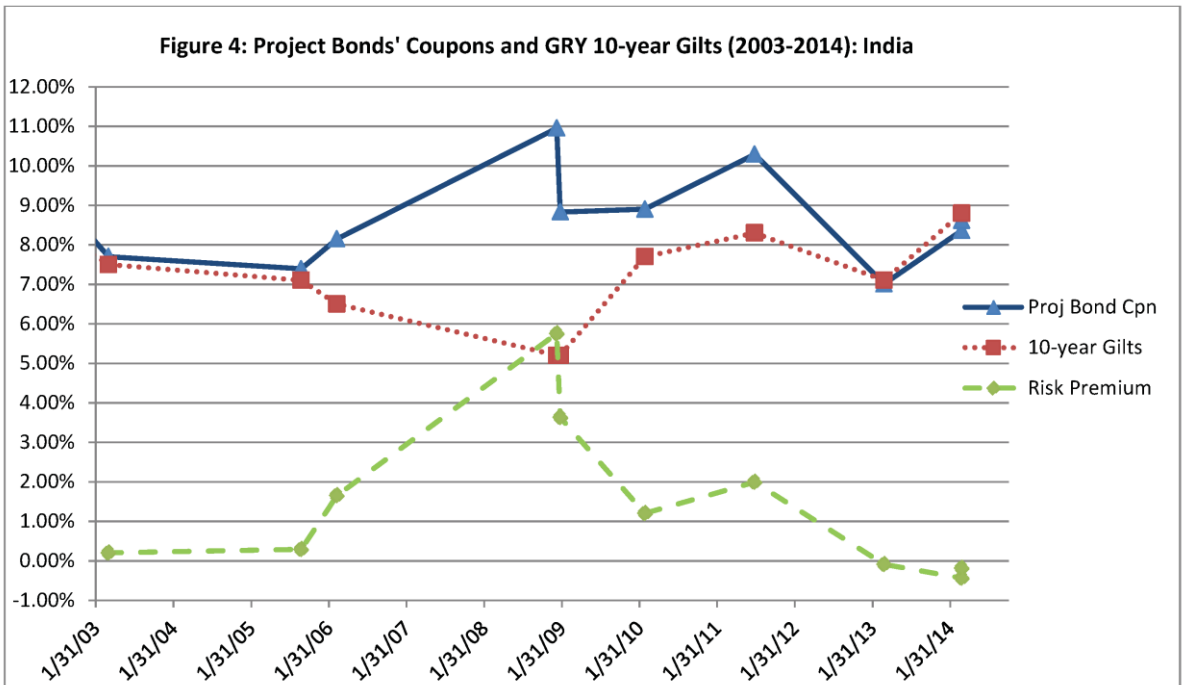
]



Correlation (Project Bonds' Coupons, Govt Bonds) = 42.93%



Correlation (Project Bonds' Coupons, Govt Bonds) = 82.32%

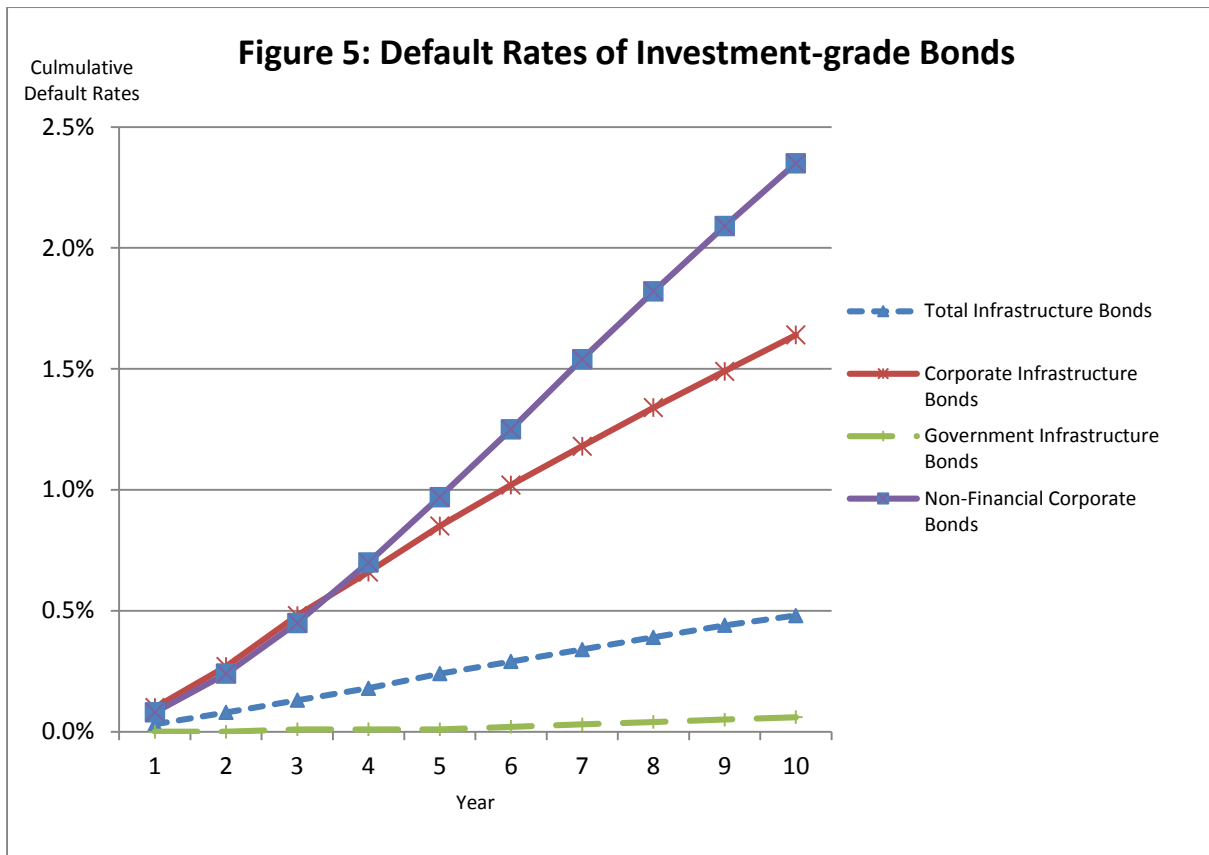


Correlation (Project Bonds' Coupons, Govt Bonds) = 74.29%

Default Rates and Government Protection of Project Bonds

Intuitively, project bonds tend to be more risky than those of corporate issuers primarily because of the inherently complex nature of construction and development, hence higher default rates are often presumed. However, a cross-country study on default rates of various bond products reveals that such preconception is not necessarily true (Moody's, 2012). In the initial phase of new projects, infrastructure bonds issued by private corporations do actually have a slightly higher chance to default than that of non-financial corporate bonds (See Figure 5). This could be largely due to unforeseeable circumstances (such as delay and disruption in construction) and cash flows to the projects being mostly negative. Yet, once the projects reach a more financially mature stage (after the fourth year on average), defaults will become less likely relative to other bond projects. Indeed, once government infrastructure bonds are taken into account, the performance of all infrastructure bonds (Total Infrastructure Bonds in Figure 5) is consistently better than that of non-financial corporate bonds throughout the bonds' lifetime.

Another reason for the project bonds' greater stability over longer time horizons could be the potential government support for the investments. For example in Malaysia, most of the local infrastructure bond issuers, and/or their guarantors, are government-linked corporations (GLC) over which the state has direct control as the majority shareholder. Furthermore, the majority of the GLCs have been strategically placed under the direct management of Khazanah Nasional, the sovereign wealth fund of Malaysia. With these added features of institutional backing embedded in their project structures, defaults are considerably less likely to occur, especially when the projects are deemed politically advantageous or sensitive.



Source: Moody's Investors Service (2012)

Conclusion

The originality of this paper stems from the analysis of the merits of using projects bonds to finance infrastructure investment projects, the pricing of such bonds and the level of risk premium demanded by the market. It is evident that in most European countries post GFC, austerity regimes are in place and national governments alone are not able to finance the growing demand for major infrastructure investment. It is argued that to delay investment in this sector has the potential of hindering economic recovery. The need for a partnership with the private sector in order to raise the necessary level of capital is thus pivotal.

Institutional investors are attracted to bonds due to the matching of long term debt to long term cashflows of the project, so there is a natural fit between supply and demand. The use of bond finance to fund major infrastructure projects is not new, but the current market conditions in the sovereign debt market, where strong demand has forced down yields, has opened up the opportunity to introduce project bonds offering a higher yield to satisfy institutional investment demand for long term fixed income products. This window may close

in the event of interest rate rises, which are expected to start to happen in the UK over the next 12 to 18 months. However, in continental Europe the very low interest rate environment is expected to continue for much longer, due to the lack of economic growth and low levels of inflation and therefore the specific opportunity to introduce project bonds due to the 'non-normal' market pricing of government bonds may be open for a longer period in Europe. If this opportunity is not to be missed, further research is needed to fully explore and understand institutional investor attitudes to investment in project bonds.

Evidence from the interviewees and from the analysis of project bonds from the Asian countries (with the exception of Taiwan) would suggest that a risk premium of between 150 to 300 basis points over the comparable gilt would be appropriate depending on the sector and the degree of government involvement in underwriting the issue. In the market of June 2015 this might suggest a project bond offering a sub 5% yield. However, in the event of the GRY on a UK 10-year gilt mean reverting to say 5%, the coupon demanded on a project bond would need to rise to 6.5%/8.00% in order to maintain the margin. For a pure income product an 8% coupon would be challenging and would bring into sharp focus the benefits of promoting a participating bond or a convertible bond to allow some trimming of the margin.

Of course, interest rates may remain low for a longer period of time than is expected, but even if rates do rise, project bonds offer the type of long term income product that institutional investors require throughout the economic cycles, with the long life of the fund a positive advantage enabling matching of long term liabilities. In this respect the analysis underpinning this paper has significance for the delivery of regeneration and infrastructure with the introduction of project bonds an important innovation, assisting the financing of investment in these key sectors at a time when bank lending is likely to remain fragile.

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