**Does the method of accounting for Private Finance Initiatives by grantors affect project loan spreads?: Evidence from Private Finance Initiatives in the U.K.**

Demi Chung, Leonard Leye Li and Gary S. Monroe
School of Accounting, Auditing and Taxation
UNSW Sydney

**Abstract**

The implementation of MIIFRIC 12 by the UK Government in 2010 required government entities to recognise Project Finance Initiatives (PFI) assets and the liabilities on the government grantor's balance sheet. Prior to the implementation of MIIFRIC 12, most PFI assets and liabilities were not recognised on the grantor's balance sheet. MIIFRIC 12 had the effect of increasing the transparency regarding the reporting of PFI by grantors. In PFI, grantors are a revenue counterparty to PFI debt agreements because the grantor does not transact directly with lenders; loans are taken out by Special Purpose Vehicles (SPV) rather than grantors and the grantors provide revenue streams to the SPV by paying an annual unitary charge to service the debt, maintain the assets and provide a return to investors once the assets become operational. We examine whether the enhanced accounting transparency by a revenue counterparty increases the cost of borrowing for the borrower by examining whether the adoption of the new standard affects loan pricing on new PFI loans. We document that PFI loan spreads are higher after the implementation of MIIFRIC 12. The effect is more pronounced for grantors who were financially distressed, had a higher reliance on PFIs as a source of off-balance-sheet financing prior to MIIFRIC 12 and were more financially constrained. Our findings suggest that the reporting requirements under MIIFRIC 12 provide more transparency on the grantor's financial condition, which allows PFI lenders to better assess revenue counterparty risk. We provide evidence on whether the adoption of a new accounting standard by a counterparty, one without a direct transactional relationship with the lender, affects the lender's pricing decisions regarding the borrower's cost of borrowing. We also add new evidence to the question of whether capitalisation reporting requirements of off-balance-sheet liabilities affect lenders and other users' evaluations and decisions.

**Keywords:** IFRIC12; IPSAS 32; Project Finance Initiative; Public Private Partnerships; loan spread, government accounting

## 1 | INTRODUCTION

To fund large infrastructure projects, government entities may use a Project Finance Initiatives (PFI) to finance the project.[1] PFI and related schemes are design, build, finance and operation contracts between governments and private sector providers. They are a popular means used by governments to deploy private capital for public infrastructure developments and to transfer risks associated with the design, finance, construction, operation and maintenance of the asset from the government to private investors. The parties involved in PFIs include the government, (hereafter grantor[2]), a special purpose vehicle (SPV) with private investors (known as sponsors) that is established for the project and lenders that lend money for the project to the SPV. The contractual features in PFI arrangements introduce revenue counterparty risk[3] to the borrower-lender relationship because the grantor does not transact directly with lenders; loans are taken out by SPV rather than grantors and the grantor is the sole purchaser of all the outputs generated by the SPV. The grantor provides revenue streams to the SPV by paying an annual unitary charge once the assets become operational. Those revenue streams are used by the SPV to service the debt, maintain and operate the assets, and provide a return to investors.

In the financial year ending 31 March 2010, the UK Government[4] implemented a modified *IFRIC 12: Service Concession Arrangements* (MIIFRIC 12) on accounting for service concession

[1] Public Finance Initiatives is the terminology used in the UK. The terminology used in the US is usually Public Private Partnerships. We use the UK terminology as our study is based on UK data.
[2] Accounting standards govern PFI transactions, i.e., IPSAS 32, IFRIC 12 and MIIFRIC 12 define the government as the grantor. We adopt this terminology in the rest of the paper. Governments or grantors refer to ministerial departments, local governments, local fire and rescue authorities, local police authorities, National Health Service Trusts, and other government agencies, all of which are permitted to use their own resources to procure PFIs.
[3] Revenue counterparty risk is the risk of default due to the inability of the revenue counterparty to fulfil their obligations (Bonetti et al., 2010; Ahiabor and James, 2019), which in this case is the risk the grantor may not be able to make payments to the SPV.
[4] UK Government refers to the central government.

arrangements.[5] MIIFRIC 12 requires all PFI assets and liabilities to be recognised on the grantor's balance sheet, thus increasing transparency about the revenue counterparty risk in the PFIs. Prior research documents that counterparty risk is priced in loan spreads (Dailami and Hauswald, 2007; Bonetti et al., 2010; Corielli et al., 2010; Gatti et al., 2013; Ahiabor and James, 2019). However, prior research has not examined whether the method of accounting for PFIs is associated with loan spreads. We argue that the method of accounting for PFIs affects the disclosure of counterparty risk in these contracts and, therefore, we examine whether the implementation of MIIFRIC 12 in the UK affected the loan spreads on new PFI loans.

Prior research documents that lenders price their exposure to the SPV's counterparty risk in loan spreads (Dailami and Hauswald, 2007; Bonetti et al., 2010; Corielli et al., 2010; Gatti et al., 2013; Ahiabor and James, 2019; Moody's, 2022; Fitch, 2023). Specifically, the credit quality (Dailami and Hauswald, 2007; Bonetti et al., 2010) and financial condition (Moody's, 2022; Fitch, 2023) of the revenue counterparty are associated with the spreads of project loans. Dailami and Hauswald (2007) find that the credit spread of the revenue counterparty is a strong determinant of the credit spreads of the SPV's project bond. A similar study by Bonetti, Caselli and Gatti (2010) documents that the credit ratings of the revenue counterparty and the credit spreads of the SPV's project bonds are strongly inversely related. Rating methodologies by credit agencies (Moody's, 2022; Fitch, 2023) consider the revenue counterparty's credit quality, financial condition and financial distress as important factors in assigning ratings to PFI loans. Other studies (Corielli et al., 2010; Gatti et al., 2013; Ahiabor and James, 2019) extend the counterparty risk to include sponsors and lead arrangers as the counterparties.

[5] The financial year of UK government entities ends on 31 March, so a financial year covers the period from 1 April to 31 March.

Although prior research has examined the relation between counterparty risks and loan spreads for PFI lending, the effect of accounting for PFIs by the revenue counterparty on PFI loan spreads remains unexplored. This is because prior to the financial year ending 31 March 2010, most PFI borrowings were treated as off-balance sheet in the government accounts.[6] The adoption of MIIFRIC 12 by the UK Government in the financial year ending 31 March 2010 offers a unique opportunity to examine whether the method of accounting for PFIs, i.e., recognising the SPV's borrowing to fund the construction of the PFI assets on the grantor's balance sheet, affects PFI loan spreads. We expect that the adoption of MIIFRIC 12 will have a significant effect on loan spreads because the increased transparency about a grantor's PFI liabilities reduces the information asymmetry regarding the revenue counterparty's (the grantor) financial capacity and, therefore, revenue counterparty risk. Prior research argues that mandatorily increased transparency increases the cost of capital when it increases the overall risk of the firm's cash flows (Gao, 2010); elevates uncertainty about the future for users (Johnstone, 2016); increases lenders additional learning and monitoring costs to determine how borrower credit quality and cash flow capacity are captured under the new standards relative to prior accounting standards (Chen et al., 2015); reveals surprise information (Kalogirou et al., 2021); reduces the ability to comply with financial covenants (Chen et al., 2023) and increases firms' asset value volatilities (Chen et al., 2024). We argue that the adoption of MIIFRIC 12 increased transparency about grantors' counterparty risk through enhanced disclosures and the recognition of PFI assets and liabilities on the grantor's balance

[6] Accounting for PFIs by governments has received considerable criticisms (Grimsey and Lewis, 2002; Spackman, 2002; Heming, 2008; Heald and Georgiou, 2011; Hodges and Mellett, 2012). The criticisms include that off-balance sheet accounting facilitated governments to evade the public accountability process (Hodges and Mellett, 2005; Shaoul et al., 2012), enabled governments to procure projects they otherwise would not be able to afford (Benito et al., 2008; Khadaroo, 2014) and transferred public wealth to private profit (Stafford et al., 2010; Shaoul, 2011; Toms et al., 2011; Vecchi and Hellowell, 2013). More recent studies document that the off-balance sheet accounting for PFIs overstated governments' financial capacity (Buso et al., 2017) and understated government debt (Cracel Viana et al., 2021).

sheet. This should result in better assessments of revenue counterparty risk given that these projects are highly leveraged and the uncertainty about the grantor's cash flows is high. To compensate for the higher revenue counterparty risk, lenders will charge a higher risk premium on new PFI loans following the implementation of MIIFRIC 12.

We investigate whether the implementation of MIIFRIC 12 in the UK affected the loan spreads on new PFI loans by examining the loan spreads for PFI loan tranches with financial close dates in the eleven-year sample period with financial year ends from 31 March 2005 to 31 March 2015. We restrict our sample to mandatory government adopters who have new PFI loans both before and after the accounting change that occurred in the financial year ending 31 March 2010 and recognised PFIs on their balance sheet for the first time in the financial year ending 31 March 2010.[7]

We find that PFI loan spreads are higher after the implementation of MIIFRIC 12. This finding suggests that the reporting requirements under MIIFRIC 12 provide more transparency on the grantor's financial condition, which allow lenders to better assess the grantor's revenue counterparty risk with the consequence that lenders charge higher loan spreads for new PFI loans. The effect is economically and statistically significant. The increase in loan spreads post-MIIFRIC 12 implementation is approximately 68.8% of its mean and 73.3% of its standard deviation.

Next, we examine whether the effect is more pronounced for financially distressed grantors. We argue that financially distressed grantors have limited borrowing capacity and higher cash flow risk and, therefore, higher revenue counterparty risk. Recognising PFI on the grantor's balance

[7] In our sample period, there is only one voluntary adopter who has three projects with seven loan tranches. Due to the small sample size, we are unable to adopt the difference-in-differences research design. We focus on new loans because PFI loans are typically fixed rate loans so loan spreads on existing loans are not affected by the new standard.

sheet and the enhanced disclosures under the new reporting requirements enable PFI lenders to better identify financially distressed grantors with limited borrowing capacity and higher revenue counterparty risk. We measure grantors' financial distress based on the budgetary adjustments triggered by recognising PFI liabilities on the grantor's balance sheet as a result of MIIFRIC 12 (Fitch 2016), which ensures that the cross-section variation is solely driven by MIIFRIC 12 because these adjustments are only triggered by changes directly related to MIIFRIC 12 rather than other accounting standards. Consistent with our expectation, we find that the effect of MIIFRIC 12 adoption on loan spreads is more pronounced for grantors that are financially distressed.

Next, consistent with Chen, Correia and Urcan (2023), we examine whether the effect varies, in the cross-section, with the extent to which grantors rely on PFIs as a source of off-balance-sheet financing. We expect the effect of MIIFRIC 12 on loan spreads for new projects will be more pronounced for grantors that were more reliant on the use of PFIs. Prior to the implementation of MIIFRIC 12 the grantor's level of revenue counterparty risk was not very transparent and, therefore, difficult for lenders to assess. The adoption of MIIFRIC 12 brought the borrowings on to the grantor's balance sheet and enhanced the disclosures of PFIs, resulting in increased transparency about a grantor's level of revenue counterparty risk. Grantors with more reliance on the use of PFIs to fund infrastructure projects have higher revenue counterparty risk and this increased transparency is likely to increase the risk assessments for grantors with greater reliance on the use of PFIs more than grantors with less reliance on PFIs. This should result in higher loan spreads for new PFI projects for grantors that are more reliant on PFIs. We find evidence that is consistent with our expectation that our main results are more pronounced for PFI-intensive grantors, i.e., grantors who have more off-balance-sheet PFI projects in the year prior to the

adoption of MIIFRIC 12. This provides some assurance that the effect we observe is driven by the adoption of MIIFRIC 12 rather than other accounting standards, other regulatory changes or changes in macroeconomic conditions.[8]

We also conduct cross-sectional tests to examine whether the effect of MIIFRIC 12 on loan spreads is more pronounced for grantors that are more financially constrained in the year of implementation. Our results indicate that the effect of MIIFRIC 12 on the loan spreads of new PFIs are more pronounced for grantors that are more financially constrained.

Our main result is robust to alternative measures of loan spread, controlling for Basel II and other macro-economic effects including the austerity effect,[9, 10] the GFC effect, removing observations from the year that MIIFRIC 12 was adopted and excluding observations where the grantor has an equity interest in the PFI project.

The concurrent adoption of International Financial Reporting Standards (IFRS) by the UK Government poses an important challenge to the identification of the effect of MIIFIRC 12 on loan spreads for PFIs. However, prior research documents that most of the changes arising from the switch to IFRS were not related to accounting for PFIs as there was no equivalent standard in IFRS

[8] To the best of our knowledge, there is no government in other countries or jurisdictions accounted for their PFIs/PPPs under MIIFRIC 12/IPSAS 32 or a similar standard prior to IFRS adoptions. For this reason, we are unable to perform a placebo test. However, we believe that the two-way interaction term between MIIFRIC 12 and the budgetary adjustment specifically related to MIIFRIC 12 and MIIFRIC 12's two-way interaction with PFI reliance intensity alleviate the concern regarding the identification challenge.

[9] The implementation of Basel II regime occurred in January 2008 in the UK. Under Basel II, banks are allowed to use internal risk models to calculate capital requirements or adopt a new standardised approach. Following the implementation of Basel II, banks lowered the residential property mortgage risk weights with the result of a reduction in mortgage rates (Benetton et al., 2021).

[10] In 2010, the UK Government introduced austerity measures, which include cutting public expenditure and government grants, with the aim of eliminating current budget deficit and reduce national debt as a percentage of GDP. We expect these measures have minimal effects on PFI procurements since grantors must rely on their own cash resources for interest and debt repayments related to PFIs (NAO, 2018). In addition, local authorities partially offset the reduction in grants through a combination of raising local tax, charging more for services or developing new sources of revenue, i.e., providing more advanced or complicated care services (Hoddinott et al., 2022).

that related to PFIs and IFRS and UK GAAP were very similar on other accounting issues that might affect reporting on PFIs (Ellwood and Garcia-Lacalle, 2012; Hodges and Mellett, 2012), which alleviates the concern that the increase in loan spreads is driven by changes in accounting standards unrelated to MIIFRIC 12. In addition, our tests for financial distress and grantor reliance on PFI funding for infrastructure financing provide some assurance that the effect we observe is driven by the adoption of MIIFRIC 12 rather than the adoption of IFRS. To further address the identification issue, we take advantage of the delayed adoption of IFRS by local governments, which provides us with a one-year post-implementation window to test the MIIFRIC 12 effect on loan spreads when IFRS had not yet been adopted by local governments. We reperform our main tests on a reduced sample of grantors that are local governments during the periods five years before and one year after the MIIFRIC 12 implementation by local governments. The results for the reduced sample are consistent with our main results except we find insignificant results for the cross-sectional test that relates to reliance on PFI financing, which may be attributed to the much smaller sample size. These findings reduce the concern that our main results are driven by the concurrent adoption of IFRS.

Our findings provide evidence that is new to the literature. We document that the enhanced accounting transparency on previously unreported borrowings by a revenue counterparty increases the cost of borrowing for the borrower, thus making several important contributions to the accounting literature. First, we add to the ongoing debate concerning the consequences of accounting standards on the cost of debt. Some studies document that transparency is associated with a lower cost of debt not only for private firms but also government agencies (Benson et al., 1984; Amihud and Mendelson, 1986; Handa and Linn, 1993; Sengupta, 1998; Duffie and Lando, 2001; Yu, 2005; Wittenberg-Moerman, 2008; Armstrong et al., 2010), while other studies do not

find these benefits exist in the private debt market (Florou and Kosi, 2015). Kalogirou, Kiosse and Pope (2021) further document that IAS 19 produces discriminative effect on the cost of debt for financially risky firms and these firms incur a higher cost of borrowing following the implementation of IAS 19 that brought pension liabilities on the mandatory adopters' balance sheets. Our study differs from prior research that examines the effect of new accounting standards that result in recognising off-balance-sheet liabilities on the adopter's balance sheet on the cost of debt. Prior research examines the direct consequences of a company's adoption of accounting standards. We provide evidence on whether the adoption of accounting standards by a counterparty, one without a direct transactional relationship with the lender, affects the lender's pricing decisions regarding the borrower's cost of borrowing. This indirect effect from a change in an accounting standard on the cost of debt has not previously been investigated. Understanding this effect is important because it reveals how regulatory changes can influence financial decision-making beyond the directly affected parties.

Second, we add to the project finance literature that examines the association between characteristics of counterparties and PFI loan spreads (e.g., Dailami and Hauswald, 2007; Bonetti et al., 2010; Corielli et al., 2010; Gatti et al., 2013; Ahiabor and James, 2019). This line of research focuses on the associations between the financial characteristics of the revenue counterparty and PFI loan spreads (Dailami and Hauswald, 2007; Bonetti et al., 2010), the characteristics of the lead arranger in loan syndicates and PFI loan spreads (Gatti et al., 2013); and the impacts of the other roles that sponsor counterparties assume in the PFI contracts on PFI loan spreads (Corielli et al., 2010; Ahiabor and James, 2019). We extend this literature by documenting that the accounting method adopted by the counterparty has a strong association with PFI loan spreads. Previous research has not examined this issue. This is an important issue to examine because the accounting

policy adopted by the counterparty affects the lender's ability to assess the counterparty risk and adjust loan spreads in response. The findings provide borrowers and users with useful insights to understand the informational value of accounting by a counterparty, which has not been explored in the project finance literature, that lenders consider in pricing their loans.

Third, our findings add new evidence to the question of whether capitalisation reporting requirements of off-balance-sheet liabilities affect lenders and other users' evaluations and decisions, which has been a matter of contention for many years. Recent studies (Wilkins and Zimmer, 1983, Altamuro et al., 2014, Kraft 2015, Lim et al., 2017) find that credit rating agencies, creditors and banks price their risk assessments for off-balance-sheet debt such as operating leases in credit spreads. In contrast, our finding that the implementation of MIIFRIC 12 has a significant positive association with PFI loan spreads suggests that the off-balance-sheet borrowings by the revenue counterparty were not priced by lenders when making lending decisions for PFI financing.

The paper proceeds as follows. The next section outlines the background on the accounting for PFIs in the UK and is followed by the hypothesis development in section three; section four details the research design; section five reports the sample selection process, section six describes the data and section seven discusses the empirical results; the final section concludes the paper and identifies several areas for future research.

## 2 | BACKGROUND

Public Private Partnerships are a popular financing scheme used by governments to fund large scale public infrastructure, which gained popularity in the early 1980s (Brealey et al., 1996). A related scheme, PFI was introduced in the UK in 1992. The value of such financing schemes at the

global level as of February 2020 totalled US$36.5 trillion.[11] PFIs are highly leveraged with a typical debt level of 90% (NAO, 2009a), and most loans are in the form of senior debt from bankers and syndicated loans (HM Treasury, 2003). The overall cost of capital for PFI projects that are over 10-15 years in maturity was about 150 to 200 basis points (bps) above the reference gilt rate (SCEA, 2010) or 60-150 bps above the nominal cost of Government borrowing (NAO, 2009a).

The parties in a PFI involve a government grantor, lenders and a SPV, which is usually formed for the sole purpose of undertaking a single PFI project.[12] The SPV is owned by a consortium of project sponsors, which typically include two or three companies made up of construction firms, facility management companies and investment banks. The grantor only transacts with the SPV and does not enter borrowing agreements with lenders. A lender loans money to the SPV (the borrower) and the grantor is not responsible for the liabilities incurred by the SPV. The SPV constructs the asset and manages the operations of the asset until some future point in time when the SPV transfers ownership of the asset to the grantor. The grantor only makes payments to the SPV once the asset is operational and the asset-based services are being delivered. After the asset is operational, the grantor pays the SPV a periodic unitary charge, which includes capital and interest elements to cover the cost of the asset, investor returns and a service element to cover the operations and maintenance of the asset.

A unique feature of PFI lending is that the loans are non-recourse, i.e., if the SPV is unable to pay off its debt, the lenders have no right to the assets of the SPV's sponsors but only the assets

[11] Data were obtained from Refinitiv Project Finance database.
[12] Appendix 1 illustrates a web of relationships amongst the contractual parties in a PFI project.

controlled by the SPV.[13] Revenue streams that take the form of an annual unitary charge come from the grantor. In most PFI projects, the grantor's annual unitary payments are the sole source of the project revenue and are used to repay debt, cover interest on borrowings, fund construction and operations, and provide a return to investors (Demirag et al., 2011). These contractual features introduce revenue counterparty risk to the borrower-lender relationship because the grantor may not be able to make payments to the SPV. The relationship web illustrated in Appendix 1 shows grantor only enters into a contractual relationship with the SPV and is not liable for costs and loans incurred by the SPV. Lenders, capital investors and other service suppliers rely on the cash flows from the grantor as their sources of principal repayments and investment returns.

Against this backdrop, a question arises as to who needs to recognise PFI-related assets and liabilities on the balance sheet. Prior to the financial year ending 31 March 2010, accounting for PFIs by grantors was subject to FRS 5A (ASB, 1998) and a Treasury interpretation (Treasury Taskforce, 1999). Both standards were based on the 'risks and rewards' approach borrowed from *IAS 17*: *Leases*. The ambiguous risk transfer calculations under those reporting requirements allowed for considerable management discretion on how such contracts should be treated. In practice, the 'risks and rewards' assessment criteria resulted in governments adopting the 'technicist' approach to accounting to quantify the risks transferred in such a way to keep PFI

[13] The UK governments only guarantee loans taken out by SPVs in exceptional circumstances. For example, to deal with concerns of potential lenders, particularly the continued disagreement between Transport for London and the UK Government about the PPPs, the UK government provided assurance to Metronet's (the SPV of London Underground infrastructure modernisation project) lenders to guarantee 95% of its debt obligations (NAO, 2009b). The government will let grantors with excessive borrowings be dissolved. For example, South London Healthcare NHS Trust was put into administration in July 2012 due to its unsustainable level of debt and was subsequently dissolved. All three hospitals under the Trust were financed by PFI and were transferred to different NHS trusts after the dissolution. Northamptonshire County Council, another government that heavily relied on PFI for capital works (in the council's 2018/19 Statement of Accounts, the reported PFI debt alone accounts for 83% of its revenue reserve) was subject to the same fate after declaring bankruptcy in 2018 and was ultimately dissolved in 2021 with its functions reorganised into two unitary authorities – North and West Northamptonshire.

contracts off the government's balance sheet to avoid being accounted for as borrowings (Froud, 2003). As a result, most PFI contracts stayed off-balance sheet under the risks and rewards criterion (Hodges and Mellett, 2012). The accounting guidance then was intended to support the political agenda that encouraged public sector organisations to enter into operating lease agreements to transfer risks to the private sector with only the lease payments counting as expenditure and without their capital budgets being cut (SCEA, 2010). To promote the use of PFIs, in 1993 the Chancellor of the Exchequer, Kenneth Clarke made it plain that the Treasury would not approve any capital project unless options to secure PFI finance had been explored (House of Commons, 2014). This off-balance-sheet accounting was largely responsible for the popularity of the PFI schemes (NAO, 2009a) because it made PFIs seemed more affordable from the grantor's perspective.

Financial disclosures under the off-balance-sheet treatment were at the grantor's discretion and were inconsistent across grantors, varying from little to none.[14] These inconsistent on/off balance sheet reporting practices reflected the lack of comparability in accounting for PFI contracts (Hodges and Mellet, 2005). The introduction of MIIFRIC 12 was intended to put an end to the inconsistent discretionary reporting of PFIs.

In March 2007, HM Treasury announced its decision to switch UK government accounting from UK GAAP to IFRS for the financial year ending 31 March 2009. However, this was later rescheduled to the financial year ending 31 March 2010,[15] in part due to the absence of guidance

[14] Appendix 2 presents two examples of disclosures for PFI schools by two different borough councils in London.
[15] The implementation of IFRS for local government entities was delayed for a further year, i.e., it was implemented for the first time in the financial year ending 31 March 2011. This was to ease the transition to IFRS for these smaller entities (FRAB, 2011; Ellwood and Garcia-Lacalle, 2012).

in IFRS regarding the accounting for PFIs by the public sector (Hodges and Mellett, 2012).[16] The only accounting standard on PFI contracts at the time, *International Financial Reporting Interpretations Committee (IFRIC) 12: Service Concession Arrangements*, only governed the reporting for these contracts from the perspective of private sector operators, which was not applicable to the public sector. To fill this void, HM Treasury developed a practice guidance based on the mirror image of IFRIC 12 for grantors - MIIFRIC 12, which mandates all PFI transactions be evaluated against the 'control' criteria, resulting almost all PFIs being recognised on grantors' balance sheet.[17]

The direct accounting changes resulting from the adoption of MIIFRIC 12 include the capitalisation requirement to bring all PFI related assets and liabilities on to the government's balance sheet and itemising the related financing costs as interest expense in the income statement. Moreover, the adoption of MIIFRIC 12 resulted in these PFI commitments being brought back to the capital budgeting provisions and being counted towards the grantor's total borrowings. Consequentially, grantors must adjust their revenue reserves to comply with the "prudent provision" statutory duty to ensure that all borrowings and capital spending are affordable, prudent and sustainable.

## 3 | LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

In PFIs, lenders rely on the project sponsors or the lead arranger (if the loans are syndicated) for information about the project and are not directly involved in the project negotiations with the

[16] The international public sector accounting standard for PFIs and related schemes *IPSAS 32, Service Concession Arrangements: Grantor* was issued in October 2011.

[17] MIIFRIC 12 requires that the accounting treatment for PFIs by the grantors be consistent with the treatment used by private operators. For example, if the private operator accounts for the PFI contract as off-balance sheet, then the grantor should account for the same contract as on-balance sheet. MIIFRIC 12 was the precursor to IPSAS 32 and does not differ significantly from IPSAS 32.

grantor (Demirag et al., 2011). However, lenders bear the costs of unforeseen contingencies and potential opportunistic behaviour by the grantor because the grantor's cash flows are the major source of revenue that effectively secures the borrowing. Thus, the uncertainty regarding the grantor's financial capacity and behaviour creates a counterparty risk for lenders.

Several studies in the project finance literature document how lenders price their concerns for revenue counterparty risk (Dailami and Hauswald, 2007; Bonetti et al., 2010), sponsor counterparty risk (Corielli et al., 2010; Ahiabor and James, 2019), and lead arranger counterparty risk (Gatti et al., 2013) in loan spreads. Among the concerns for the counterparty risk, lower credit quality of the counterparty (Dailami and Hauswald, 2007; Bonetti et al., 2010), limited financial capacity of the counterparty (Moody's, 2022; Fitch, 2023), and whether the counterparty will supply certain types of goods or services to the SPV (Corielli et al., 2010), have all been found to have a significant positive association with loan spreads. In contrast, Gatti et al. (2013) find that loan spreads for project finance loans are significantly lower for credits arranged by prestigious banks and Ashiabor and James (2019) also report a similar result that loan spread is reduced when loans are certified by domestic lead arrangers. Corielli et al. (2010) examine whether the use of non-financial contracts to shift risks from the SPVs to their counterparties reduces the level of loan spreads. They report mixed evidence, with the findings dependent on the type of contract and whether the sponsors (equity holders) are a counterparty (signatory) to the contract.[18]

MIIFRIC 12 requires grantors to report all PFI related assets and liabilities on their balance sheets. Specifically, the principal and interest components of the PFI liabilities must be separately

[18] These non-financial contracts are designed to reduce cash flow volatility for the SPV and include contracts for construction, engineering procurement and construction, purchasing of materials, sales agreements to sell outputs to a third party at a predetermined price, and operation and management of the assets of the SPV.

reported as borrowings and financing costs. The new reporting requirements reduce information asymmetry between the grantor and the lender who previously could only rely on second hand information about the grantor from the project sponsors thus providing lenders with much more transparent information to assess the revenue counterparty risk.

Prior research demonstrates analytically and empirically that increased transparency can have a negative effect on cost of capital for some companies. For example, Gao (2010) suggests that better disclosure quality could increase cost of capital when it reveals the overall risk of the firm's cash flows. In a similar vein, Johnstone (2016) demonstrates that better financial reporting can often create greater uncertainty about the future for users or create greater certainty on unfavourable information that reduces future payoffs. Kalogirou et al. (2021) show that the reporting of previously off-balance-sheet pension-related debt in France increased the cost of borrowing for firms where enhanced transparency reveals surprise information. A related paper on new pension reporting requirements under SFAS No.158 (2006) in the US by Chen et al. (2024) report similar findings that the volatility of the defined benefit plan's funded status revealed by the new requirements increases the firm's credit risk. Chen et al. (2023) document that the capitalisation of finance leases in some European countries leads lenders to demand higher interest rates on current and future borrowings. The new information revealed under mandatory disclosure is associated with higher interest rates for borrowers because lenders incur additional learning and monitoring costs to determine how borrower's credit quality and cash flow capacity are captured under the new standards relative to prior accounting standards (Chen et al., 2015).

Consistent with this line of literature, we argue that the enhanced disclosures under MIIFIRC 12 will increase the loan spreads charged on new PFI loans after the implementation of MIIFRIC 12. This is because the more transparent disclosures under the new reporting requirements provide

new information that informs lenders about the uncertainty regarding grantors' financial capacity and cash flow risk, which were previously unknown to lenders. The emphasis on the "control" criteria under MIIFRIC 12 effectively means that new information that is useful to evaluate the risk and uncertainty of all public services provided by the grantor are revealed, whereas the "risks and rewards" criteria under the previous reporting requirements only considered the risks of a particular project (Froud 2003). In other words, MIIFRIC 12's reporting requirements reveal a grantor's revenue counterparty risk through its financial capacity and revenue generation potential to service its borrowings.

The grantor's financial capacity and revenue generation potential should be a concern for PFI lenders because the grantor pays the SPV a periodic unitary charge. The grantor's periodic unitary payments are usually the sole source of the project revenue used to repay debt, cover interest on borrowings, fund construction and operations, and provide a return to investors (Demirag et al., 2011). If the grantor does not generate sufficient cash flow to pay the unitary charge to the SPV, then the SPV will not be able to service its debt. Therefore, PFI lenders are concerned with the grantor's revenue counterparty risk to the borrower-lender relationship (Bonetti et al., 2010; Ahiabor and James, 2019). The enhanced disclosures and recognition of the PFI assets and liabilities on the balance sheet should result in better assessments of revenue counterparty risk given that these projects are highly leveraged and the uncertainty about the grantor's cash flows is high. To compensate for the higher revenue counterparty risk, lenders will charge a higher risk premium on new PFI loans following the implementation of MIIFRIC 12. We state our first hypothesis as follows:

*Hypothesis 1. The loan spreads on new PFI loans are higher following the implementation of MIIFRIC 12.*

Our arguments are not without tension, as it is possible that PFI lenders would not price counterparty risk into the debt agreements. For example, Vecchi and Hellowell (2013) argue that that PFIs are risk-free investments since the chance of credit default is rare and that the UK Government would not allow certain projects to fail, thus casting doubt on the information value of accounting disclosures on PFIs. However, most grantors are at the local authority level (i.e., councils and NHS trusts) and they are responsible for their own borrowings.[19] It's not the UK Government's position to provide financial support or bail out local authorities who have encountered severe financial difficulties. The UK Government has always maintained its position of not providing guarantees for PFI borrowings.[20]

Prior research on accounting standards that require capitalisation of previously off-balance-sheet liabilities shed additional light on the differentiated effects of transparency on companies with high financial risk. Kalogirou et al. (2021) document that the effect of the increased transparency under IAS 19 in France result in decreased leverage and higher cost of debt, but the results only hold for companies with high financial risk. Their findings indicate that, in the absence of transparency, companies with high financial risk have higher levels of debt and incur a lower cost of debt than they would under more transparent reporting requirements for pensions.

[19] A limited number of grantors are at the ministerial departmental level, such as Department of Health & Social Care, who through primary care trusts, entered into substantial amount of LIFT projects. Others include the Ministry of Defence and the Department for Transport.

[20] For example, in the national health sector, potential lenders collectively expressed concerns about the ability of hospital trusts to meet their financial obligations. The "National Health Service (Residual Liabilities) Act" passed in 1996 gave the lenders certain protections, but these fell well short of a commitment that the UK Government will stand behind the debts of NHS Trusts. Another example in the education sector further reinforced the UK Government's stand on PFI debts. In 2004, the insolvency of Jarvis PLC, a major contractor in PFI schools, threatened to place several projects in default. The UK Treasury made it clear to lenders that no additional government support would be forthcoming. Lenders were forced to deal with the consequences of the failure, resulting in many lenders incurred significant losses (EPEC, 2011).

We argue that the effect of MIIFRIC 12 on loan spreads is more pronounced for financially distressed grantors because these grantors have limited capacity to borrow and higher cash flow risk and, therefore, higher revenue counterparty risk. Under the previous reporting requirements for PFIs, it was difficult to identify financially distressed grantors that relied on PFIs as a means of financing projects. The enhanced disclosures under the new reporting requirements enable PFI lenders to better identify financially distressed grantors with limited borrowing capacity and higher revenue counterparty risk. Therefore, we expect the effect of MIIFRIC 12 on loan spreads for new PFI loans is more pronounced for financially distressed grantors. We state this expectation in the second hypothesis as follows:

*Hypothesis 2. The effect of the implementation of MIIFRIC 12 on loan spreads for new PFI loans is more pronounced for financially distressed grantors.*

Consistent with Chen et al. (2023), we also examine whether the effect varies, in the cross-section, with the extent to which grantors rely on PFIs as a source of off-balance-sheet financing. Grantors with more reliance on the use of PFIs to fund infrastructure projects have higher revenue counterparty risk because they have more off-balance-sheet debt and greater demands on their cash flows to pay unitary charges. In addition, prior to the implementation of MIIFRIC 12, financial disclosures under the off-balance-sheet treatment were at the grantor's discretion and were inconsistent across grantors, varying from little to none (Shaoul et al., 2010). This problem is exacerbated for grantors with more reliance on the use of PFIs, thus leading to a greater understatement of their revenue counterparty risk. The implementation of MIIFRIC 12 brought the borrowings on to the grantor's balance sheet and enhanced the disclosures of PFIs, and this is likely to increase the risk assessments for grantors with greater reliance on the use of PFIs more than grantors with less reliance on PFIs. Therefore, the implementation of MIIFRIC 12 is expected

to have a more pronounced effect on loan spreads on new projects funded after the implementation of MIIFRIC 12 for grantors that were more reliant on the use of PFIs. This leads to our third hypothesis as follows:

*Hypothesis 3. The effect of the implementation of MIIFRIC 12 on loan spreads for new PFI loans is more pronounced for grantors with higher reliance on PFIs before the implementation of MIIFRIC 12.*

## 4 | RESEARCH DESIGN

To test our hypotheses, we take advantage of the move from FRS 5A to MIIFRIC 12 in the UK government sector in the financial year ending 31 March 2010. We employ a pre- and post-MIIFRIC 12 research design to test the effect of the implementation of MIIFRIC 12.[21] To provide reliable tests of differences between the pre- and post-MIIFRIC 12 periods, we require grantors in the sample to have new PFIs procured during our sample period both before and after the adoption year. We focus on new PFIs procured during our sample period rather than all PFIs because PFI loans are usually fixed-rate loans. That means the implementation of MIIFRIC 12 would not have an impact on loan spreads for ongoing PFI loans.

Following Corielli, Gatti and Steffanoni (2010) and Ahiabor and James (2019), we use a single loan tranche as a unit of observation and the year in which financial close occurred as the reference year for each loan tranche. [22]

[21] We do not use a difference-in-differences design because there is no control group. All grantors are required to comply with the new standard and there was only one grantor in our sample period that recognised PFIs on its balance sheet prior to the implementation of the new standard. The number of grantors in the control group is not sufficient to perform any meaningful statistical tests.

[22] The UK Government's financial reporting year runs from 1 April to 31 March. We use the year in which financial close occurred as the cut-off to determine whether a new loan was issued before or after the implementation of MIIFRIC 12, i.e., if the financial close date is before (after) 1 April 2009, the loans are regarded as financed before (after) MIIFRIC 12.

We estimate the following model to test Hypothesis 1.

$$LoanSpread_{ijt} = \beta_1 MIIFRIC12_{kt} + \sum\beta LoanCharacteristics_{ijt} + \sum\beta ProjectCharacteristics_{jt} + \sum\beta GrantorCharacteristics_{jkt} + \sum\beta MacroEffects_{t} + Industry\ FEs + Grantor\ FEs + \varepsilon_{ijt} \quad (1)$$

The dependent variable $LoanSpread_{ijt}$, is calculated as the difference between the interest rate on loan tranche *i* for project *j* in fiscal year *t* within our sample period (2005-2015) and the risk-free rate (UK daily gilt rate) with matching loan characteristics. We match the issue dates and loan terms of the PFI loan tranches with the relevant UK daily gilt rate to compute the risk adjusted interest rate on loan tranches. For our sensitivity tests, we also define the dependent variable using (1) PWLB[23] as the base rate, (2) the interest rate on loan tranche *i* adjusted for different base rates, i.e., the gilt and the PWLB rate, scaled by the loan maturity (Blanc-Brude and Strange, 2007), and (3) the natural logarithm of the rates defined above (Graham et al., 2008; Altamuro et al., 2014). We use the financial close dates as the cut-off to define our test variable, $MIIFRIC12_{kt}$ is set to one for loans with financial close dates on or after 1 April 2009. A significant positive coefficient on *MIIFRIC 12* supports Hypothesis 1.

Following prior research, we include several control variables that have been found to be associated with loan spreads. $LoanCharacteristics_{ijt}$ include a suite of control variables for loan tranche *i* that prior research finds to be associated with loan spreads. Following Graham, Li and Qiu (2008), Corielli, Gatti and Steffanoni (2010) and Ahiabor and James (2019), we include loan tranche amount (*Size*) and maturity (*Maturity*) as controls at the loan tranche level. Prior studies

[23] PWLB (Public Works Loan Board rate) lending facility is operated by the UK Debt Management Office (DMO) on behalf of HM Treasury and provides loans to local authorities, and other specified bodies, from the National Loans Fund, operating within a policy framework set by HM Treasury. The loans are for capital projects. https://www.dmo.gov.uk/responsibilities/local-authority-lending/about-pwlb-lending/

suggest that loan spreads are inversely related to *Size*, *Maturity*, hence we predict the coefficients on *Size* and *Maturity* are negative. *Senior* is an indicator variable equal to one if the loan is a senior loan. In line with Ahiabor and James (2019), we expect a negative coefficient on *Senior*.

$ProjectCharacteristics_{jt}$ include control variables for project *j*. *TranchNum* is the total number of loan tranches per project at financial close (Guedes and Pino, 2023). In line with the literature, we predict a negative coefficient. Corielli, Gatti and Steffanoni (2010) report that project leverage is associated with loans spreads. We therefore include the equity to debt ratio (*EquityDebt*) and expect a negative coefficient.[24] *DSCR* is the debt service coverage ratio (Demirag et al., 2011). *WAS* is the project's weighted average spread, computed as the weighted average between spreads on loans and the tranche amount's weight in the deal size (Guedes and Pino, 2023). We predict the coefficient on *DSCR* is negative while the coefficient on *WAS* is positive. Demirag, Khadaroo, Stapleton and Stevenson (2011) argue that risk-taking by grantors mitigates lenders' risk aversion, which will result in lower loan spreads for PFIs. We use grantor's equity interest in the SPV (*GrantorEquity*) as a measure of the grantor's risk-taking and predict the coefficient on *GrantorEquity* is negative. *ProjectSize* is the total value of the SPV's assets (Corielli et al., 2010) measured using the cost of project *j* at construction completion. *FinCost* is the total financing cost of project *j*, i.e., bank fees, transaction fees, commissions; and *TtlDebtDeal* is the sum of all tranche amounts per project (Guedes and Pino, 2023). In accordance with previous research, we expect *ProjectSize* (Corielli et al., 2010) and *FinCost* (Guedes and Pino, 2023) will have positive coefficients while *TtlDebtDeal* will have a negative coefficient (Guedes and Pino, 2023).

[24] In our sample, most projects are highly leveraged with over 57% of projects being 100% financed by debt. We use the equity to debt ratio rather than the more traditional debt to equity ratio to avoid the issue of dividing by zero equity. This also has the effect of reversing the expected sign compared to using the debt-to-equity ratio.

We control for grantor characteristics $GrantorCharacteristics_{jkt}$ using grantor $k$'s accumulated PFI experience, measured by the total number of projects that the grantor had previously procured when taking out new PFIs in financial close year $t$ *(Experience)*. Studies (Demirage et al., 2011; Chung and Hensher, 2015) document that lenders' risk-aversion is mitigated by working with grantors who are more experienced, we therefore expect *Experience* will lower the grantor's revenue counterparty risk for lenders and have a negative coefficient.

To address concerns that loan pricing is correlated with a country's overall economic factors, we control for macro-level effects such as share market price index (*SPI*), and market sector infrastructure investments (*MktInfInvt*) in the UK for fiscal year $t$ (Guedes and Pinto, 2023). We control for the implementation of Basel II by including *BASEL2*, which is an indicator variable set equal to one for loan tranches with financial close date on or after January 2008. The Basel II reform was implemented in January 2008 and deregulated the capital requirements imposed on lenders. As the result, mortgage rates fell 10-16bp on average (Benetton et al., 2021). If Basel II has an effect on *LoanSpread*, we expect a negative coefficient on *BASEL2*. We also control for the government austerity measures. Coinciding with the timing of MIIFRIC 12 adoption, the UK Government introduced austerity measures in 2010 with the aim of eliminating current budget deficits and reducing national debt as a percentage of GDP. Capital allocations by the central government fell substantially by 36.3% in real terms between the financial years ending 31 March 2010 and 31 March 2013 (Atkins et al., 2020). We expect the austerity measures will have little effect or no effect on PFI procurements since grantors must rely on their own cash resources for interest and debt repayments related to PFIs (NAO, 2018). In addition, local authorities partially offset the reduction in grants through a combination of raising local tax, charging more for services or developing new sources of revenue, i.e., providing more advanced or complicated care services

(Hoddinott et al., 2022). We capture government austerity measures using *GovtCap*, which is calculated as total government capital spending as a percentage of GDP. Finally, we control for industry and grantor fixed effects and cluster standard errors by grantors. Appendix 3 provides variable definitions and data sources.

Hypotheses 2 and 3 examine MIIFRIC 12's differential effects on grantors. We expect the effect of MIIFRIC 12 on *LoanSpread* is more pronounced for grantors that are more financially distressed and that were more reliant on PFIs prior to the implementation of MIIFRIC 12. We estimate the following models (2) and (3) to test Hypotheses 2 and 3:

$$LoanSpread_{ijt} = \beta_1 MIIFRIC12_{kt} + \beta_2 FinDistress_{kt} + \beta_3 MIIFRIC12_{kt} \times FinDistress_{kt} + \sum \beta LoanCharacteristics_{ijt} + \sum \beta ProjectCharacteristics_{jt} + \sum \beta GrantorCharacteristics_{jkt} + \sum \beta MacroEffects_{t} + Industry\ FEs + Grantor\ FEs + \varepsilon_{ijt} \quad (2)$$

Model (2) includes all the variables from model (1) and adds $FinDistress_{kt}$ and its interaction with $MIIFRIC12_{kt}$. We adopt credit agencies' evaluation criteria (Fitch, 2016) and use the adjusted revenue reserve to construct a measure to capture a grantor's financial distress. The increase in recognised borrowings resulting from MIIFRIC 12 triggered a budgetary adjustment under which grantors must make a statutory charge to their revenue reserve to ensure there is sufficient revenue in the future to repay existing liabilities. Reserve adjustments below the recognised PFI liabilities are considered a sign of growing financial distress because adjustments above the PFI liabilities would compromise their revenue spendings in the financial year following the adjustment on service delivery required as part of their statutory duties, e.g., education and health care services for their local constituents (Fitch, 2016).[25] Therefore, we set an indicator variable, $FinDistress_{kt}$,

[25] To ensure that borrowings are prudent and affordable, all governments in the UK are subject to borrowing limits set by the HM Treasury (Bailey et al., 2012). Imprudent levels of borrowing would result in the grantor's capital budgets

equal to one for grantors whose reserve levels are below the reported PFI borrowings, and zero otherwise. A significant coefficient on the interaction term $MIIFRIC12_{kt} \times FinDistress_{kt}$ ($\beta_3$) supports Hypothesis 2.

$$LoanSpread_{ijt} = \beta_1 MIIFRIC12_{kt} + \beta_2 Intensity_{kt} + \beta_3 MIIFRIC12_{kt} \times Intensity_{kt} + \sum \beta LoanCharacteristics_{ijt} + \sum \beta ProjectCharacteristics_{jt} + \sum \beta GrantorCharacteristics_{jkt} + \sum \beta MacroEffects_{t} + Industry\ FEs + Grantor\ FEs + \varepsilon_{ijt} \quad (3)$$

Model (3) includes all the variables from model (1) and adds $Intensity_{kt}$ and its interaction with $MIIFRIC12_{kt}$, $Intensity_{kt}$ takes the value of one if the total number of PFI projects by grantor $k$ in the pre-MIIFRIC 12 period, i.e., as of 31 March 2009 is above the sample median, and zero otherwise. The variable of interest for Hypothesis 3 is $MIIFRIC12_{kt} \times Intensity_{kt}$. If, as predicted, grantors with a higher reliance on PFI pre-MIIFRIC 12 will experience a stronger effect of MIIFRIC 12, then $\beta_3$ should be significantly positive.

## 5 | SAMPLE SELECTION AND DATA

The sample selection process is detailed in Table 1. We require data on loan tranches, projects, and grantors. Before collecting data on loan tranches, we first need to identify the PFI projects.

being cut. Without sufficient budget allocations from the central government, the grantor may have to rely on borrowing to deliver its statutory service obligations to the local residents and businesses. Grantors with excessive borrowings may wind up being dissolved. Under the prudent requirements, the increase in the recognised borrowing resulting from MIIFRIC 12 triggered a budgetary adjustment under legislations (e.g., the Local Government Finance Act 1992, National Health Service Act 2006, Appropriation Acts) governing grantors' financial prudent behaviours, which mandate grantors must make a statutory charge to its revenue reserve to earmark future debt repayments from the existing borrowing. Grantors are not permitted to use HM Treasury's cash allocations for PFI capital investments; but must rely on their own cash resources for interest and debt repayments related to PFIs (NAO, 2018). However, these legislations do not specify the levels of charge to the reserve (Sandford, 2023), leaving the levels of adjustment at the grantor's discretion. The levels of budgetary adjustment are evaluated by credit agencies as one of the criteria to assess the grantor's ability, who acts as the revenue counterparty in PFIs, to meet the PFI commitments (Fitch, 2016; Moody's, 2022; Fitch, 2023), hence will be taken into account in their rating assessments on PFI loans. The levels of earmark adjustment that are below the recognised PFI borrowing are considered as a sign of growing financial distress (Fitch, 2016).

HM Treasury published a list of all PFI projects up to financial close dates in October 2018.[26] The published data only includes projects that are delivered or supported by departments and devolved administrations and procured under standard PFI contract terms. Other forms of PFIs, such as NHS projects under the Local Improvement Finance Trust (LIFT) programme, are not covered. The list contains 684 PFI projects covering the information from the grantor's perspective, however many project characteristics are missing.

To obtain project level data including loan tranche spreads, we extract project finance data for the UK from the Refinitiv Project Finance database to obtain a list of 800 projects. After merging the two data sets, dropping the duplicated projects, unidentifiable projects and projects that are not PFIs, we are left with a list of 666 projects with financial close dates from 1991 to 2020. We restrict our sample to an 11-year period that begins five years before and ends five years after the implementation of MIIFRIC 12 (2005 – 2015). As part of our research design, we require the grantors in the sample to have new PFI loans procured during our sample period both before and after the adoption year. We further require grantors to be mandatory adopters, i.e., only recognise PFI on balance sheet post MIIFRIC 12. We drop one singleton observation so that we can include sector fixed effects. This further reduces our sample down to 201 projects and includes 615 loan tranches. We exclude 195 equity loan tranches because they are not priced at commercial terms. Our final sample comprises 201 projects with 420 loan tranches from 52 grantors.

Noticeably, the number of new PFI projects decreased significantly after the implementation of MIIFRIC 12 (65 projects after versus 136 projects before). On average, new projects after the

[26] The PFI scheme came to a halt in 2018 when the then Chancellor Philip Hammond announced that the UK government would no longer use PFIs. However, the UK's reliance on the PFI model or a variant to provide public infrastructure is unlikely to stop. This is well evidenced in the HM Treasury's (2021) vision to leverage private investment through the new UK Infrastructure Bank and the Department for Transport's plan to adopt the passenger service concession contracts in the rail industry (DfT, 2021).

implementation of MIIFRIC 12 are financed by a slightly higher number of loan tranches (2.3 tranches per project after versus 2 tranches before) at financial close.

[TABLE 1]

We hand collect grantor's financial statement data and project level data missing from Refinitiv Project Finance database. From the merged sample, we match the SPV and the grantor for each PFI project. Since each project is individually financed, operated and maintained by a SPV, it is possible to determine each project's capital cost, loan and equity amounts and interest on loans by analysing the annual financial statements filed by these SPVs. We locate the SPV's financial statements on the UK Companies House website. For each SPV, we download the first available financial statements on the website up to the financial year of 2015/2016 and match it with its capital charge filings to identify each loan tranche's financing year, tranche amount and borrowing rate.

We further require three years of grantor financial data to test Hypothesis 2 and perform one of our sensitivity tests. We collect the financial statements for each grantor for these tests for the financial year ending 31 March 2008 to financial year ending 31 March 2010 to identify the revenue reserve adjustments as the budgetary response to bring the PFI borrowings on the balance sheet in the adoption year; as well as gather information on grantors' interest coverage ratios and interest-bearing liability to income ratios.

We collect additional information on the risk-free rates in the UK, i.e., the daily gilt rate and the PWLB rate with matching issuance date and maturity to determine the loan spread on each PFI loan.

## 6 | DESCRIPTIVE STATISTICS

The descriptive statistics for the primary sample are reported in Table 2. The mean of *LoanSpread* is 1.826 (182.6bps) above the reference gilt rate which is consistent with the range of 150 to 200bps reported in the UK (SCEA, 2010). The average tranche size (*Size)* is £55.29 million, and the average loan tranche term (*Maturity*) is 17.6 years. The average capital cost of each PFI project is £190 million and the average loan tranche size is £55 million.

[TABLE 2]

In terms of project characteristics, *TranchNum* has a mean value of 2.907 showing on average it requires almost three loan tranches to finance a PFI. *EquityDebt* has an average value of 0.191 or 19.1% and most of the projects do not have any equity interest (the sample 25 percentiles, median and 75 percentiles are all zero). This is consistent with prior research indicating that PFIs are highly leveraged (NAO, 2009a). *DSCR* has an average value of 2.196 times; it measures the likelihood that future cash flows are sufficient to cover debt and interest payments. In the private sector, a project finance that has a *DSCR* above 1.25 is considered as a highly profitable investment. In our sample, the average *DSCR* is almost twice as high, suggesting PFIs are profitable investments to private investors. The ratio is comparable with the difference of the project's internal rate of return and the benchmark weighted average cost of capital in the UK PFIs identified in Vecchi and Hellowell (2013). *WAS* in our sample has an average of 4.24 percent and is also consistent with the observations in the UK (Vecchi and Hellowell, 2013). The average *ProjectSize* is £191 million, and the average *FinCost* is £69 million. The average *TtlDebtDeal* is £179 million.

The mean for *GrantorEquity* is 0.053 or 5.3% and is zero for the majority of the projects (the sample 25 percentiles, median and 75 percentiles are all zero). The low equity interest from grantors is expected since PFIs are designed to shift risks to the private sector. There are a small

number of projects where the grantors participated as equity investors. These projects include the majority of the PFIs launched under the LIFT program by the Department of Health & Social Care, and some school and transport projects. The purpose of the equity investments in these projects was to enable the government to act as ‘‘a minority equity co-investor” to allow long term investment projects to be prioritised according to local needs (NAO, 2005).

In terms of grantor characteristics, grantors had an average of 12 previous PFI projects (*Experience*) when new PFI debt was taken out during our sample period; however, this metric is quite skewed with a median of 4 previous projects.

Panel C in Table 2 shows the Pearson correlation matrix. *MIIFRIC12* is positively and significantly correlated with *LoanSpread* ($p < 0.01$). *FinDistress* is not significantly correlated with *LoanSpread*. *Intensity* is negatively correlated with *LoanSpread* ($p < 0.10$). Other control variables are consistent with our expectations except for *TranchNum and FinCost*, which are not significantly correlated with *LoanSpread*. *LoanSpread* is significantly correlated with *SPI* ($p < 0.05$). Both *BASEL2* and *GovtCap* are positively correlated with *LoanSpread* ($p < 0.01$).

[TABLE 3]

Table 3 presents the results of the univariate analysis of the before and after MIIFRIC 12 adoption for the dependent variables and independent variables. Welch t-test results of mean difference are reported in the final column in Table 3. *LoanSpread* is more than 108bps higher in the post-MIIFRIC 12 period, and the difference is significant ($p < 0.01$). Similar results exist for the different measures of *LoanSpread*. Post-MIIFRIC12, *Size* is £23.41 million higher while *Maturity* is approximately 2.16 years shorter and both differences are significant ($p < 0.05$ and $p < 0.10$ respectively). *WAS* decreased slightly by 0.20 percent and the decrease is significant ($p < 0.05$). *GrantorEquity* decreased by 0.021 or 2.1 percent and the difference is significant ($p < 0.05$).

*Experience* halved post-MIIFRIC 12, from an average 16 projects per grantor pre-MIIFRIC 12 to six projects per grantor post-MIIFRIC 12, and the means are significantly different ($p < 0.01$). This trend is in line with the overall decline in the uptakes of PFI post-MIIFRIC 12.[27] *MktInfInvt* increased by £274.71 million ($p < 0.05$) and *GovtCap* increased by 8.33% post MIIFRIC 12 and is significant ($p < 0.01$). No other variables are significantly different across the two periods.

The trend line in Figure 1 shows that *LoanSpread* increases sharply during the MIIFRIC12 adoption year, then settles at a lower level in 2011 and maintains at a similar level throughout the 2012 and 2013 financial years. It experiences a significant decrease in 2014 and picks back up again in 2015. However, the level that *LoanSpread* falls to in 2014 remains higher than the levels in the pre-MIIFRIC 12 period. This trend tracks against the general trajectory of risk-free rates, e.g., the gilt and the PWLB rate. In Figure 1, the gilt and the PWLB rate are tracking with each other closely but both rates experienced the downward trajectory in the post-MIIFRIC 12 period. Figure 2 shows that the significant increase in *LoanSpread* in 2010 does not appear to be driven by other macroeconomic factors given that *SPI* and *MktInfInvt* are all relatively stable for several years after the implementation of MIIFRIC 12. Only *GovtCap* appears to have changed significantly after the implementation of MIIFRIC 12.

[FIGURES 1 and 2]

## 7 | EMPIRICAL RESULTS

### 7.1 | Test of Hypothesis 1

The regression results for model (1) are reported in the first two columns of Table 4. In column (1), we include only *MIIFRIC12*, industry fixed effects, grantor fixed effects and grantor

[27] In our untabluated robustness tests, we test whether the effect of MIIFRIC 12 on loan spreads is caused by the overall declining uptakes of PFIs. The results indicate this does not drive our results.

clusters in the model. In column (2), we add control variables. The coefficients on *MIIFRIC12* are positive (1.257 and 1.517 respectively) in both columns and significant ($p < 0.01$, two-tailed). These results support Hypothesis 1 that the reporting requirements under MIIFRIC 12 provide more transparency on the grantor's financial condition, which allow lenders to better assess the revenue counterparty risk, with the consequence that lenders charge higher loan spreads for new PFI loans. The economic magnitude of the effect is economically significant: the increase in loan spreads is approximately 1.257 (1.517) percent or 125.7 (151.7) bps after the implementation of MIIFRIC 12.

With respect to the control variables reported under column (2) in Table 4 *Senior* and *DSCR* are not significant whereas the coefficient of *TranchNum* is positive and significant ($p < 0.10$). This suggests that lenders consider projects that are financed by a large number of loan tranches as risky. These projects may require large amount of capital investment hence one lender is unable to provide sufficient funds to the project. This explanation is reflected in our sample. The coefficients for *Size*, *Maturity*, *EquityDebt*, *GrantorEquity*, *ProjectSize* and *FinCost* are significant. Grantor characteristics, i.e., *Experience*, is not significant.

[TABLE 4]

### 7.2 | Tests of Hypothesis 2 and Hypothesis 3

Prior research on the effects of new accounting standard adoptions documents that the adoption of a new accounting standard is not uniform across all adopters (Baber et al., 2024; Kalogirou et al., 2021; Chen et al., 2023; Ma and Thomas, 2023). Hypothesis 2 and Hypothesis 3 test these potential discriminative effects.

Hypothesis 2 predicts that the effect of the implementation of MIIFRIC 12 on loan spreads for new PFI loans is more pronounced for PFIs procured by financially distressed grantors. As

previously discussed, $FinDistress_{kt}$ is equal to one for grantors whose revenue reserve adjustment are below the reported PFI borrowings, and zero otherwise. The variable of interest is the interaction term *MIIFRICxFinDistress*. The results reported under column (3) in Table 4 support our prediction that the effect of MIIFRIC 12 adoption on loan spreads is more pronounced for grantors that are financially distressed. The coefficient of the interaction term *MIIFRICxFinDistress* is positive and significant (coeff. = 0.791, $p < 0.05$). This indicates that the loan spreads on new PFI loans are significantly higher (0.791 percent or 79.1bps) for financially distressed grantors. The main effect *MIIFRC12* remains positive and significant. Our results on financially distressed grantors measured by the levels of budgetary adjustment discussed earlier provide evidence that the effect we document is driven by MIIFRIC 12 because these adjustments are only triggered by changes directly related to MIIFRIC 12.

Hypothesis 3 predicts that the effect of MIIFIRC 12 on loan spreads is more pronounced for grantors that had higher reliance on PFIs prior to the mandatory adoption of MIIFRIC 12. Model (3) tests this hypothesis. As previously discussed, *Intensity* takes the value of one if the total number of off-balance-sheet PFI projects procured by the grantor in the pre-MIIFRIC 12 period, i.e., as of 31 March 2009, is above the sample median, and zero otherwise. The variable of interest is the interaction term *MIIFIRC12xIntensity*. The results are presented under column (4) in Table 4. The interaction term is positive and significant (coeff. = 0.756, $p < 0.10$)). The economic effect for these grantors is material, on average, the *LoanSpread* is 0.756 percent or 75.6bps higher. The main effect of *MIIFRIC12* remains positive and significant. Our evidence is consistent with the effect of MIIFRIC 12 on PFI loan spreads being stronger for PFI-intensive grantors, i.e., grantors who have a large number of off-balance-sheet PFI projects in the year prior to MIIFRIC 12's adoption, i.e., as of 31 March 2009. Consistent with Chen et al. (2023), this result provides some

assurance that the effect we document is driven by the adoption of MIIFRIC 12 rather than the adoption of IFRS, regulatory changes or changes in macroeconomic conditions. These findings support our expectations that the effect of the adoption of MIIFRIC 12 on PFI loan spreads are affected by the grantor's financial capacity and their previous reliance on PFIs as off-balance-sheet financing.

### 7.3 | Cross-sectional tests

Next, we conduct cross-sectional tests using grantors' financial statement data to examine whether the effect of MIIFRIC 12 on PFI loan spreads is more concentrated in financially constrained grantors to augment our results obtained using budgetary and non-accounting information. We also investigate the channel through which the impact of MIIFIRC 12 on loan spreads takes place. We adopt the interest coverage ratio (*InterestCov)* and interest-bearing liability to income ratio *(DebtIncome)* to measure a grantor's financial constraint for the following reasons. Unlike private sector firms, governments are not permitted to use the proceeds from asset sales or use capital allocations from the Treasury to cover interest payments and repay debt; or use their property as collateral for loans (Sandford, 2023). They can only use their income streams for interest and principal repayments on borrowings (Bailey et al., 2012). It is expected that grantors who can generate sufficient income to cover interest and principal repayments will be considered as less financially constrained and therefore pose less revenue counterparty risk to lenders.

We measure *InterestCov* and *DebtIncome* in the year of MIIFRIC 12 implementation (2010).[28] We expect grantors with a higher *InterestCov* present lower revenue counterparty risk hence a

[28] Prior to the implementation of MIIFRIC 12, grantors did not report PFI related borrowings on balance sheet, hence the interest-bearing liability to income measured prior to the implementation of MIIFRIC 12 has limited informational value about financial constraint. Therefore, we base our cross-sectional test on the year of implementation.

negative coefficient while grantors with a higher *DebtIncome* pose higher revenue counterparty risk to lenders therefore we predict a positive coefficient.

[TABLE 5]

These cross-sectional test results are shown in Table 5. We augment Model (1) by including each of the financial constraint measure's interactions with *MIIFRIC12*. The variable of interest is *MIIFRIC12*×*FinancialConstraint*. The interaction term with *InterestCov2010* is significant and negative ($p < 0.01$) (column 1 InterestCov2010) while the interaction term with *DebtIncome2010* is positive and significant ($p < 0.10$) (column 2 DebtIncome2010). These results indicate that the effect of MIIFRIC 12 on the cost of new project finance is more pronounced for grantors that were more financially constrained.

### 7.4 | Sensitivity tests: Alternative measures for LoanSpread

We conduct sensitivity tests using alternative base rates to calculate *LoanSpread*. The results are presented in Table 6. The first column in Table 6 measures *LoanSpread* using PWLB as the base rate. The PWLB rate is on average 1.004 percent or 100.4bps higher than the gilt, resulting in some negative observations for *LoanSpread_PWLB*. We exclude these negative observations, therefore the samples in all measures using PWLB as the base rate in Table 6, i.e., under columns (1), (3), (5) and (7) are smaller than our main sample. In columns (2) and (3), we scale the risk-adjusted *LoanSpread* by the loan maturity (Blanc-Brude and Strange, 2007); and in columns (4) to (7), we take the natural logarithm of *LoanSpread* and the rates defined above (Graham et al., 2008; Altamuro et al., 2014). As shown in columns (1) to (7) in Table 6, *MIIFRIC12* remains positive and significant ($p < 0.01$) across all the different measures of *LoanSpread*. The results for all other control variables are qualitatively similar to those reported in the main model.

[TABLE 6]

### 7.5 | The confounding effect of IFRS

The concurrent adoption of IFRS by the UK Government for public sector entities poses an important challenge to the identification of the effect of MIIFIRC 12 on loan spreads for PFIs. However, prior research documents that most of the changes arising from the switch to IFRS were not related to accounting for PFIs as there was no equivalent standard in IFRS that related to PFIs and IFRS and UK GAAP were very similar on other accounting issues that might affect reporting on PFIs (Ellwood and Garcia-Lacalle, 2012; Hodges and Mellett, 2012), which alleviates the concern that the higher loan spreads we observe after the adoption of MIIFRIC are driven by changes in accounting standards unrelated to MIIFRIC 12.

To further address the identification issue, we take advantage of the delayed adoption of IFRS by local governments. The central government departments and the NHS adopted IFRS for the financial year ending 31 March 2010; however, local governments adopted IFRS one year later in the financial year ending 31 March 2011 to ease the transition to IFRS (FRAB, 2011; Ellwood and Garcia-Lacalle, 2012). The delayed adoption of IFRS by local governments provides us with a one-year post-implementation window to test the MIIFRIC 12 effect on loan spreads when IFRS had not yet been adopted by local governments. We reperform the main tests of H1, H2 and H3 on a reduced sample, i.e., we restrict the grantors to local governments and the sample period from financial years ending 31 March 2005 to 31 March 2010 only; this leaves us with a total observation of 75 loan tranches with financial close dates five years before and one year after the MIIFRIC 12 implementation by local governments. The regression results are presented in Table 7. Due to the much-reduced sample size, we drop the grantor fixed effect in all tests. The results in Table 7 are largely consistent with the main tests in Table 4. The coefficients on *MIIFIRC 12* for H1 (column 1) and H2 (column 2) remain significant ($p < 0.05$), the interaction term between

*MIIFRIC 12* and *FinDistress* under column 2 is significant ($p < 0.10$). These results support H1 and H2. The insignificant results under column 3 that relate to reliance on PFIs (*Intesity*) may be attributed to the much smaller sample size. Overall, these additional findings reduce the concern that our main results are driven by the concurrent adoption of IFRS.

[TABLE 7]

### 7.6 | Robustness tests

#### 7.6.1 | Excluding the GFC period

Our sample includes loan tranche data from 2007 and 2008 when the UK experienced the global financial crisis (GFC), which significantly increased the cost of borrowing. However, the GFC occurred during the pre-MIIFRIC 12 period so this would work against our finding of higher loan spreads after the implementation of MIIFRIC 12. However, the higher interest rates may not be uniform across the economy and this may have affected our results. We alleviate this concern by reperforming our test of Hypothesis 1 after excluding loan tranches financed in 2007 and 2008. The results are reported in column (1) of Table 8. Consistent with our earlier results, the coefficient for *MIIFRIC12* is positive and significant ($p < 0.01$).

[TABLE 8]

#### 7.6.2 | Adoption year effect

In our second robustness test, we exclude the adoption year. As shown in Figure 1, *LoanSpread* spiked in the adoption year ending 31 March 2010. The spike in 2010 may overstate the impact of MIIFRIC 12 on *LoanSpread*. The results reported in column (2) of Table 8 exclude loan tranches financed in 2010. The coefficient for *MIIFRIC12* remains positive and significant ($p < 0.01$).

#### 7.6.3 | Grantor equity interest

Recall that some grantors have a small equity interest in PFI projects. In our sample, over 62 percent of the projects where the grantor has an equity interest were procured and financed before MIIFRIC 12 took effect. In our previous tests, we find that grantor equity interest has a significant negative association with *LoanSpread*. This is because risk-taking by governments will mitigate lenders' risk aversion (Demirag et al., 2011). Including these projects and loan tranches in our tests may overstate the effect of MIIFRIC 12 on *LoanSpread*. In our third robustness test, we exclude these projects and loan tranches. Results are shown in column (3) of Table 8. The coefficient for *MIIFRIC12* remains positive and significant ($p < 0.05$).

## 8 | CONCLUSION

The implementation of MIIFRIC 12 by the UK Government in the financial year ending 31 March 2010 required government entities to recognise PFI assets and the associated liabilities on the grantor's balance sheet and to itemise the related financing costs as interest expense in the income statement for annual reporting periods beginning 1 April 2009. Prior to the implementation of MIIFRIC 12, FRS5A allowed considerable discretion in accounting for PFI assets and liabilities, which allowed most PFI assets and liabilities to be kept off the balance sheet. Thus, MIIFRIC 12 had the effect of increasing the transparency regarding the reporting of PFI transactions by grantors, who are a revenue counterparty to PFI transactions. Our study investigates whether the enhanced accounting transparency by a revenue counterparty increases the cost of borrowing for the borrower by examining whether the adoption of the new standard affects loan pricing on new PFI loans. We document that PFI loan spreads are higher after the implementation of MIIFRIC 12. The effect is more pronounced for PFIs with grantors who showed signs of financial distress in their budgetary adjustments and grantors that had a higher reliance on PFIs as a source of off-balance-sheet financing prior to the adoption of MIIFRIC 12. Our cross-sectional tests indicate

that the effect of MIIFRIC 12 on the cost of new project finance is more pronounced for grantors that were more financially constrained. Our results are robust to a battery of sensitivity and robustness tests. These findings suggest that the reporting requirements under MIIFRIC 12 provide more transparency on the grantor's financial condition, which allow lenders to better assess the revenue counterparty risk.

The concurrent adoption of IFRS by the UK Government for public sector entities poses an important challenge to the identification of the effect of MIIFIRC 12 on loan spreads for PFIs. However, prior research documents that most of the changes arising from the switch to IFRS were not related to accounting for PFIs as there was no equivalent standard in IFRS that related to PFIs and IFRS and UK GAAP were very similar on other accounting issues that might affect reporting on PFIs (Ellwood and Garcia-Lacalle, 2012; Hodges and Mellett, 2012), which alleviates the concern that the higher loan spreads we observe after the adoption of MIIFRIC are driven by changes in accounting standards unrelated to MIIFRIC 12. In addition, our results examining the effect for financially distressed grantors measured by the levels of budgetary adjustment provides evidence that the effect we document is driven by MIIFRIC 12 because these adjustments are only triggered by changes directly related to MIIFRIC 12 rather than IFRS. Finally, consistent with Chen et al. (2023), our result for the extent to which grantors rely more on PFIs as a source of off-balance- sheet financing provides evidence that the effect we document is driven by MIIFRIC 12 rather than the adoption of IFRS. To further address the identification issue, we take advantage of the delayed adoption of IFRS by local governments, which provides us with a one-year post-implementation window to test the MIIFRIC 12 effect on loan spreads when IFRS had not yet been adopted by local governments. We reperform our main tests on a reduced sample of grantors that are local governments during the periods five years before and one year after the MIIFRIC 12

implementation by local governments. The results for the reduced sample are consistent with our main results except we find insignificant results for the cross-sectional test that relates to reliance on PFI financing, which may be attributed to the much smaller sample size. These findings reduce the concern that our main results are driven by the concurrent adoption of IFRS.

Our study makes several contributions to the literature. First, we add to the ongoing debate regarding the consequences of accounting standards on the cost of borrowing. Our study differs from prior research that examines the effect of new accounting standards that result in recognising off-balance-sheet liabilities on the adopter's balance sheet on the cost of debt. Prior research examines the direct consequences of a company's adoption of accounting standards. We provide evidence on whether the adoption of accounting standards by a counterparty, one without a direct transactional relationship with the lender, affects the lender's pricing decisions regarding the borrower's cost of borrowing. This indirect effect from a change in an accounting standard on the cost of debt has not previously been investigated. Understanding this effect is important because it reveals how regulatory changes can influence financial decision-making beyond the directly affected parties. Second, we add to the project finance literature that examines the association between characteristics of counterparties and PFI loan spreads by documenting that the accounting method adopted by the counterparty has a strong association with PFI loan spreads. Previous research has not examined this issue. This is an important issue to examine because the accounting policy adopted by the counterparty affects the lender's ability to assess the counterparty risk and adjust loan spreads in response. Lastly, our findings add new evidence to the question of whether capitalisation reporting requirements of off-balance-sheet liabilities affect lenders and other users' evaluations and decisions, which has been a matter of contention for many years. In contrast to most recent studies documenting that lenders, creditors and users price their risk assessments for

off-balance-sheet debt such as operating leases in credit spreads, our finding that the implementation of MIIFRIC 12 has a significant positive association with PFI loan spreads suggests that the off-balance-sheet borrowings by the revenue counterparty were not fully priced by lenders when making lending decisions for PFI financing.

We acknowledge that our findings may not be generalisable to other countries. The UK Government has a strong credit rating, and the country has a long-standing reputation in standard setting and enforcement of accounting standards, the differences in the quality of institutions across countries may limit the study's generalisability. Nevertheless, this study provides initial evidence on the informational value of financial reporting by a borrower's counterparty to lenders' pricing decisions.

With respect to future research opportunities, recent studies (e.g., Chen et al., 2023; Dambra et al., 2023) have shown that the accounting requirements to capitalise previously off-balance-sheet liabilities have led to adopters change their internal decisions, deprioritise their capital spending, seek new opportunities or reduce public welfare expenditure. We encourage future research to investigate whether MIIFRIC 12 or similar standards have instigated similar responses from governments. Some responses may improve operational efficiency, other responses may compromise social value of public services to the citizen, e.g., by cutting revenue spending to other areas, such as public welfare (Dambra et al., 2023) to use revenue to service debt. We leave these important topics to future research.

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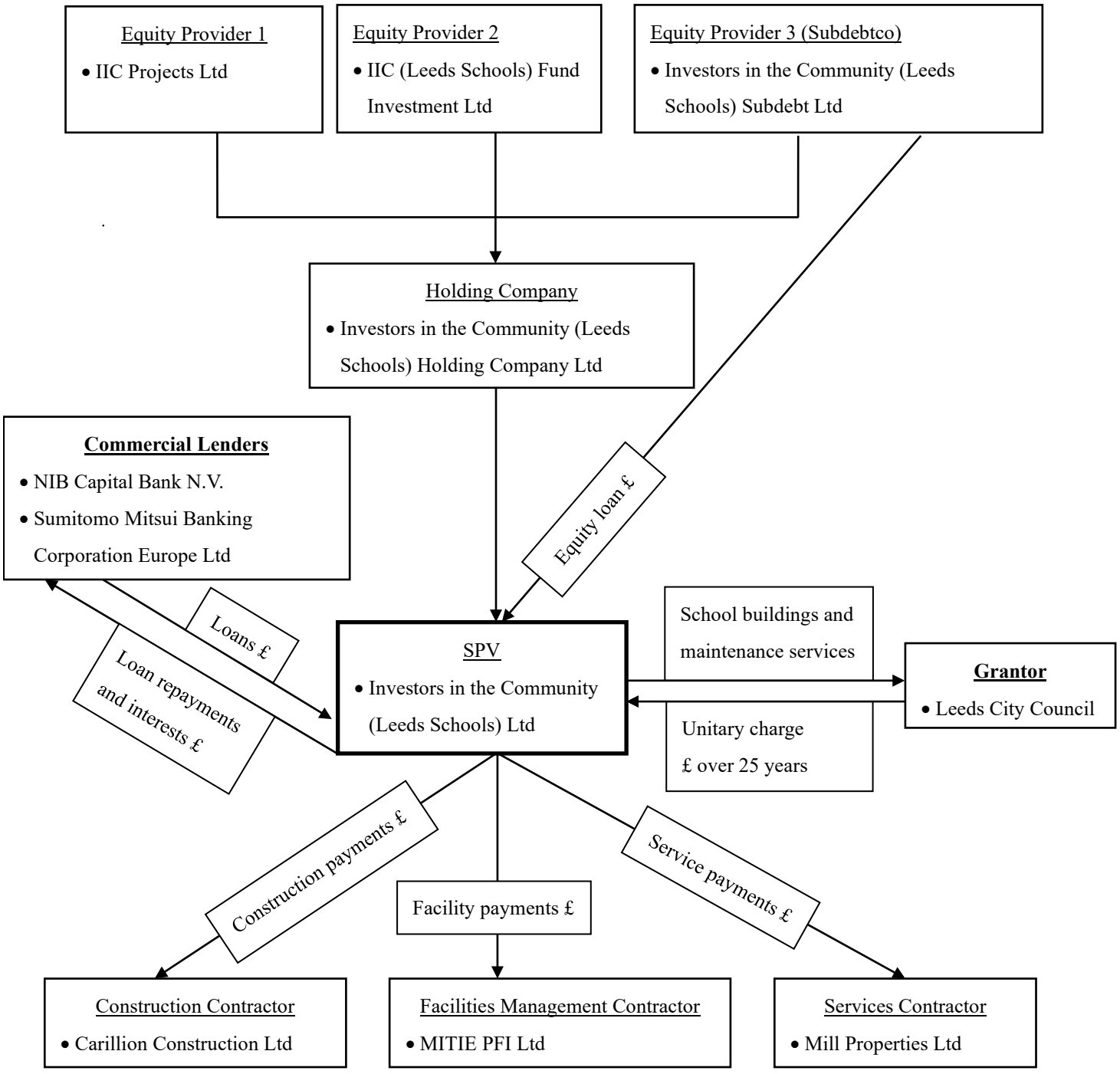
## APPENDIX 1: PFI CONTRACT STRUCTURE – LEEDS SCHOOLS PROJECT



## APPENDIX 2: EXAMPLES OF FINANCIAL DISCLOSURES ON PFI SCHOOLS BY GRANTORS IN 2008/09

Example 1: London Borough of Barking & Dagenham

On 30 March 2004, the Council contracted with Bouygues (UK) Ltd to provide secondary school and community facilities for the Jo Richardson Community School at Castle Green Park and refurbishment works and services at Eastbury Comprehensive School under a Private Finance Initiative (PFI). The schools opened in September 2005 and provide the necessary suitable places to cater for steadily increasing pupil numbers in the borough.

The Council has classified the scheme as "off-balance sheet". A capital contribution of £12.9m has been made which reduces the annual unitary charge payable and is released over the life of the contract. This has been treated as a long-term debtor and is written down over the life of the scheme. The following transactions have been charged to the income and expenditure account:

| | **£'000** |
|---|---|
| Amounts included within operating expenses in respect of PFI transactions deemed to be off-balance sheet | 5,680 |
| Amortisation of PFI deferred asset | 576 |
| Build up of residual value of scheme | 182 |
| The contract is scheduled to end on 31 August 2030 | |

Example 2: London Borough of Bexley

The Council has contracted with Investors in the Community (IIC) for the redevelopment and facilities management of Welling and Bexleyheath secondary schools. Annual payments commenced during 2005/06 for 25 years and are currently £5.1m, of which 43% will increase annually in line with RPI and 57% is fixed. They can also vary as a result of performance and availability deductions, benchmarking, certain changes in law and contract variations initiated by the Council. The costs are being met from the annual PFI grant provided by the government of £3.6m together with budgets approved by the Council.

As the majority of the risk associated with the facilities has been transferred to IIC, they are treated as off the Council's balance sheet.

As a proportion of the buildings were transferred to the operator for redevelopment, their existing value of £12.4m is recognised as a long-term debtor that will be amortised to the revenue account over the period of the contract. This is £0.372m in 2008/09 (£0.361m in 2007/08).

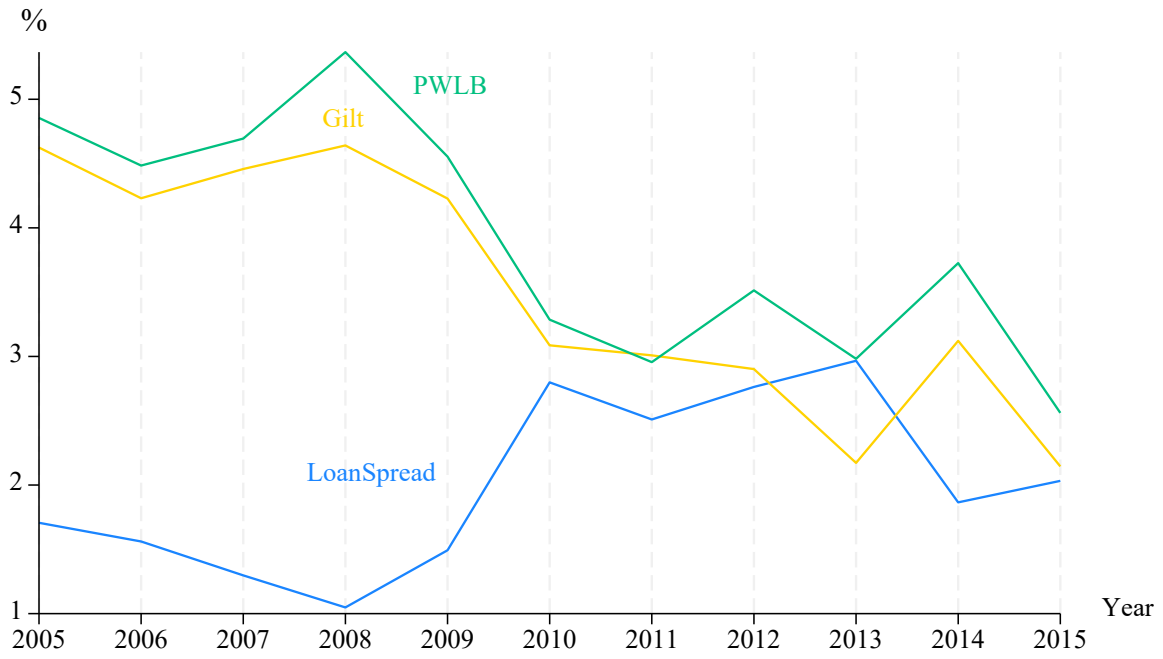
At the end of the contract term, all the property returns to the Council for nil consideration. On the basis of depreciated replacement cost, the estimated value on its transfer back to the Council is £14.5m. Therefore, part of the unitary charge will be set aside each year to reflect the accrued value. This is £0.670m in 2008/09 (£0.639m in 2007/08). These sums will be reviewed through periodic valuations.

## APPENDIX 3: VARIABLE DEFINITIONS

| Variable | Definition | Source |
|---|---|---|
| **Dependent Variables** | | |
| *LoanSpread* | The difference between the interest rate charged at the loan tranche and the UK daily gilt rate with matching issuance date and maturity. | Refinitiv Project Finance database; SPV annual financial statements; Office for National Statistics UK |
| *LoanSpread _PWLB* | The difference between the interest rate charged at the loan tranche and the UK Public Works Loan Board rate with matching issuance date and maturity. | Refinitiv Project Finance database; SPV annual financial statements; UK Debt Management Office |
| *wLoanSpread* | *LoanSpread* weighted by loan tranche maturity. | Refinitiv Project Finance database; SPV annual financial statements; Office for National Statistics UK |
| *wLoanSpread _PWLB* | *LoanSpread_PWLB* weighted by loan tranche maturity. | Refinitiv Project Finance database; SPV annual financial statements; UK Debt Management Office |
| *logLoanSpread* | The natural logarithm of *LoanSpread.* | Refinitiv Project Finance database; SPV annual financial statements; Office for National Statistics UK |
| *logLoanSpread _PWLB* | The natural logarithm of *LoanSpread_PWLB.* | Refinitiv Project Finance database; SPV annual financial statements; UK Debt Management Office |
| *log_ wLoanSpread* | The natural logarithm of *wLoanSpread.* | Refinitiv Project Finance database; SPV annual financial statements; Office for National Statistics UK |
| *log_ wLoanSpread _PWLB* | The natural logarithm of *wLoanSpread_PWLB.* | Refinitiv Project Finance database; SPV annual financial statements; UK Debt Management Office |
| **Test variables** | | |
| *MIIFRIC12* | Indicator variable set equal to one if the financial close date for the loan tranche is on or after 2010, and 0 otherwise. | |
| $FinDistress_{kt}$ | An indicator variable set equal to one for grantor *k* whose revenue reserve adjustment level is below the recognised PFI borrowing in the adoption year, and 0 otherwise. | Grantor financial statements |
| $Intensity_{kt}$ | Indicator variable set equal to one if the total number of PFI projects by grantor *k* in the pre-MIIFRIC 12 period, i.e., as of 31 March 2009, is above the sample median, and 0 otherwise. | HM Treasury; Refinitiv Project Finance database; |
| **Control Variables (alphabetical order)** | | |

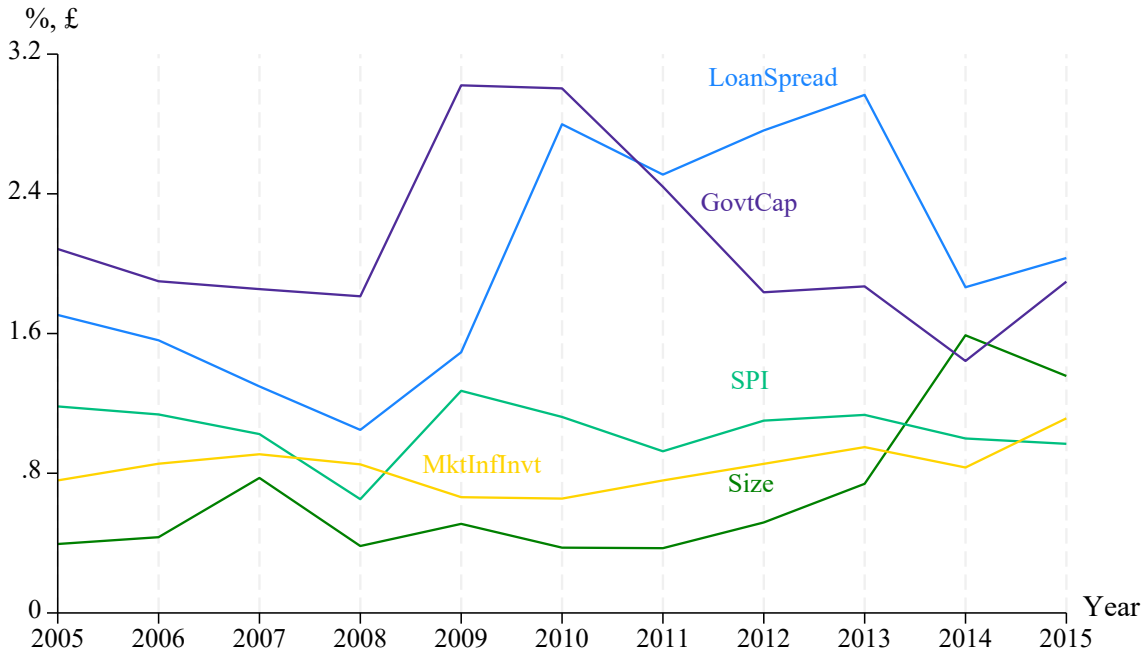
| | | |
|---|---|---|
| *BASEL2* | An indicator variable set equal to one for loan tranches with financial close dates in and after January 2008, and 0 otherwise. | |
| *DSCR* | A project's debt service coverage ratio, measured by the sum of the total cash flows that the project generates and any equity investment value to the project's total debt plus interest. | HM Treasury; Refinitiv Project Finance database; SPV annual financial statements |
| *EquityDebt* | A project's equity to debt ratio | Refinitiv Project Finance database; SPV annual financial statements |
| *Experience* | The total number of PFI projects that the grantor had previously undertaken when new PFI debt was taken out in financial close year *t.* | HM Treasury; Refinitiv Project Finance database |
| *FinCost* | A project's other financing costs in £ million. | Refinitiv Project Finance database; SPV annual financial statements |
| *GovtCap* | Austerity measure: government capital expenditure as a percentage of GDP | Office for National Statistics UK |
| *GrantorEquity* | The percentage of grantor equity investment to the total equity investments in the SPV. | Refinitiv Project Finance database; SPV annual financial statements |
| *Maturity* | The loan tranche maturity in years. | Refinitiv Project Finance database; SPV annual financial statements |
| *MktInfInvt* | UK's annual total market sector infrastructure investment in £ billion. | Office for National Statistics UK |
| *ProjectSize* | Total value of the SPV's assets | Refinitiv Project Finance database; SPV annual financial statements |
| *Size* | The loan tranche amount in £ million. | Refinitiv Project Finance database; SPV annual financial statements |
| *SPI* | UK's share price index. | Office for National Statistics UK |
| *TtlDebtDeal* | A project's total amount of debt capital. | Refinitiv Project Finance database; SPV annual financial statements |
| *WAS* | A project's weighted average spread: $\sum(\frac{Loan\ Tranche_i}{Total\ Project\ Debt_j} \times LoanSpread_i \times (1 - Tax\ Rate))$ | Refinitiv Project Finance database; SPV annual financial statements |
| **Cross-Sectional Variables for Financial Constraint** | | |
| *InterestCov2010* | A grantor's interest coverage ratio in 2010. | Grantor financial statements |
| *DebtIncome2010* | A grantor's interest-bearing liability to income ratio in 2010. | Grantor financial statements |

**FIGURE 1: TREND ANALYSIS OF LoanSpread, Gilt, PWLB**




Note: This figure depicts the trend analysis between the average *LoanSpread*, and the average risk-free rates as measure by the UK daily gilt and PWLB with matching issuance date and maturity. Variable definitions are in Appendix 3.

**FIGURE 2: TREND ANALYSIS OF LoanSpread, Size, Macro effects**




Note: This figure depicts the trend analysis between *LoanSpread,* Size (scaled by 100), *SPI*, *MktInfInvt* (scaled by 10,000) and *GovtCap*. Variable definitions are in Appendix 3.

**TABLE 1** Sample description

Sample Selection Process starts off with the number of projects identified from the HMT Treasury list then merged with Refinitiv. Then hand collect data to obtain information at loan tranche level.

| ***Projects*** | # Observations |
|---|---|
| Project from HM Treasury | 684 projects |
| Project from Refinitiv | 800 projects |
| Drop projects that are duplicated, and projects that cannot be identified from the merged dataset and are not PFIs | (818) projects |
| | 666 projects |
| Drop projects that were not procured in our sample period, i.e., 2005-2015 | (307) projects |
| Drop projects that were procured by grantors who did not have new projects in the post adoption period, i.e., 2010-2015 | (154) projects |
| Drop projects that were procured by non-mandatory adopters | (3) projects |
| Drop singleton observations | (1) projects |
| **Final sample** | **201 projects** |
| Pre-MIIFRIC 12 | 136 projects |
| Post-MIIFRIC 12 | 65 projects |
| *Other data from the final project sample* | |
| **Loan tranches** | **420 tranches** |
| Pre-MIIFRIC 12 | 376 tranches |
| Drop equity loans | (105) tranches |
| **Pre-MIIFRIC 12 sample** | **271 tranches** |
| Post-MIIFRIC 12 | 239 tranches |
| Drop equity loans | (90) tranches |
| **Post-MIIFRIC 12 sample** | **149 tranches** |
| **Loan tranches per project at financial close** | **2.09 tranches** |
| Pre-MIIFRIC 12 | 2.00 tranches |
| Post-MIIFRIC 12 | 2.28 tranches |
| **Grantors** | **52 grantors** |

**TABLE 2** Descriptive statistics

| Variable | N | Mean | Std.Dev. | Bottom Quartile | Median | Top Quartile |
|---|---|---|---|---|---|---|
| **Panel A: LoanSpread measures (%)** | | | | | | |
| *LoanSpread* | 420 | 1.826 | (1.715) | 0.676 | 1.385 | 2.288 |
| *LoanSpread_PWLB* | 419 | 1.630 | (1.667) | 0.466 | 1.170 | 2.051 |
| *wLoanSpread* | 420 | 0.358 | (0.662) | 0.037 | 0.070 | 0.298 |
| *wLoanSpread_PWLB* | 419 | 0.274 | (0.487) | 0.030 | 0.070 | 0.272 |
| *logLoanSpread* | 420 | 0.192 | (0.983) | -0.391 | 0.326 | 0.828 |
| *logLoanSpread_PWLB* | 419 | -0.058 | (1.174) | -0.763 | 0.157 | 0.718 |
| *log_wLoanSpread* | 420 | -2.239 | (1.517) | -3.291 | -2.654 | -1.211 |
| *log_wLoanSpread_PWLB* | 419 | -2.484 | (1.625) | -3.493 | -2.655 | -1.303 |
| **Panel B: Continuous variables (debt only) for Hypothesis 1, 2 and 3** | | | | | | |
| Loan characteristics | | | | | | |
| *Size (£ million)* | 420 | 55.285 | (111.367) | 5.781 | 22.113 | 53.502 |
| *Maturity (years)* | 420 | 17.606 | (11.314) | 3.000 | 25.000 | 26.000 |
| Project characteristics | | | | | | |
| *TranchNum (tranches)* | 420 | 2.907 | (1.312) | 2.000 | 3.000 | 3.000 |
| *EquityDebt* | 420 | 0.191 | (0.761) | 0.000 | 0.000 | 0.102 |
| *DSCR (times)* | 420 | 2.196 | (1.662) | 1.489 | 1.832 | 2.265 |
| *WAS (%)* | 420 | 4.240 | (0.893) | 3.813 | 4.192 | 4.734 |
| *GrantorEquity* | 420 | 0.053 | (0.113) | 0.000 | 0.000 | 0.010 |
| *ProjectSize (£ million)* | 420 | 190.567 | (492.982) | 34.374 | 57.758 | 115.044 |
| *FinCost (£ million)* | 420 | 68.640 | (144.744) | 1.380 | 26.818 | 69.019 |
| *TtlDebtDeal (£ million)* | 420 | 178.672 | (531.024) | 33.558 | 56.669 | 118.688 |
| Grantor characteristics | | | | | | |
| *Experience (projects)* | 420 | 12.464 | (15.958) | 2.000 | 4.000 | 26.000 |
| Macro effects | | | | | | |
| *SPI* | 420 | 104.035 | (18.517) | 96.862 | 112.249 | 118.268 |
| *MktInfInvt (£ million)* | 420 | 8,176.326 | (1,127.477) | 7,587.000 | 8,508.000 | 8,546.000 |
| *GovtCap (%)* | 420 | 2.139 | (0.444) | 1.854 | 1.900 | 2.441 |
| **Panel C: Other factor variables** | | | | | | |
| Grantor Characteristics | | | | | | |
| | **0** | **1** | | | **TOTAL** | |
| *FinDistress* | 27 grantors | 25 grantors | | | 52 grantors | |
| *Intensity* | 31 grantors | 21 grantors | | | 52 grantors | |
| *Senior* | 40 tranches | 381 tranches | | | 421 tranches | |

**Panel D: Pearson correlation matrix**

| | *LoanSpread* | *MIIFRIC12* | *FinDistress* | *Intensity* | *Size* | *Maturity* | *Senior* | *TranchNum* | *EquityDebt* | *DSCR* |
|---|---|---|---|---|---|---|---|---|---|---|
| *MIIFIRC12* | 0.303*** | | | | | | | | | |
| *FinDistress* | 0.033 | 0.169*** | | | | | | | | |
| *Intensity* | -0.080* | -0.459*** | -0.284*** | | | | | | | |
| *Size* | -0.121** | 0.101** | 0.048 | -0.019 | | | | | | |
| *Maturity* | -0.138*** | -0.092* | -0.096** | 0.077 | 0.256*** | | | | | |
| *Senior* | -0.106** | -0.031 | 0.033 | -0.015 | 0.051 | -0.055 | | | | |
| *TranchNum* | 0.039 | 0.073 | -0.113** | -0.043 | 0.093* | 0.039 | -0.011 | | | |
| *EquityDebt* | -0.064 | -0.064 | 0.111** | 0.069 | 0.006 | -0.056 | 0.002 | 0.001 | | |
| *DSCR* | -0.009 | 0.026 | 0.034 | -0.041 | 0.120** | -0.064 | -0.016 | -0.165*** | -0.008 | |
| *WAS* | 0.093* | -0.105** | -0.018 | 0.158*** | -0.055 | 0.003 | 0.025 | -0.059 | -0.035 | -0.029 |
| *GrantorEquity* | -0.078 | -0.088* | -0.080* | 0.116** | -0.116** | 0.048 | 0.023 | 0.076 | -0.026 | -0.005 |
| *ProjectSize* | 0.044 | 0.007 | -0.015 | 0.021 | 0.684*** | 0.100** | -0.013 | 0.171*** | -0.158*** | 0.127*** |
| *FinCost* | -0.074 | 0.048 | 0.039 | -0.012 | 0.945*** | 0.368*** | 0.015 | 0.079* | -0.083* | 0.067 |
| *TtlDebtDeal* | -0.014 | 0.052 | 0.072 | -0.050 | 0.688*** | 0.084* | 0.039 | 0.283*** | -0.137*** | -0.006 |
| *Experience* | -0.116** | -0.300*** | -0.416*** | 0.655*** | -0.039 | 0.154*** | 0.037 | 0.108** | 0.002 | -0.081* |
| *BASEL2* | 0.228*** | 0.763*** | 0.092* | -0.308*** | 0.093* | -0.073 | -0.042 | 0.147*** | -0.028 | 0.015 |
| *SPI* | 0.118** | -0.020 | -0.091* | 0.062 | -0.008 | 0.071 | -0.021 | -0.051 | -0.076 | -0.089* |
| *MktInfInvt* | -0.055 | 0.118** | 0.067 | -0.121** | 0.181*** | -0.054 | -0.051 | -0.019 | 0.002 | 0.129*** |
| GovtCap | 0.127*** | 0.187*** | 0.012 | -0.037 | -0.097** | -0.035 | 0.020 | 0.142*** | -0.001 | -0.123** |

| | *WAS* | *Grantor Equity* | *Project Size* | *FinCost* | *TtlDebtDeal* | *Experience* | *BASEL2* | *SPI* | *MktInf Invt* |
|---|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *GrantorEquity* | 0.110** | | | | | | | | |
| *ProjectSize* | 0.052 | -0.086* | | | | | | | |
| *FinCost* | -0.005 | -0.103** | 0.670*** | | | | | | |
| *TtlDebtDeal* | 0.003 | -0.093* | 0.811*** | 0.668*** | | | | | |
| *Experience* | 0.096** | 0.258*** | -0.020 | -0.048 | -0.059 | | | | |
| *BASEL2* | -0.128*** | -0.079* | 0.058 | 0.049 | 0.112** | -0.194*** | | | |
| *SPI* | 0.081* | -0.059 | -0.025 | 0.003 | 0.006 | -0.009 | 0.005 | | |
| *MktInfInvt* | 0.096** | -0.056 | 0.009 | 0.043 | -0.051 | -0.031 | -0.096** | 0.058 | |
| GovtCap | -0.025 | 0.010 | -0.066 | -0.074 | -0.001 | -0.084* | 0.454*** | -0.025 | 0.010 |

**Notes**: This table shows the sample descriptions. Panel A shows the different measures of *LoanSpread*. Panel B shows the descriptive statistics, including the number of observations, mean, standard deviations, bottom quartile, median, and top quartile of continuous variables used in Models (1), (2) and (3) for testing Hypothesis 1, 2 and 3. Panel C shows the descriptive statistics for the factor variables. Panel D reports the Pearson correlation matrix. Variable definitions are in the Appendix 3. ***, **, and * indicate significance at the 1%, 5%, and 10% levels (two-tailed). All continuous variables are winsorized at the 1% and 99% level.

**TABLE 3** Univariate analysis of the effects of MIIFRIC 12 on *LoanSpread* and control variables

| Variable | Pre-MIIFIRC 12 | | Post-MIIFRIC 12 | | Welch t-test of means (Pre-Post) |
|---|---|---|---|---|---|
| | N | Mean | N | Mean | |
| **Panel A: LoanSpread measures (%)** | | | | | |
| *LoanSpread* | 271 | 1.442 | 149 | 2.524 | -6.046*** |
| *LoanSpread_PWLB* | 270 | 1.235 | 149 | 2.345 | -6.883*** |
| *wLoanSpread* | 271 | 0.223 | 149 | 0.605 | -5.882*** |
| *wLoanSpread_PWLB* | 270 | 0.196 | 149 | 0.416 | -4.542*** |
| *logLoanSpread* | 271 | -0.030 | 149 | 0.596 | -6.546*** |
| *logLoanSpread_PWLB* | 270 | -0.382 | 149 | 0.530 | -8.196*** |
| *log_wLoanSpread* | 271 | -2.502 | 149 | -1.761 | -4.920*** |
| *log_wLoanSpread_PWLB* | 270 | -2.848 | 149 | -1.825 | -6.466*** |
| **Panel B: Continuous variables (debt only) for Hypothesis 1, 2 and 3** | | | | | |
| Loan characteristics | | | | | |
| *Size (£ million)* | 271 | 46.979 | 149 | 70.393 | -2.013** |
| *Maturity (years)* | 271 | 18.374 | 149 | 16.210 | 1.914* |
| Project characteristics | | | | | |
| *TranchNum (tranches)* | 271 | 2.838 | 149 | 3.034 | -1.455 |
| *EquityDebt* | 271 | 0.227 | 149 | 0.124 | 1.626 |
| *DSCR (times)* | 271 | 2.154 | 149 | 2.273 | -0.676 |
| *WAS (%)* | 271 | 4.309 | 149 | 4.113 | 2.129** |
| *ProjectSize (£ million)* | 271 | 188.288 | 149 | 194.712 | -0.147 |
| *FinCost (£ million)* | 271 | 63.481 | 149 | 78.023 | -0.966 |
| *TtlDebtDeal (£ million)* | 271 | 158.272 | 149 | 215.775 | -1.186 |
| *GrantorEquity* | 271 | 0.060 | 149 | 0.039 | 2.105** |
| Grantor characteristics | | | | | |
| *Experience (projects)* | 271 | 15.996 | 149 | 6.040 | 7.358*** |
| Marco effects | | | | | |
| *SPI* | 271 | 104.291 | 149 | 103.569 | 0.476 |
| *MktInfInvt (£ million)* | 271 | 8,087.871 | 149 | 8,353.577 | -2.002** |
| *GovtCap (%)* | 271 | 2.077 | 149 | 2.250 | -3.575*** |
| **Panel C: factor variable** | | | | | |
| | **MIIFRIC 12 = 0** | | **MIIFRIC 12 = 1** | | **TOTAL** |
| *Senior* | 247 | | 133 | | 380 |
| **Panel D: Projects by industrial category** | | | | | |
| Correctional institutions | 1 | | 1 | | 2 |
| Defence | 11 | | 2 | | 13 |
| Education | 46 | | 24 | | 70 |
| Health | 49 | | 6 | | 55 |
| Police protection | 2 | | 2 | | 4 |
| Refuse systems | 5 | | 7 | | 12 |
| Social housing | 9 | | 6 | | 15 |
| Sports | 1 | | 1 | | 2 |
| Transport | 12 | | 16 | | 28 |
| **Total** | **136** | | **65** | | **201** |

**Notes**: This table shows the sample descriptions stratified into the pre and post MIIFRIC 12 groups. Panel A shows the different measures of *LoanSpread*. Panel B shows the descriptive statistics, including the number of observations and the mean of continuous variables used in Models (1), (2) and (3) for testing Hypothesis 1, 2 and 3. t-stats of Welch t test of means for each continuous variable before and after MIIFRIC 12 are reported in the final column. Panel C shows the descriptive statistics for the factor variable. Panel D reports the industries where the PFI scheme is most active in the sample. Variable definitions are in the Appendix 3. ***, **, and * indicate significance at the 1%, 5%, and 10% levels (two-tailed). All continuous variables are winsorized at the 1% and 99% level.

**TABLE 4** Tests of Hypotheses 1, 2 and 3

| Dependent Variable = *LoanSpread* | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| *MIIFRIC12* | 1.257*** | 1.517*** | 1.232*** | 1.212*** |
| | (5.16) | (5.10) | (3.69) | (3.35) |
| *MIIFRIC12 × FinDistress* | | | 0.791** | |
| | | | (2.06) | |
| *MIIFRIC12 × Intensity* | | | | 0.756* |
| | | | | (1.75) |
| *Size* | | -0.013*** | -0.013*** | -0.014*** |
| | | (-5.44) | (-5.45) | (-5.47) |
| *Maturity* | | -0.028** | -0.027** | -0.028** |
| | | (-2.34) | (-2.29) | (-2.37) |
| *Senior* | | 0.067 | 0.061 | 0.085 |
| | | (0.22) | (0.20) | (0.27) |
| *TranchNum* | | 0.109* | 0.113* | 0.125** |
| | | (1.77) | (1.94) | (2.21) |
| *EquityDebt* | | -0.269*** | -0.272*** | -0.262*** |
| | | (-2.87) | (-2.96) | (-2.96) |
| *DSCR* | | 0.174 | 0.190* | 0.158 |
| | | (1.67) | (1.84) | (1.59) |
| *WAS* | | 0.198* | 0.180* | 0.222** |
| | | (1.94) | (1.91) | (2.23) |
| *GrantorEquity* | | -0.967*** | -0.945*** | -1.000*** |
| | | (-3.98) | (-4.09) | (-3.89) |
| *ProjectSize* | | 0.001*** | 0.001*** | 0.001*** |
| | | (4.07) | (4.07) | (4.48) |
| *FinCost* | | 0.008*** | 0.008*** | 0.008*** |
| | | (4.87) | (4.69) | (5.05) |
| *TtlDebtDeal* | | -0.000 | 0.000 | -0.000 |
| | | (-0.49) | (0.28) | (-0.95) |
| *Experience* | | -0.004 | 0.012 | -0.020 |
| | | (-0.12) | (0.37) | (-0.85) |
| *BASEL2* | | -0.076 | -0.141 | 0.049 |
| | | (-0.24) | (-0.45) | (0.16) |
| *SPI* | | 0.016** | 0.019*** | 0.016** |
| | | (2.68) | (2.96) | (2.59) |
| *MktInfInvt* | | 0.000 | 0.000 | 0.000 |
| | | (0.61) | (0.44) | (0.85) |
| *GovtCap* | | 0.045 | -0.101 | 0.040 |
| | | (0.10) | (-0.21) | (0.10) |
| *Constant* | 1.380*** | -2.248 | -2.204 | -2.438 |
| | (15.97) | (-0.97) | (-0.90) | (-1.13) |
| Industry Fixed Effects | YES | YES | YES | YES |
| Grantor Fixed Effects | YES | YES | YES | YES |
| Grantor Cluster | YES | YES | YES | YES |
| Observations | 420 | 420 | 420 | 420 |
| Adjusted R-squared | 0.074 | 0.192 | 0.198 | 0.196 |

**Notes**: The table tests the effect of MIIFRIC 12 on PFI loan spreads. The dependent variable is *LoanSpread*, which is the difference between the interest rate on loan tranche and the risk-free rate using the UK daily gilt with matching issuance date and maturity. MIIFRIC12 is an indicator for the period after the implementation beginning on 1 April 2009. *FinDistress* is an indicator for financially distressed grantors whose revenue reserve adjustments were below the recognised PFI borrowings in the adoption year. *Intensity* under column (4) is an indicator for grantors whose total number of PFI projects procured before the adoption year, i.e., as of 31 March 2009, is above the sample median. All models are controlled for industry and grantor fixed effects. t-statistics

are reported in parentheses. Standard errors are clustered by grantor. Variable definitions are in Appendix 3. ***, **, and * indicate significance at the 1%, 5%, and 10% levels (two-tailed). All continuous variables are winsorized at the 1% and 99% level.

**TABLE 5** Cross-sectional test

| Dependent Var. = *LoanSpread* | (1) | (2) |
|---|---|---|
| *FinancialConstraint* = | InterestCov2010 | DebtIncome2010 |
| *MIIFRIC12* | 2.178*** | 1.187*** |
| | (6.36) | (3.91) |
| *MIIFRIC12 × Financial Constraint* | -0.011*** | 0.418* |
| | (-3.80) | (1.87) |
| *Size* | -0.014*** | -0.014*** |
| | (-5.36) | (-5.53) |
| *Maturity* | -0.028** | -0.027** |
| | (-2.42) | (-2.32) |
| *Senior* | 0.060 | 0.061 |
| | (0.19) | (0.20) |
| *TranchNum* | 0.101* | 0.116** |
| | (1.73) | (2.04) |
| *EquityDebt* | -0.281*** | -0.283*** |
| | (-3.19) | (-3.14) |
| *DSCR* | 0.180* | 0.172* |
| | (1.97) | (1.86) |
| *WAS* | 0.169* | 0.233** |
| | (1.92) | (2.47) |
| *GrantorEquity* | -0.945*** | -0.925*** |
| | (-4.09) | (-3.96) |
| *ProjectSize* | 0.001*** | 0.001*** |
| | (4.05) | (3.88) |
| *FinCost* | 0.009*** | 0.008*** |
| | (5.18) | (4.93) |
| *TtlDebtDeal* | 0.000 | 0.000 |
| | (0.11) | (1.29) |
| *Experience* | 0.014 | -0.003 |
| | (0.52) | (-0.13) |
| *BASEL2* | -0.221 | -0.072 |
| | (-0.70) | (-0.23) |
| *SPI* | 0.017*** | 0.017*** |
| | (2.97) | (2.86) |
| *MktInfInvt* | 0.000 | 0.000 |
| | (0.41) | (0.46) |
| *GovtCap* | 0.018 | -0.057 |
| | (0.04) | (-0.13) |
| *Constant* | -2.007 | -2.082 |
| | (-0.87) | (-0.98) |
| Industry Fixed Effects | YES | YES |
| Grantor Fixed Effects | YES | YES |
| Grantor Cluster | YES | YES |
| Observations | 420 | 420 |
| Adjusted R-squared | 0.212 | 0.200 |

**Notes**: The table tests the effect of MIIFRIC 12 on the cross-sectional differences in grantors' financial constraints on *LoanSpread*. The dependent variable is *LoanSpread*, which is the difference between the interest rate on loan tranche and the risk-free rate using the UK daily gilt with matching issuance date and maturity. *MIIFRIC12* is an indicator for the period after the implementation beginning on 1 April 2009. *InterestCov2010* is a grantor's interest coverage ratio in 2010. *DebtIncome2010* is a grantor's interest-bearing liability to income ratio in 2010. All models control for industry and grantor fixed effects. *t-statistics* are reported in parentheses. Standard errors are clustered by grantor. Variable definitions are in Appendix 3. ***, **, and * indicate significance at the 1%, 5%, and 10% levels (two-tailed). All continuous variables are winsorized at the 1% and 99% level.

**TABLE 6** Sensitivity tests

| Dependent Var. = *LoanSpread* | (1) LoanSpread_PWLB | (2) wLoan Spread | (3) wLoanSpread_PWLB | (4) logLoan Spread | (5) logLoan Spread_PWLB | (6) log_wLoan Spread | (7) log_wLoan Spread_PWLB |
|---|---|---|---|---|---|---|---|
| *MIIFRIC12* | 1.526*** | 0.334*** | 0.263*** | 0.830*** | 1.172*** | 0.834*** | 1.182*** |
| | (6.08) | (2.72) | (2.93) | (4.48) | (5.64) | (4.19) | (5.64) |
| *Size* | -0.012*** | -0.003*** | -0.002*** | -0.005*** | -0.007*** | -0.007*** | -0.009*** |
| | (-4.58) | (-4.18) | (-5.12) | (-3.60) | (-3.98) | (-4.70) | (-4.93) |
| *Maturity* | 0.001 | -0.039*** | -0.028*** | -0.005 | 0.000 | -0.106*** | -0.101*** |
| | (0.14) | (-7.09) | (-8.51) | (-0.93) | (0.10) | (-18.30) | (-19.26) |
| *Senior* | 0.075 | 0.111 | 0.112** | 0.383** | 0.438** | 0.385** | 0.454** |
| | (0.22) | (1.37) | (2.22) | (2.29) | (2.24) | (2.50) | (2.52) |
| *TranchNum* | 0.035 | 0.026 | 0.005 | 0.009 | -0.096*** | 0.003 | -0.101** |
| | (0.62) | (1.12) | (0.32) | (0.26) | (-2.77) | (0.08) | (-2.56) |
| *EquityDebt* | -0.182** | -0.082** | -0.055** | -0.163*** | -0.106 | -0.139** | -0.085 |
| | (-2.02) | (-2.30) | (-2.37) | (-2.74) | (-1.55) | (-2.15) | (-1.12) |
| *DSCR* | 0.101 | 0.033 | 0.008 | 0.049 | 0.002 | 0.049 | -0.003 |
| | (0.97) | (1.50) | (0.60) | (0.93) | (0.04) | (0.86) | (-0.04) |
| *WAS* | 0.162 | 0.057* | 0.010 | 0.171*** | 0.208*** | 0.155** | 0.198** |
| | (1.26) | (1.79) | (0.54) | (2.81) | (2.86) | (2.34) | (2.65) |
| *GrantorEquity* | -0.490 | -0.073 | -0.028 | -0.574** | -0.167 | -0.704** | -0.319 |
| | (-1.48) | (-0.89) | (-0.45) | (-2.38) | (-0.59) | (-2.55) | (-1.01) |
| *ProjectSize* | 0.001*** | 0.000** | 0.000** | 0.000*** | 0.000*** | 0.000*** | 0.000*** |
| | (4.13) | (2.23) | (2.47) | (3.61) | (3.02) | (5.24) | (4.06) |
| *FinCost* | 0.007*** | 0.002*** | 0.002*** | 0.003*** | 0.004*** | 0.005*** | 0.006*** |
| | (4.39) | (4.61) | (5.75) | (3.45) | (4.10) | (5.68) | (6.02) |
| *TtlDebtDeal* | -0.000* | -0.000 | -0.000 | 0.000 | -0.000 | 0.000 | -0.000 |
| | (-1.72) | (-0.18) | (-0.30) | (0.38) | (-1.02) | (0.08) | (-1.13) |
| *Experience* | -0.012 | 0.001 | 0.002 | -0.011 | -0.030 | -0.008 | -0.026 |
| | (-0.40) | (0.27) | (0.46) | (-0.62) | (-1.36) | (-0.47) | (-1.16) |
| *BASEL2* | -0.277 | 0.041 | -0.063 | 0.049 | -0.015 | -0.019 | -0.092 |
| | (-0.88) | (0.34) | (-0.68) | (0.21) | (-0.06) | (-0.08) | (-0.37) |
| *SPI* | 0.007 | 0.005** | 0.002 | 0.007 | 0.001 | 0.006 | 0.001 |
| | (1.22) | (2.27) | (1.41) | (1.67) | (0.28) | (1.32) | (0.16) |
| *MktInfInvt* | 0.000 | -0.000 | -0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | (0.64) | (-0.71) | (-0.37) | (0.73) | (0.54) | (0.10) | (0.05) |
| *GovtCap* | 0.588 | -0.079 | -0.012 | 0.028 | 0.335 | -0.027 | 0.291 |
| | (1.12) | (-0.59) | (-0.15) | (0.11) | (0.90) | (-0.10) | (0.84) |
| *Constant* | -2.601 | 0.286 | 0.382 | -2.378* | -2.451 | -2.294 | -2.460 |
| | (-0.89) | (0.48) | (0.86) | (-1.68) | (-1.21) | (-1.49) | (-1.23) |
| Industry Fixed Effects | YES | YES | YES | YES | YES | YES | YES |
| Grantor Fixed Effects | YES | YES | YES | YES | YES | YES | YES |
| Grantor Cluster | YES | YES | YES | YES | YES | YES | YES |
| Observations | 419 | 420 | 419 | 420 | 419 | 420 | 419 |
| Adjusted R-squared | 0.164 | 0.448 | 0.391 | 0.168 | 0.211 | 0.628 | 0.572 |

**Notes**: The table provides the sensitivity tests using different definitions of *LoanSpread*. *LoanSpread_PWLB* defines *LoanSpread* using PWLB rate with matching issuance date and maturity as the base rate. *wLoanSpread* is the weighted measure of *LoanSpread* using the loan tranche maturity as the weight. *wLoanSpread_PWLB* is the weighted measure of *LoanSpread_PWLB* using the loan tranche maturity as the weight. *logLoanSpread* is the natural logarithm of *LoanSpread*. *logLoanSpread_PWLB* is the natural logarithm of *LoanSpread_PWLB*. *log_wLoanSpread* is the natural logarithm of *wLoanSpread*. *log_wLoanSpread_PWLB* is the natural logarithm of *wLoanSpread_PWLB*. We exclude the negative measures of *LoanSpread_PWLB* in our tests thus the sample size in columns (1), (3), (5) and (7) is smaller. All models control for industry and grantor fixed effects. *t-statistics* are reported in parentheses. Standard errors are clustered by grantor. Variable definitions are in Appendix 3. ***, **, and * indicate significance at the 1%, 5%, and 10% levels (two-

tailed). All continuous variables are winsorized at the 1% and 99% level.

**TABLE 7** Tests of Hypotheses 1, 2 and 3 on delayed IFRS adopters

| Dependent Variable = *LoanSpread* | (1) | (2) | (3) |
|---|---|---|---|
| *MIIFRIC12* | 1.771** | 1.262** | 0.381 |
| | (2.26) | (3.69) | (0.28) |
| *MIIFRIC12 × FinDistress* | | 1.169* | |
| | | (2.09) | |
| *MIIFRIC12 × Intensity* | | | 1.333 |
| | | | (1.14) |
| *Size* | -0.057 | -0.064 | -0.061 |
| | (-1.42) | (-1.62) | (-1.32) |
| *Maturity* | -0.053 | -0.063 | -0.052 |
| | (-0.84) | (-1.04) | (-0.83) |
| *Senior* | 0.265 | -0.019 | 0.275 |
| | (0.49) | (-0.03) | (0.51) |
| *TranchNum* | 0.076 | -0.092 | 0.316 |
| | (0.40) | (-0.46) | (1.72) |
| *EquityDebt* | -0.820 | -0.468 | -0.845* |
| | (-1.70) | (-0.78) | (-1.94) |
| *DSCR* | 0.785* | 0.600 | 0.870** |
| | (2.12) | (1.42) | (2.48) |
| *WAS* | 0.175 | 0.270 | 0.079 |
| | (1.36) | (1.43) | (0.58) |
| *GrantorEquity* | -1.968 | -1.923 | -2.853 |
| | (-1.22) | (-1.07) | (-1.48) |
| *ProjectSize* | -0.005 | -0.006 | -0.005 |
| | (-0.68) | (-1.06) | (-0.70) |
| *FinCost* | 0.040* | 0.046** | 0.042 |
| | (1.89) | (2.32) | (1.78) |
| *TtlDebtDeal* | 0.004 | 0.009 | 0.005 |
| | (0.74) | (1.66) | (0.91) |
| *Experience* | 0.367*** | 0.551*** | 0.401*** |
| | (4.08) | (7.02) | (6.17) |
| *BASEL2* | -2.495** | -2.585*** | -3.078* |
| | (-2.27) | (-3.26) | (-1.99) |
| *SPI* | 0.043** | 0.022 | 0.043** |
| | (2.43) | (0.94) | (2.47) |
| *MktInfInvt* | -0.001 | -0.002 | -0.001 |
| | (-0.41) | (-0.98) | (-0.54) |
| *GovtCap* | -0.054 | -1.288 | 0.218 |
| | (-0.02) | (-0.68) | (0.11) |
| *Constant* | 0.413 | 14.507 | 0.207 |
| | (0.02) | (0.74) | (0.01) |
| Industry Fixed Effects | YES | YES | YES |
| Grantor Fixed Effects | NO | NO | NO |
| Grantor Cluster | YES | YES | YES |
| Observations | 75 | 75 | 75 |
| Adjusted R-squared | 0.147 | 0.153 | 0.133 |

**Notes**: The table tests the effect of MIIFRIC 12 on PFI loan spreads on grantors who implemented MIIFRIC 12 in the financial year ending 31 March 2010 but delayed the adoption of IFRS by one year. The reduced sample includes loan tranches with financial close dates five years before and one year after the adoption of MIIFRIC 12. The dependent variable is *LoanSpread*, which is the difference between the interest rate on loan tranche and the risk-free rate using the UK daily gilt with matching issuance date and maturity. MIIFRIC12 is an indicator for the period after the implementation beginning on 1 April 2009. *FinDistress* under column (2) is an indicator for financially distressed grantors whose revenue reserve

adjustments were below the recognised PFI borrowings in the adoption year. *Intensity* under column (3) is an indicator for grantors whose total number of PFI projects procured before the adoption year, i.e., as of 31 March 2009, is above the sample median. All models are controlled for industry fixed effects. t-statistics are reported in parentheses. Standard errors are clustered by grantor. Variable definitions are in Appendix 3. ***, **, and * indicate significance at the 1%, 5%, and 10% levels (two-tailed). All continuous variables are winsorized at the 1% and 99% level.

**TABLE 8**: Robustness tests

| Dependent variable = *LoanSpread* | (1) | (2) | (3) |
|---|---|---|---|
| *MIIFRIC12* | 2.623*** | 2.123*** | 1.038** |
| | (4.30) | (3.79) | (2.55) |
| *Size* | -0.022*** | -0.012*** | -0.011*** |
| | (-6.16) | (-5.36) | (-4.55) |
| *Maturity* | 0.004 | -0.021* | -0.022 |
| | (0.13) | (-1.72) | (-1.39) |
| *Senior* | 0.059 | -0.218 | 0.048 |
| | (0.19) | (-0.40) | (0.09) |
| *TranchNum* | 0.161 | -0.109 | 0.123 |
| | (1.38) | (-0.74) | (1.47) |
| *EquityDebt* | -0.092 | 0.009 | 0.004 |
| | (-0.73) | (0.03) | (0.02) |
| *DSCR* | 0.025 | 0.296*** | 0.187 |
| | (0.12) | (2.75) | (1.40) |
| *WAS* | 0.155 | 0.220** | 0.254** |
| | (0.90) | (2.06) | (2.12) |
| *GrantorEquity* | -0.682** | -1.999 | |
| | (-2.44) | (-0.96) | |
| *ProjectSize* | 0.001* | 0.001*** | 0.001*** |
| | (2.02) | (3.58) | (5.87) |
| *FinCost* | 0.000 | 0.007*** | 0.007*** |
| | (0.03) | (4.60) | (3.28) |
| *TtlDebtDeal* | 0.009* | 0.000* | -0.000 |
| | (1.92) | (1.70) | (-1.30) |
| *Experience* | -0.018 | 0.083 | -0.019 |
| | (-0.49) | (0.77) | (-0.43) |
| *BASEL2* | -0.798 | -0.720 | 0.246 |
| | (-0.93) | (-1.10) | (0.62) |
| *SPI* | 0.018 | 0.014* | 0.021** |
| | (0.76) | (1.98) | (2.26) |
| *MktInfInvt* | -0.000 | 0.000 | 0.000 |
| | (-0.31) | (0.24) | (1.13) |
| *GovtCap* | 0.592 | 0.707 | 0.244 |
| | (0.60) | (0.99) | (0.46) |
| *Constant* | -2.359 | -3.104 | -4.372* |
| | (-0.41) | (-1.40) | (-1.70) |
| Industry Fixed Effects | YES | YES | YES |
| Grantor Fixed Effects | YES | YES | YES |
| Grantor Cluster | YES | YES | YES |
| Observations | 188 | 264 | 282 |
| Adjusted R-squared | 0.250 | 0.176 | 0.091 |

**Notes**: The table provides robustness tests. The dependent variable is *LoanSpread*, which is the difference between the interest rate on loan tranche and the risk-free rate using the UK daily gilt with matching issuance date and maturity. *MIIFRIC12* is an indicator for the period after the implementation beginning on 1 April 2009. Column (1) removes the GFC effect by dropping loan tranches financed in 2007 and 2008. Column (2) removes the adoption year effect by dropping loan tranches financed in 2010. Column (3) removes the grantor equity effect by dropping projects and associated loan tranches with grantor equity investments. The control variable *GrantorEquity* is removed from the test because of collinearity. All models control for industry and grantor fixed effects. *t-statistics* are reported in parentheses. Standard errors are clustered by grantor. Variable definitions are in

Appendix 3. ***, **, and * indicate significance at the 1%, 5%, and 10% levels (two-tailed). All continuous variables are winsorized at the 1% and 99% level.