Information Asymmetry, Financial Intermediation, and Wealth Effects of Project Finance Loans

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Using a unique hand-collected sample, we study market reactions to mining developers announcing project finance loans. We document a significant 3-day abnormal return of 2.6% and a 3.4% reduction in abnormal bid-ask spread around loan approvals, consistent with information transfer from private lenders to equityholders and reduction in asymmetric information. Cross-sectional analysis reveals a negative association between announcement return and hedging requirements specified in loan contracts, which becomes insignificant after controlling for the treatment effects of hedging. Specialist banks do not charge lower rates, but are more likely to impose hedging requirements, consistent with rent extraction due to bargaining power. (*JEL* G30, G32)

We thank an anonymous referee for helpful suggestions that have significantly improved the paper. We are grateful to Ray Ball, Philip Brown, Matt Grosse, Wilson Tong, and participants at the 2019 BAFA Corporate Finance and Asset Pricing Conference, the 2019 AFAANZ Conference, and seminars at Latrobe University and the University of Western Australia for thoughtful discussions and comments. All remaining errors are our responsibility. Send correspondence to Andrew Ferguson, UTS Business School, University of Technology Sydney, PO Box 123 Broadway NSW 2007, Australia; telephone: +61 295143565. Email: Andrew.Ferguson@uts.edu.au.

Introduction

Project finance (PF) loans refer to non- or limited-recourse financing of long-term projects (typically infrastructure, industrial and mining) with repayment primarily based upon the cash flows of the project.[1] According to data from Thomson Reuters, global PF loans in 2018 amounted to USD $282.7 billion (871 deals), an increase of 21.7% from 2017, the highest volume on record.[2] Despite their economic significance, there are relatively few empirical studies on PF loans (Brealey, Cooper, and Habib 1996). Conventional wisdom holds that project vehicles are not publicly-traded entities (Gatti et al. 2013), which render capital market studies impossible. However, we take advantage of a unique setting in the Australian mining industry where Australian Securities Exchange (ASX) listed companies, namely, mining exploration entities (MEEs), own the project vehicles that hold rights to mineral projects. Our objective is to undertake the first empirical study of capital market reactions to PF loan announcements to shed light on the role that financial intermediation plays in signalling private information and reducing information asymmetry for small, high-risk firms and the effects it has on shareholder wealth.

We consider a number of research questions in relation to PF loan approvals. In the first part of the paper, we aim to provide the first evidence on how the stock market reacts, in terms of abnormal returns and bid-ask spread, to firms announcing PF loans. The literature on financial intermediation (e.g., Leyland and Pyle 1977) suggests loan approvals by private lenders increase shareholder value and reduce information asymmetry. However, findings from prior empirical studies are mixed (e.g., James 1987; Maskara and Mullineaux 2011).

[1] In some cases, a mining project sponsor may have an equity interest in another project sponsor or a defined resource at another project not subject to development, which will form part of the security of the PF loan. In these cases, loans are described in the announcements as "limited recourse". However, mining project sponsors typically have only a small amount of cash and no other material assets upon which recourse is available as lenders often require residual asset disposal prior to loan approval. PF loans to mining projects are secured over the relevant mining lease(s), reserves, and property, plant and equipment associated with the mine development.

[2] https://practiceguides.chambers.com/practice-guides/project-finance-2019-second-edition (Link accessed 26/10/2020).

Our unique MEE sample provides a cleaner setting for such market reaction studies since ASX's continuous disclosure requirement enables PF loan announcement dates to be precisely identified. Most of our sample are single-project firms with very little or no debt before project financing. In addition, we are able to identify various company announcements over the life-cycle of the PF loan process—from first mentions and mandates through to approvals and drawdowns.

In the second part of the paper, we investigate factors affecting the shareholder wealth of PF loan borrowers. In particular, we are interested in how loan contractual terms (specifically, hedging requirements), lender identity, and government policy uncertainty (GPU) would affect borrowers' loan announcement returns. Smith and Stulz (1985) and Stulz (1996) suggest that smaller firms are more likely to engage in hedging than large firms because of greater risks and higher bankruptcy costs, but this prediction is rarely observed in the empirical literature to date. In our MEE sample, 40% of the PF loan contracts include hedging requirements (commodity price and/or currency hedging) for loan protection, making our study of hedging policy in smaller firms feasible, including the propensity of PF loans to have hedging requirements. Prior studies have examined whether the use of hedging would increase firm value and the results are mixed, dependent on various factors including commodity users versus producers, industry, and firm size.[3] Nevertheless, no studies we know of have explored the use of hedging in the context of loan contracting and its effects on shareholder wealth.

The supply side of the PF loan market for MEEs exhibits signs of industry specialization with the leading bank participating in 22%, and the top three banks in 43%, of all the sample deals. Prior literature (e.g., Lee and Sharpe 2009) suggests leading or dominant banks have positive reputation or certification effects due to their superior screening and monitoring

[3] See, for example, Carter et al. (2017) for a review of this line of literature.

ability, resulting in positive borrower stock price responses, lower interest rates charged and less borrowing base required for protection (Ross 2010). An alternative view is that banks, through specialization, capture market share and power in an industry to extract rents from borrowers (Stomper 2006). We investigate which of these two opposing views prevails in our setting by examining if PF loans originated by specialist banks are associated with higher announcement CAR, less protection by hedging requirements and lower loan spread.

There is also a growing literature examining the effects of GPU on investment decisions (Julio and Yook 2012; Jens 2017) and stock prices (Pastor and Veronesi 2012, 2013). Australian MEEs develop projects in many jurisdictions across the globe, subject to varying levels of GPU of the project host country.[4] We consider whether PF loan approvals would help mitigate market concerns of the effects of political risk on mining projects by examining the association between GPU and borrower stock price reactions.

Using a sample of Australian MEEs over the period 1995–2014, we find that borrowers experience, on average, a positive 3-day CAR of 2.6% and a 3.4% drop in bid-ask spread around PF loan approval announcements. These results are consistent with arguments that bank screening and monitoring increases shareholder value and reduce information asymmetry (Leland and Pyle 1977).

Cross-sectional analysis initially reveals loan announcement CAR is lower where the PF loan specifies a requirement for hedging to be undertaken by the borrower to obtain access to the facility. This result appears to be consistent with arguments in Smith and Stulz (1985), who suggest that "Although hedging increases the value of the firm, it also redistributes wealth from shareholders to bondholders in a way that makes shareholders worse-off" (*p*.398). However,

[4] See, for example, the history of the Bougainville Copper project located in Papua New Guinea and the Chatree Gold project located in Thailand. As part of our loan pricing data collection, we identify two firms obtaining loan margin discounts after purchasing political risk insurance (Anderson 1999). See "Risks to miners increasing with rising resources nationalism" at https://blog.ajg.com.au/risks-to-miners-increasing-with-rising-resources-nationalism. (Link accessed 21/06/2021).

after controlling for potential endogeneity of the treatment effect of hedging, the negative association between hedging requirements and announcement return becomes insignificant. This suggests that the relation between hedging and shareholder wealth is a complex one. It could be that shareholders are indifferent to firms using hedging (Jin and Jorion 2006) or that the costs and benefits of hedging in the case of MEEs roughly offset each other. The selection model that we developed indicates hedging is more likely to be imposed in precious metals projects and non-USD loans, while less likely in projects with existing offtake agreements. More importantly, we document that specialist banks are the most significant factor driving the requirement of hedging in PF loans. This result is consistent with a market or bargaining power explanation that specialist banks are able to extract rents (Stomper 2006) by requiring hedging on the part of the project sponsors who have limited access to alternative sources of project financing (Murfin 2012).

We do not observe significant wealth effects for projects financed by reputable specialist lenders. This is in contrast to arguments in the literature that leading or dominant banks have positive reputation/certification effects on the basis of superior screening and monitoring (Lee and Sharpe 2009). Rather, our results are suggestive of the bargaining power of specialist lenders, who impose tougher lending conditions on borrowers (including hedging requirements), and hence no positive market reaction is observed. Consistent with this explanation is that the borrower has a greater likelihood of being "locked in" due to substantial information asymmetry between outside lenders and the borrower in this setting (Sharpe 1990; Rajan 1992; Bharath et al. 2011).

Our results also show GPU is positively associated with loan announcement return across all model specifications. The implication is that private lenders are effective in mitigating the market's concern on the political risks of the project host countries.

We conduct two additional analyses on our PF sample. First, we explore the determinants of PF loan pricing using a reduced sample with available data. We find that loan spread is negatively related to banks' benchmark base rate and positively associated with borrowing firms' management shareholding. Non-bank lenders also charge a higher spread than bank lenders. Surprisingly, banks do not charge a lower spread for loans with hedging requirements despite the lower default risk afforded by hedging. There is also no evidence of specialist banks charging a lower interest rate. These results, together with our previous findings that specialist banks have a higher propensity to impose hedging requirements, seem to suggest reputable specialist banks are using their market power to benefit from their borrowers, especially those in a weaker bargaining position.

We also examine the long-term performance of our sample firms subsequent to their loan approvals. We find that borrowers' post-loan operating performance remains poor on average, and comparable to MEEs with all-equity financed projects, suggesting the high-risk nature of mining operations and that bank screening and monitoring may not be as effective in high information asymmetry settings (Lee and Sharpe 2009). This is interesting since Holmstrom and Tirole (1997) argue that firms with little to offer in the way of collateral will be subsequently monitored more intensely. There is little descriptive evidence to suggest this heightened monitoring effects better performance, even by specialist banks.

Our study contributes to several strands of literature. First, it extends the scope of the project finance literature to the MEE setting, where project vehicles are owned and operated by ASX-listed mining firms as single or flagship projects. This differs from other PF settings in which the project companies created are legally independent of their sponsors (Esty 2004). The MEE setting thus enables us to examine, for the first time, how the stock market reacts to firms obtaining PF loan approvals. Our finding of a positive announcement return broadens the evidence of market reactions to bank loan announcements (Mikkelson and Partch 1986; James

1987; Fery et al. 2003; Gonzalez 2011; Maskara and Mullineaux 2011) to the PF setting. Whilst theory predicts that banks are useful in lowering information asymmetry, there are few studies in the literature directly testing whether bank loan announcements are associated with a reduction in the borrower's information asymmetry. The evidence that we document on the reduction in bid-ask spread around PF loan approvals highlights the screening and monitoring role that financial intermediation plays in lowering information asymmetry between high-risk borrowers and the market.

Second, our paper contributes to the literature on the corporate use of hedging, especially among smaller, high-risk firms. Theoretically, small firms are more likely to hedge than large companies because bankruptcy costs are not proportional (Smith and Stulz 1995). They thus have more incentives to hedge against financial trouble due to their more volatile cash flows and limited access to capital (Stulz 1996). However, the empirical literature has generally found that the use of hedging is more pervasive in large companies (Nance, Smith, and Smithson 1993; Geczy, Minton, and Schrand 1997; Carter, Rogers, and Simkins 2006).[5] The inclusion of hedging requirements in many of the PF loan contracts in our MEE sample makes the examination of hedging use in smaller firms feasible. Banks require borrowers to implement hedging facilities in order to protect the downside risk of the PF loan. To our knowledge, we are the first to develop a selection model of hedging requirements in a loan contracting setting. This is in contrast to the hedging model of Tufano (1996) for large gold producers. In addition, no study, to date, has sought to examine evidence of a possible wealth transfer from equityholders to debtholders due to hedging (Smith and Stulz 1985), which we are able to

[5] Tufano (1996) suggests that "… empiricists seeking to test if practise is consistent with theory have been stymied by a lack of meaningful data" It is possible that reasons why more hedging in small firms has not been observed in the finance literature include size and country biases in sample coverage of many commonly used financial economics databases. For example, commodity price hedging is mostly undertaken by mining firms, but most mining companies are domiciled outside of the US in Canada and Australia. Another possible reason more work has not been done on hedging is the need to hand collect data.

consider through examining the cross-sectional variation in abnormal stock returns around announcements of PF loan approvals.

Third, our analysis on specialist banks contributes to the literature on lender identity and loan terms. Prior studies have documented conflicting results on the effects of reputable/dominant banks on syndicated loan spread and loan terms. One strand of studies finds that loans from reputable banks are associated with lower interest rates charged and less protection required and attributes these results to the certification effects of top-tier lenders (e.g., Ross 2010; Gatti et al. 2013). In contrast, there are theoretical and empirical studies (e.g., Stomper 2006; McCahery and Schwienbacher 2010) suggesting that reputable specialist banks are extracting rents (e.g., charging higher loan spread) from borrowers because of their market power. We show that specialist banks in our MEE setting behave in a way more consistent with rent extraction because of their market or bargaining power,

1. Sample and Data

1.1 Mining exploration entities

MEEs are largely single project-focused entities and at the end of 2017 comprised around 25% of all companies listed on the ASX (Bui, Ferguson, and Lam 2020).[6] Under ASX's continuous disclosure requirements, PF loan announcement dates can be precisely identified (see example in Appendix 1). MEEs are relatively homogenous in terms of their operating and financial characteristics. Typically, they have no prior production, earnings, or borrowing history and are predominately all-equity financed from the grassroots exploration phase through to mineral discovery, resource definition and feasibility study completion. These tractable and well-defined sequential life-cycle stages are depicted in Appendix 2. At the discovery stage, the

[6] The ASX describes MEEs as firms in the energy or materials sectors under the Global Industry Classification Scheme (GICS), which have no positive operating cash flows or product revenues. Due to their risk profile, the ASX requires MEEs to file a quarterly cash flow statement to disclose their sources and uses of cash, including management forecasts of cash outflows to regularly inform investors of the liquidity of the MEE.

focus of the MEE is on furthering resource definition drilling which normally takes some years to complete. After the initial resource definition is completed, the company routinely undertakes a scoping study (Stage 5), where preliminary project economics are considered. If scoping study economics are positive, the company will conduct further drilling and exploration activity and undertake additional feasibility studies. Whilst the exact timing can vary, PF loan approvals (Stage 17) typically occur after the completion of the "full" or "bankable" or "definitive" or "optimised" feasibility study (Stage 14), where the project economics and a mine implementation plan are documented in detail, and various statutory project approvals are obtained (Stage 15), a process which can take many years itself. Following the receipt of statutory approvals, mandating of a debt financier takes place (Stage 16), where the emerging mine developer obtains indicative term sheets from lenders and mandates a preferred financier or lead arranger.

MEEs have many attributes in common with biotechnology firms in terms of long life-cycles and high information asymmetry. Mining projects have long life-cycles, with estimates (from discovery to production) ranging from 10 years for gold projects to 15–25 years for base metal projects.[7] This is very similar to the 10–20-year project life-cycle estimates for biotech firms in Lerner, Shane, and Tsai (2003) and Robinson and Stuart (2007).[8] MEEs are characterized by high information asymmetry like biotech firms. Lerner, Shane, and Tsai (2003) argue that it is difficult for investors to assess how a biotechnology firm is progressing due to the long project development time and the fact that information problems are likely correlated across firms. Similarly, it usually takes years for MEEs to ascertain the full size of

[7] A recent World Bank policy working paper (Khan et al. 2016) suggests that the average time taken from an initial gold discovery to production is 10 years and 15 years for base metals projects (zinc, lead, copper, and nickel). Industry estimates place the period from early exploration to final production for copper mines at close to 25 years.

[8] Further, the mining project life-cycle estimates of the time between discovery and production will normally exclude the pre-discovery grassroots exploration phase, which itself can last for years. It is possible, if not likely, that IPOs with grassroots or greenfield exploration projects may spend their whole public life without making a significant mineral discovery.

a mineral deposit and to increase the confidence levels of the resource estimate.[9] So, even after bankable feasibility studies are completed, there are frequently issues of in-ground resources not behaving or conforming to resource model estimations, or, in extreme cases, even outright fraud.[10] Like biotech drug developments, mining exploration is highly risky. Bartrop and Guj (2009) estimate the probability of discovering an economic orebody in a greenfield exploration program, irrespective of its size, at 0.9% (i.e., 23.37 discoveries in 2,669 trials). The probability drops to 0.3% for a major orebody and 0.07% for a world-class orebody. Again, these slender probabilities of success are similar to those in drug development discussed in Robinson and Stuart (2007, *p*.563).

Despite all these similarities, MEEs follow a very different funding pattern compared to biotech firms as discussed in Lerner, Shane, and Tsai (2003) and Robinson and Stuart (2007). Unlike the case of biotech firms, there is little in the way of informed intermediaries in the pre-IPO phase for MEEs. Exploration phase MEEs, regardless of pre-IPO, IPO or post-IPO, typically only attract equity funding. In the scoping and feasibility phases, MEEs are still predominantly equity financed. It is only later in the feasibility phase that a small number of MEEs may be able to source seed loans of around $1–3 million, which are used to finance costly feasibility studies. These seed loans are often structured as convertible notes, with the financier aiming to position to convert into equity if project development accelerates after bankable feasibility study completion. The PF loans we refer to in this study all occur in the development phase. Equity funding still plays an important part of the project funding mix during the development phase.

[9] It should be pointed out that resource sampling is only a tiny fraction of the overall size of the deposit, less than 0.001% according to Stephenson (2004) as discussed in Ferguson and Pundrich (2015).

[10] Lerner, Shane, and Tsai (2003) cite the biotech fraud example of Centocor in January 1993. Similarly, in the MEE setting, the fraud in relation to the resource estimates announced by Bre-X Minerals saw the Vancouver Composite Index fall by over 25% in less than six weeks during Spring 1997 as the junior mining sector collapsed in the wake of the failure of Bre-X Minerals (Brown and Burdekin 2000).

The balance sheet of MEEs is relatively simple, consists mainly of a small amount of cash, deferred exploration and evaluation expenditure, and accumulated losses (Ferguson, Kean, and Pundrich 2020). This makes MEEs relatively transparent compared to large diversified firms, where debt finance provided to one division will have less impact on the firm overall (Esty 2004).[11] Further, the contractual structure around MEEs' PF loans is likewise highly standardised and relatively transparent (Dailami and Hauswald 2007).[12] Some PF loan approvals granted to MEEs are associated with a hedging requirement in the loan contract, which specifies a quantum of the output commodity and/or foreign currency to be hedged. Though the majority of MEEs' mine development projects are located in Australia, a significant proportion of them are scattered around the globe in host countries with wide-ranging socio-economic development and political and legal systems. In addition, PF lenders to MEEs are diverse, ranging from banks versus non-banks, international versus local, and governmental versus commercial, etc.

1.2 Data sources

We draw on a sample of PF loan deals successfully completed by Australian MEEs spanning the period 1995–2014. The primary source of loan announcements is through searches on Morningstar's DatAnalysis Premium database and Factiva, which yields a sample of 120 PF loan approvals.[13] We drop four deals due to missing necessary stock price data and another deal because of the convertible nature of the loan consistent with Miller and Reisel (2012),

[11] MEEs are not equity carve-outs (Bayar, Chemmanur, and Liu 2011).

[12] For example, the contractual nexus of MEEs includes disclosure of the identity of key non-financial contracts mentioned in Corielli, Gatti, and Steffanoni (2010), such as the engineering, procurement and construction, and management contractor, and parties to offtake agreements, although detailed disclosure (such as contractual terms) is rare.

[13] The ASX announcements platform available in Morningstar DatAnalysis Premium allows for text searches of announcements archived after September 1998. Accordingly, we use Factiva for text searches of announcements prior to September 1998. Some post-September 1998 ASX company filings are "image PDFs" and not searchable in DatAnalysis Premium, so we utilize Factiva to identify these projects.

resulting in a final sample of 115 PF deals involving a total of 114 unique firms and 239 announcements to the market (Table 1, Panel A).

[Insert Table 1 here]

MEEs typically make one or more announcements regarding the status or progress of their PF loan application during the approval process. First, a borrower may mention that it has made initial contact with a bank (or other lenders) or it is seeking PF loans. After obtaining indicative term sheets from prospective financiers, often with the assistance of a financial advisor, the firm may then give a formal mandate to a bank (or banks in the case of mandated syndicates) to arrange PF facilities. The PF loan process requires approval by the credit committee of the bank. When all the conditions precedent attached to the loan term sheet are satisfied, drawdown of the PF loan can commence. Typically, the loan is drawn down in pre-specified tranches, which may differ in quantum and are subject to their own satisfactory performance milestones in relation to mine construction progress. By manually reading the content of firms' PF disclosures, we classify all these announcements into the following types: (1) mentions; (2) mandates; (3) approvals, which are further divided into first, revised, final, or sole approvals; and (4) drawdowns.[14]

Table 1, Panel B, presents a breakdown of the PF loan announcements by type. Of the 239 announcements identified, very few (2.1%) involve mentions. In contrast, 18.8% of the announcements are associated with firms mandating loan arrangers. A total of 28.0% of all announcements are sole approvals of PF loans, followed by 20.1% (19.7%) for first (final) approval announcements. Only 7.5% of announcements relate to drawdown of the loans upon fulfilment of the conditions precedent. To conduct empirical tests, data is required on loan- and firm-level characteristics and we manually collect details of PF loan quantum, hedging and off-

[14] Despite ASX's continuous disclosure requirements, firms still have discretion over how to disclose some aspects of the PF loan application process (like which loan life-cycle events to disclose on the basis of whether the firm considers they will result in a material impact on stock price). Thus, not all firms have a complete set of announcements in accordance with this PF life-cycle classification.

take requirements, and lender identity from sample firms' PF announcements. Data on firms' prior and subsequent fiscal-year financial and shareholding information is sourced from DatAnalysis Premium. Other stock market data, such as daily closing, bid, and ask prices, and market capitalization, are obtained from Datastream.

1.3 Project loan deals by year, commodity and host country

Figure 1 plots the distribution of PF loan deals in the sample by year. The number of deals in earlier years was rather small, reflecting low precious metals prices over the period 1999–2002. Subsequently, the number of PF deals steadily increased during the period known as the "mining boom" in Australia (2003–2012). Following the decline in gold prices after 2012, there was a reduction in the numbers of PF deals.

[Insert Figure 1 here]

In terms of the breakdown by project host country and commodity type, Table 2 depicts the largest number of PF deals are for base metals (32 deals or 28%) and precious metals (45 deals or 39%) projects. Overall, there are 16 (14%) oil and gas projects, with 25% of these located in the US. This evidence reflects the nature of the extractive industries in Australia, which has a greater focus on minerals extraction *vis-a-vis* oil and gas development, compared to the US. As for the distribution of PF deals by project location, Table 2 shows most projects are located in Australia 68 (59%), with the remaining 47 deals (41%) located in 28 offshore jurisdictions.

1.4 Lender participation

Table 3, Panel A, reports descriptive statistics on individual lender participation in PF deals, with Macquarie Bank underwriting 25 (22%) of all the 115 loans as either the sole lender (20 deals) or lead arranger (5 deals). This evidence points to Macquarie's dominant position in mining PF lending, consistent with anecdotal reports.[15] The second largest (in terms of number

[15] For example, Saracen Resources in a subsequent project expansion loan announcement on 7 November 2012 states: "We are pleased to advise the market about the facilities from Macquarie, which is a leader in this segment

of deals) loan provider is Rothschild/Investec.[16] The combined Rothschild/Investec completed a total of 15 deals (13% of sample), of which 11 (4) deals are as sole lender or lead (joint) arranger. As a further indication of the dominance of the top lender, Macquarie has more than double the number of sole lender/lead arranger positions compared to the second largest bank. In third place is Bank of Scotland, participating in a total of 12 (10%) deals, of which 7 deals are in the sole lender or lead arranger role.

[Insert Table 3 here]

The tally of 147 bank and 28 non-bank participants in Column 1 indicates a total of 175 lender participation in 115 PF deals, with the difference (60) reflecting the presence of syndication. In Columns 2 and 3, we observe that banks are much more likely to be a sole lender or lead arranger (100 out of 115 or 87%). This compares with non-banks, which are sole/lead arrangers only 13% (15 out of 115) of all deals. The largest category of non-bank lenders is government-affiliated financial institutions, such as policy banks and export credit agencies (11 deals). Remaining non-bank lenders include investment funds (7 deals), commodity traders (6 deals), mining industry participants (1 deal), and equipment suppliers (3 deals). The presence of non-bank private debt intermediaries in this setting is likely due to high information asymmetry and high-risk borrowers with an absence of a credit history. Denis and Mihov (2003) find that firms with the highest credit quality use public debt, with middle ranking firms using private debt and those with the lowest credit ratings seeking loans from non-bank sources.

1.5 Loan characteristics

of the resources sector. The Finance Facilities bring substantial benefits to Saracen… This is a solid outcome for our shareholders, and gives us significant financial flexibility".

[16] Investec acquired the Australian banking operations of N.M. Rothschild & Sons in 2006, so deals for these two banks are pooled, consistent with the treatment of bank mergers in Gatti et al. (2013). See Griggs, T. "Investec to buy Rothschild's Australian banking arm", *Financial Times*, 7 April 2006.

Table 4, Panel A, reports descriptive statistics on the sample loan characteristics. The majority of the PF loans are provided by single lenders, with the mean (median) number of lenders being 1.58 (1.00). This compares with Gatti et al. (2013), who report a mean (median) of 7.48 (5.00). As for loan size, the mean (median) loan size is $107 million ($53 million), compared to $189 million ($79 million) for Gatti et al. (2013), noting their data is in US dollars.[17] Our sample has a minimum (maximum) loan size of $8.5 million ($1,510 million), in contrast to $380,000 ($21,587 million) for Gatti et al. (2013). In relative terms, the mean (median) loan to total assets ratio is 2.31 (1.24) whilst the loan to market capitalization ratio is 0.90 (0.5).[18]

[Insert Table 4 here]

Some 28% of sample projects are joint ventures. In terms of deal sourcing, 79% of deals are sourced from commercial banks, 11% from non-banks and the remaining 10% from mixed (both bank and non-bank) sources. Roughly 77% of the deals discuss some form of security, in contrast to 30% reported in Gatti et al. (2013). As for other revenue protection strategies, 21% of deals involve offtake agreements, whilst 40% include a hedging requirement as part of the loan package. Some 14% of deals discuss a required equity raising by the borrower and 24% of deals involve the lender obtaining equity (e.g., shares, options, warrants, etc.) in the borrower. Lenders having an equity position in the borrower can be interpreted as an endorsement of the MEE's future prospects as lenders look to access the borrower's future upside.

1.6 Borrower characteristics

As for firm characteristics (Table 4, Panel B), the sample has a mean (median) total assets and market capitalization of $71.9 million ($41.5 million) and $198 million ($100 million),

[17] We note that one firm did not disclose the loan amount, reducing our sample to 114 observations.

[18] A loan to total assets ratio above one can be explained due to the timing difference between the loan announcement and the financial year-end date. We measure the loan amount at the date of the loan announcement, and total assets at the financial year-end date prior to the loan announcement.

respectively. Consistent with the notion that the sample firms are largely pre-production mineral developers, they depict a mean (median) revenue to total assets ratio of 0.06 (0.01). Reflecting MEEs' balance sheet emphasis on deferred exploration and evaluation expenditure and cash (Ferguson, Kean, and Pundrich 2020), the mean (median) cash to total assets ratio is relatively high at 0.28 (0.20). Both the mean (–0.19) and median (–0.09) net profit to total equity ratio are negative, as MEEs are routinely loss-making in the pre-production phase. The debt ratios all exhibit a mean value close to zero and a median value of zero, implying most MEEs are debt-free or having only obtained either seed or bridging finance previously.[19] The mean (median) market-to-book ratio of 4.40 (2.78) is consistent with low book value of equity due to the presence of significant accumulated losses. The average top-20 shareholding (a proxy for informed or institutional shareholders) is 63%. On average, CEOs own a mean (median) of 4% (1%), whilst other directors own 8% (4%) and combined CEO and directors own a mean (median) of 11% (7%) of the issued capital in MEEs.

2. Market Reactions to Project Finance Loans

2.1 Stock price responses

2.1.1 Empirical prediction

Bank loans are theorised to benefit a firm characterised by a lack of monitoring (Diamond 1984), poor information environment (Dhaliwal, Khurana, and Pereira 2011), high information asymmetry (Boyd and Prescott 1986), low analyst coverage (Best and Zhang 1993), high risk (Diamond 1991), and small firm size (Fama 1985). These characteristics broadly describe MEEs (Bui, Ferguson, and Lam 2020). Together, these attributes make MEEs an ideal setting to consider the announcement effects of PF loans.

[19] We observe the maximum leverage ratio of 0.79. This corresponds to one firm with a large convertible note outstanding in the fiscal year prior to the PF approval. We delete this observation in further tests for robustness check (see Section 3.5).

There are numerous reasons to expect a positive share price reaction to PF loan approvals in this high information asymmetry setting. From a screening perspective, theory suggests banks are better able to screen potential loans relative to outside lenders due to private information (Leland and Pyle 1977). Capital market participants will act on signals provided by information intermediaries only when an intermediary has a sufficient stake in the market to remove incentives to misrepresent information (Campbell and Kracaw 1980). Bank loans are a credible signal in this sense as they either allocate or decline resources to borrowers (Fama 1985). Based on the informational advantages banks possess over external parties, and the credibility that lending decisions signal, investors will gain insights into project risk through loan announcements.

Banks also provide ex-post monitoring, which can raise the probability of firm success through enforcement of efficient project choice or the borrower's effort (Diamond 1991; Faulkender and Petersen 2006; Mester, Nakamura, and Renault 2007). Lenders to MEEs might also require a lender representative take a position on the board of directors (Fama 1985).[20] Further, banks are more efficient at restructuring firms in financial distress relative to outside lenders (Bolton and Scharfstein 1996; Bolton and Freixas 2000). This ex-post monitoring has been described as part of the certification role in the PF literature and is argued to reduce potential moral hazard problems (Esty and Megginson 2003).

From a signalling perspective, Ross (1977) argues that managers are likely to have private information about firm value, with high-quality firms having incentives to engage in signalling. Ross (1977) suggests one such signal is firms' use of debt financing. As managers incur a penalty in the form of negative reputational effects if their firm goes bankrupt, high-quality borrowers will have a higher tolerance for debt than lower-quality firms. The implication is

[20] An example from our sample is Mr Rune Symann's position on the Aurelia Metals Ltd board whilst employed by Glencore, the project financier to the Hera project (Source: Aurelia Metals Annual Report 2016).

that the market would interpret more debt as a stronger signal of project quality (Corielli, Gatti, and Steffanoni 2010). A special case is loan initiation where screening is conducted for the first time and a more unambiguous quality signal is being sent, compared to any subsequent loans (Diamond 1991).[21] The PF loan sample that we examine belongs to this special case. Except for a few outliers and the presence of small seed loans in some cases, the borrowers in our sample are largely debt-free. This makes our sample conducive to market reaction studies because of the stronger signal due to loan initiation.

Bank debt financing can have other signalling benefits. For example, in addition to the widely documented benefits of bank monitoring, there are benefits of concentrated debt ownership when borrowers default, and mitigation of strategic default by syndication (Esty and Megginson 2003). Further, in the PF context, banks are argued to signal contract enforceability, particularly in countries with high-risk legal and political systems (Esty and Megginson 2003). Lastly, in terms of PF theory, John and John (1991) posit that for a new venture where the information is publicly known, an announcement of project financing "…should elicit a positive stock price response" (*p*.70). We empirically test a key theoretical argument of John and John (1991) in relation to announcements of PF loans.

Early empirical evidence on borrower stock price reactions to bank loan announcements are mixed. Mikkelson and Partch (1986) examine market reactions to firms issuing both debt and equity securities using a sample of NYSE-listed industrial firms over the period 1972–1982 and find a small, positive abnormal return. James (1987) uses a sample of 300 randomly selected firms with 80 bank loan announcements over the period 1974–1983, reporting

[21] Prior studies have examined the information content of new loans and loan renewals, but not loan initiations. For example, Lummer and McConnell (1989) classify a "new" loan as a firm that arranges a loan with a new bank where the firm has no prior credit history, stating: "Except for five cases, all of the firms in our sample that announce new credit agreements had some prior bank financing in place, albeit with a different bank". This approach has been adopted in subsequent studies, such as Slovin, Johnson, and Glascock (1992), who state: "New credit agreements with new banks are classified as initiations, even if other bank debt may exist." In other words, moving from an environment of no bank monitoring to one with bank monitoring in our setting is arguably more informative than an existing borrower obtaining a new (additional) loan from another bank.

abnormal returns of 1.93% using a two-day event window surrounding bank loan announcements. In contrast, negative returns are reported around announcements of private placements and public debt announcements. Lummer and McConnell (1989) document an overall positive two-day abnormal return of 0.61%, with sub-sample analysis showing this result is driven by positive loan revisions, which experience a 0.87% abnormal return.

An alternative argument in terms of expected market reactions to PF loan approvals is that mine developments are akin to a suite of real options with a substantial embedded option value associated with the option to wait (Paddock, Siegel, and Smith 1988). Ingersoll and Ross (1992) argue that, in an uncertain environment, project valuation is highly sensitive to future interest rate movements, with rate uncertainty ubiquitous. They support findings in McDonald and Siegel (1986), who argue that managers of projects should wait to invest until such time as the present value of the project exceeds a certain benchmark in terms of capital investment. The value of the option to wait is also argued from an information arrival perspective, with Bernanke (1983) suggesting that postponing investment decisions is optimal if improved information allows managers to make better decisions. This will be especially the case in the mining industry, faced with volatile commodity price changes (Brennan and Schwartz 1985) and other project technical risks along with political uncertainty. This suggests the option to wait is valuable to mining company managers, the closure of which is potentially one reason why a negative market reaction to PF loan approvals might be expected.

In summary, there is evidence of modest market reactions to announcements of bank loans in some (but not all) prior studies. There are also arguments suggesting a negative stock price reaction if the market believes the option to wait has been extinguished prematurely. On balance, we argue PF loan announcements are associated with positive share price reactions since, apart from an initial PF debt mandate or prior seed loan to complete a feasibility study, this is the first signal of bank lending credibility sent to the market for MEEs (Diamond 1991).

Consistent with arguments in John and John (1991), we expect PF loan announcements to be associated with positive share price responses.

2.1.2 Announcement return measure

To gauge stock price reactions to firms' announcements of PF loans, we construct daily abnormal stock returns surrounding loan announcements as follows:

$$AR_{i,t} = ln\left[\frac{P_{i,t}}{P_{i,t-1}}\right] - ln\left[\frac{P_{m,t}}{P_{m,t-1}}\right], \quad (1)$$

where $AR_{i,t}$ is the abnormal (market-adjusted) return of firm i on day t, $P_{i,t}$ is the closing stock price of firm i on day t, and $P_{m,t}$ is the closing value of ASX's All Ordinaries Index m on day t.[22,23] The cumulative abnormal return (CAR) for firm i is the summation of the daily abnormal returns over the event window (q, s), calculated as:

$$CAR_i(q, s) = \sum_{t=q}^{s} AR_{i,t} \quad (2)$$

For each announcement type, we average CAR_i across the sample firms to obtain a cumulative average abnormal return ($CAAR$). We expect $CAAR(q, s)$ to be positive and significant, implying PF loans are value enhancing.

2.1.3 Results

Table 5, Panel A, reports evidence on share price reactions to firms making various types of PF loan announcements. Across the full sample of 239 announcements, we observe an average cumulative abnormal return of 2.22%, significant at the 1% level using both parametric (BMP) and non-parametric (CZ rank) tests.[24] This univariate result provides strong support for

[22] All prices are adjusted for changes in the basis of quotation, such as dividends on the ex-dividend day and, more likely in this setting, capital reconstructions.

[23] The All Ordinaries Index is a market capitalization-weighted index comprising the largest 500 ASX-listed companies and represents over 99% of market capitalization of the ASX. For robustness, we also use the "Small Ordinaries Index" as an alternative benchmark for computing abnormal returns (see Table 5).

[24] The BMP test is a parametric test based on standardized residuals corrected for event-induced changes in volatility (Boehmer, Masumeci, and Poulsen 1991). The CZ rank test is the Corrado and Zivney non-parametric rank test corrected for event-induced volatility of rankings (Corrado and Zivney 1992).

assertions that PF announcements are associated with positive abnormal returns. When partitioned by announcement type, significant variations in abnormal returns are observed. The 3-day $CAAR$ for the five PF mentions is not significant, consistent with the market deriving little information from a company announcing its intention to seek PF. Announcements of PF mandates signal that MEEs are exclusively identifying a lender or lenders for the negotiation of a project loan. The 45 mandates in the sample attract the highest 3-day $CAAR$ of 4.14%, significant at the 1% (BMP test) and 5% (CZ rank test) levels.

[Insert Table 5 here]

The sample consists of 48 first approval announcements, which typically involve a credit-approved offer of finance from the lender(s), subject to certain terms and conditions.[25] Disclosures of first approvals exhibit an average cumulative abnormal return of 2.31%, but is not significant using both parametric and non-parametric tests. Interestingly, where the terms of an initial approval are subsequently revised (revised approvals), the abnormal returns are highly negative (–3.37%), though not significant due to the small number of such announcements. In terms of latter stages of the loan cycle, final approvals (47 announcements) are met with a positive abnormal return of 1%, significant at $p<0.1$ based on the BMP test, while drawdowns (18 announcements) exhibit positive but insignificant abnormal returns. This result is expected since final approvals normally entail the fulfilment of agreed terms and conditions precedent and signing of loan documentation, and drawdowns are more of a formality. We distinguish between firms making both *first* and *final* approvals and those reporting sole approval announcements. Where only a sole approval is reported, positive abnormal returns of 2.83% are observed, significant at $p<0.05$ (BMP test) and $p<0.1$ (CZ rank test). This result is consistent with the more definitive nature of the announcement. When

[25] Examples of such conditions may include a mining lease grant, a development approval or completion of a required equity tranche or hedging facility.

combining both *first* and *sole* approvals together (i.e., first-or-sole approvals, 115 announcements in total), we observe an average 3-day CAR of 2.61%, significant at $p<0.01$ (BMP test) and $p<0.05$ (CZ rank test). This is greater than the case for final-or-sole approval announcements, where the market-adjusted abnormal return is 2.07% (significant at $p<0.01$ using the BMP test and $p<0.05$ using the CZ rank test). For robustness, we repeat the event studies by replacing the All Ordinaries Index used in our primary tests with the Small Ordinaries Index.[26] The results using the Small Ordinaries Index (Table 5, Panel B) are very similar, albeit slightly stronger, suggesting our results are not sensitive to the benchmark return used.

Table 6 reports subsample results of stock price responses based on certain loan, lender and project characteristics. In Panel A, we stratify the sample into loans with and without hedging requirements. Univariate tests of both the mean and median CAR show that loans with hedging required experience significantly lower announcement return to first approvals and first-or-sole approvals than loans without such requirements. Panel B compares loans granted by specialist (top three lenders in terms of number of PF deals in the sample) vis-à-vis non-specialist lenders. Though no significant differences in abnormal returns are detected, loans from specialist lenders have predominantly lower stock price reactions. Panel C contrasts loans for projects located in countries with high versus low political uncertainty.[27] As Panel C shows, loans in the high GPU subsample are met with significantly higher (lower) CAR to first approval (final approval) announcements than their counterparts with low GPU. Overall, there is univariate evidence suggesting characteristics like hedging requirements, lender identity and political uncertainty may influence the wealth effect of PF loans to MEEs.

[Insert Table 6 here]

[26] The S&P/ASX Small Ordinaries Index is commonly used as a benchmark for ASX-listed small capitalization stocks.

[27] Partition between high versus low political uncertainty is based on the sample median of the country political risk index compiled by the PRS Group, Inc.

In summary, univariate results from event studies show that firms making PF loan announcements to the market are met with a positive abnormal return. Subsample results indicate stock price reactions are stronger for approval announcements (in particular, first approvals and sole approvals) than other types. This is consistent with PF announcements conveying value-relevant private information about borrowers, which lowers information asymmetry as evidenced by the reduction in bid-ask spread that we will show next.

2.2 Bid-ask spread responses

2.2.1 Information asymmetry and financial intermediation

Theories of financial intermediation explain the role of banks in reducing information asymmetry. For example, Leland and Pyle (1977) suggest that information asymmetry may be the primary reason why intermediaries exist. Campbell and Kracaw (1980) and Best and Zhang (1993) argue that an important function of financial intermediaries is to produce information. Diamond (1984) posits that banks possess private information which, when conveyed to the market through loan approvals, lowers the borrower's information asymmetry.

The notion of bank loans being associated with a reduction in the borrower's information asymmetry is consistent with Fama (1985), who asserts that many organizations pay periodic monitoring fees for lines of credit from banks even though they frequently remain unused. The sole purpose of maintaining the loans is to provide positive signals about the firm's private information. The presence of bank debt in a firm's capital structure is seen to lower information asymmetry and attenuates IPO under-pricing (James and Wier 1990; Slovin and Young 1990), negative share price response to SEOs (Slovin, Sushka, and Hudson 1990), as well as the cost of debt capital for bond issuances (Datta, Iskandar-Datta, and Patel 1999; Dailami and Hauswald 2007; Buscaino et al. 2012). If banks help mitigate information asymmetry, a reduction in the borrower's bid-ask spread after a PF loan announcement is expected.

2.2.2 Proxy for information asymmetry

We proxy for the change in the borrowers' information asymmetry in the period surrounding a PF loan announcement as the abnormal (mean-adjusted) change in the bid-ask spread, similar to Duarte-Silva (2010), as follows:

$$SPREAD_{i,t} = \left[\frac{(AskPrice_{i,t} - BidPrice_{i,t})}{1/2(AskPrice_{i,t} + BidPrice_{i,t})}\right] \quad (3)$$

$$ESPREAD_i(p,q) = \frac{\sum_{t=p}^{q} SPREAD_{i,t}}{(q-p+1)} \quad (4)$$

$$ASPREAD_{i,t} = SPREAD_{i,t} - ESPREAD_i(p,q), \quad (5)$$

where $SPREAD_{i,t}$ is the daily bid-ask spread for the stock of firm i on day t, calculated as the difference between the closing ask price ($AskPrice_{i,t}$) and closing bid price ($BidPrice_{i,t}$) divided by the closing mid-point price. $ESPREAD_i$ is the average daily bid-ask spread for the stock of firm i over days p to q in the pre-event window, where p and q are set as t – 100 and t – 15, respectively. $ASPREAD_{i,t}$ is the abnormal bid-ask spread, calculated as the difference between $SPREAD_{i,t}$ and $ESPREAD_i$. We construct a cumulative abnormal spread (CAS) measure for firm i by summing up the abnormal daily spread over the event window (q, s) as follows:

$$CAS_i(q,s) = \sum_{t=q}^{s} ASPREAD_{i,t} \quad (6)$$

Similar to the abnormal returns, we construct a cumulative average abnormal spread ($CAAS$) by averaging CAS_i across firms for each announcement type. We predict that $CAAS(q,s)$ should be negative and significant, implying a reduction in information asymmetry as a result of firms' announcements of PF loans.

2.2.3 Results

Table 7 reports bid-ask spread responses to PF loan announcements for our sample. Across all 211 loan announcements with bid-ask spread information available, we observe a 2.51%

reduction in 3-day $CAAS$, significant at p<0.05 (both BMP test and CZ rank test).[28] This suggests PF loan announcements by MEEs are generally associated with a reduction in bid-ask spread, our proxy for information asymmetry. When partitioned by announcement type, we continue to observe a negative 3-day $CAAS$ across all subsamples (except for PF mentions). In particular, subsamples of sole approvals, first-or-sole approvals and final-or-sole approvals all exhibit negative abnormal bid-ask spread, significant at either the 5% or 10% levels using the parametric BMP test, whilst drawdowns are significant at p<0.05 using the CZ rank test. In addition, the percentage of negative bid-ask spread responses is greater than 50% in all announcement types, except for mentions. Overall, the results on bid-ask spread do provide support for the expectation that PF loan announcements, especially approvals, are associated with a reduction in information asymmetry.

[Insert Table 7 here]

3. Factors Influencing Wealth Effects of Project Loan Approvals

3.1 Hedging requirements

There are clearly benefits to firms to engage in hedging. Hedging affords tax benefit for firms facing a convex (increasing) tax function (Smith and Stulz 1985). By reducing the volatility of pre-tax firm value, hedging lowers the expected tax liability, thus increasing the after-tax value of the firm. Stulz (1996) argues that hedging allows managers to substitute debt for equity, which is clearly the case for MEE project developments. Further, Esty (2002) suggests "By reducing cash flow volatility, firms can add leverage and increase the value of their tax shields" (p.76). Smith and Stulz (1985) posit that hedging can lower the expected costs of bankruptcy by lowering the probability of bankruptcy. This would result in higher expected firm value. Because hedging lowers the variability in future cash flows, this would facilitate future

[28] Datastream provides bid and ask prices only after 19 June 2001, restricting results to a sample of 211 PF announcements.

refinancing of loans (Smith and Stulz 1985). In our setting, PF loans are costly for mine developers and are typically refinanced after production commencement. Another benefit is that hedging may help lower compensation to managers, employees, suppliers and customers who are less able to diversify their firm-specific risk (Smith and Stulz 1995). If the cost of hedging is lower than the expected savings in compensation to these claimholders, then firm value is increased.

Despite the suggested benefits, hedging is not without costs. In particular, Smith and Stulz (1985) argue that hedging may result in a redistribution of wealth from shareholders to bondholders. This is because debtholders benefit from reduced borrower probability of bankruptcy while shareholders bear the cost of implementing the hedging. In addition, MEE shareholders may lose the option value associated with future price increases in the underlying commodities, which, in our setting, is transferred to the debtholders (banks) who are typically the counterparty to the hedging facility.

In contrast, Jin and Jorion (2006) find that hedging has no effect on the value of oil and gas companies. They argue that investors are likely to take positions in oil producers to gain exposure to oil prices. Given that an investor knows an oil company's price exposure, the risk can be easily hedged, implying there should be no benefit from an oil producer hedging oil price risk in terms of stock valuation.

Given the contrasting views, hedging may have positive, negative, or no effect on shareholder value. We thus leave it as an empirical question for the effect of hedging to be tested in Section 3.4. Consideration of the choice to include hedging requirements in the PF loan contract is further explored in Section 3.7.

3.2 Lender identity

Prior studies have examined the certification effect of prestigious banks in the corporate loan market. Ross (2010) finds that corporate syndicated loans arranged by dominant banks (top

three commercial banks in terms of market share in the US) are associated with positive borrower announcement returns, lower interest rates, and less requirement for a borrowing base. The author attributes this dominant bank effect to the high reputation of these top banks for screening and monitoring borrowers. In relation to PF loans, Gatti et al. (2013, *p*.4) suggest that "The arranging bank has access to specialist engineering, legal, financial, logistical, market assessment, and risk assessment skills that allow the bank to effectively certify a project's true potential and to ensure that relevant adverse inside information is revealed prior to loan syndication". Using market share to proxy for reputation, they find that PF loans certified by prestigious lead arranging banks are associated with lower loan spread.

Stomper (2006) models the incentives of banks to acquire industry-specific expertise to make lending decisions. By specializing in an industry, banks are able to possess market power proportional to their industry-specific credit risk exposure. In equilibrium, Stomper (2006) shows that the supply-side of credits to the industry will be characterized by a limited number of specialist banks with industry expertise and market power, and a competitive fringe of lenders without such expertise. The top lenders in our sample fit the notion of "specialist banks". As was discussed in Section 1.4, 22% of our sample deals are arranged by the top bank (Macquarie Bank) while the top three banks are involved in 43% of all loans. Given the findings in prior studies, it is reasonable to argue that the top banks in our setting are specialist banks and likely to be associated with higher borrower announcement returns because of the reputation or certification effect resulting from the industry expertise they possess in screening and monitoring MEEs' projects.

An alternative view is that specialist banks, due to their industry expertise and market power (Stomper 2006), are likely to extract rents from borrowers in the form of higher loan spread and/or tougher loan terms (e.g., imposing hedging requirements in our MEE setting). In fact, McCahery and Schwienbacher (2010) find that reputable lead arrangers exploit informational

advantages that enable them to charge higher spreads and retain higher fractions of the loans in their syndicates, with the strongest effect found for borrowers that suffer from high information asymmetry. The fact that only 36% of our sample deals are syndicated (with 64% by sole lenders) is consistent with this scenario. Under this market or bargaining power view, we may not expect higher announcement returns associated with loans written by specialist banks if the reputation or certification effect is offset by higher loan spreads and tougher loan terms. We explore these alternative views empirically using the model in Section 3.4.

3.3 Government policy uncertainty

GPU is of significant importance to the mining industry with examples of forced mine closures and even repatriations abound.[29] In terms of extractive industry-related research, one recent study considers the impact of GPU on the pricing of uranium stocks. Using a sample of Australian-listed uranium firms over 2005–2008, Ferguson and Lam (2016) find that GPU, measured by the spread in voters' opinion polls between the two major Australian political parties and a news-based sentiment index, significantly affects the pricing of uranium stocks. They apply the event-study method and consider a number of uranium sector-specific government policy pronouncements, which are shown to attract significant stock price reactions. Esty (2002) notes the increasing risks to PF lenders financing projects located in high-risk jurisdictions. However, the presence of a private debt intermediary should serve to mitigate fears of GPU and signal adequate investor protection and contractual integrity (La Porta et al. 1998).

[29] There are many recent examples of multiple forced mine closures in the Philippines and Thailand (Chatree, Kingsgate), forced repatriation in Indonesia (Grasburg, Freeport-McMoRan), military conflict ceasing mine operations (Bougainville, Rio Tinto), legislative cancellation of a significant mining lease (Aurukun, Pechiney) in Queensland, Australia, and the recently announced cancellation of a mining lease (Bibiani, Resolute) in Ghana, which was subsequently reinstated. See https://www.reuters.com/companies/RSG.AX/key-developments (link accessed 02/04/2021).

We argue that GPU will condition the market's reaction to PF loan announcements. Specifically, the presence of a debt financier willing to place loan capital in risky jurisdictions should mitigate GPU, which features prominently in the mining industry. These risks notwithstanding, PF lenders have access to private information in relation to all aspects of the project (including GPU), along with possible direct or indirect knowledge of prior lending in particular jurisdictions. Thus, we expect that loan announcements for projects in high-GPU jurisdictions will be associated with more positive market reactions.

3.4 Cross-sectional model of announcement returns

To provide insights on the cross-sectional variation of the abnormal returns surrounding PF loan announcements, we employ a pooled OLS regression approach. To ensure that the abnormal returns are of significant magnitude, we restrict the sample for our multivariate analysis to first-or-sole approval announcements only. Announcements by firms of first-or-sole approvals of PF loans should be most informative and attract the largest market reaction. We specify the regression model as follows:

$$\begin{aligned} CAR_i = \beta_0 + \beta_1 Hedge_i + \beta_2 GPU_i + \beta_3 LoanTA_i + \beta_4 Syndic_i + \beta_5 LenderEq_i \\ + \beta_6 EqRaise_i + \beta_7 Offtake_i + \beta_8 Log(MCap)_i + \beta_9 Volatility_i \\ + \beta_{10} Top20_i + \beta_{11} MgntShdg_i + \beta_{12} CRB_i + \varepsilon_i, \end{aligned} \quad (7)$$

where the dependent variable CAR_i is the 3-day cumulative abnormal return for firm i, calculated as per Equation (2). For testing the effect of hedging requirements on market reactions to PF loan approvals, we include a binary variable $Hedge$ in the regression model, which equals one if it is disclosed within the loan announcement that commodity price and/or foreign exchange hedging is a requirement in the loan package. Given the opposing arguments on the effect of hedging, we do not predict the sign of the coefficient on hedging. To capture the effect that GPU has on loan announcement returns, we include a GPU variable in the model. This measure is based on the country political risk index compiled by the PRS Group, Inc.,

measuring various dimensions of the political and business environment facing firms operating in a country.[30] As argued, firms with projects in high government policy risk countries (i.e., high GPU measure) should benefit more from the news of obtaining a PF loan, so a positive and significant coefficient on GPU is expected.

In an augmented specification of Equation (7), we construct two proxies of specialist lender in a similar manner to Lin et al. (2012) in relation to syndication. The lender participating in the greatest number of deals (Macquarie Bank) is denoted specialist lender ($SpBank1$), whilst a second proxy ($SpBank3$) extends the definition of specialist lender to the top-three banks (Macquarie Bank, Rothschild/Investec and Bank of Scotland). In addition, an $NonBank$ indicator variable is constructed with a value of one if none of the lenders of a PF loan are classified as a commercial bank, and zero otherwise. We refer to $SpBank1$, $SpBank3$ and $NonBank$ collectively as "lender identity" proxies. If the specialist banks are superior in screening and monitoring loans, a positive coefficient on $Spbank1$ and $SpBank3$ is expected.

We employ a set of variables to control for cross-sectional variations in loan-level characteristics. $LoanTA$, measured as loan amount divided by total assets, controls for the relative size of the PF loan. We expect a relatively larger loan to have a more positive market reaction. A larger loan represents a stronger signal of the quality of the project by the lender (Corielli, Gatti, and Steffanoni 2010). $Syndic$ is a binary variable taking the value of one if the loan is syndicated, and zero otherwise. A loan is classified as syndicated if there is more than one lender participating in the PF deal (Lin et al. 2012). $LenderEq$ is a binary variable with a value of one if it is disclosed within the PF loan announcement or prior fiscal year annual report that the lenders own shares, warrants or options in the borrower, and zero otherwise. A positive association is predicted between lenders holding equity in the firm and the market reaction on

[30] The PRS score is ranked between 0 and 1 with a lower score indicating higher risk. We construct the GPU measure as 1 minus the PRS score such that a higher GPU measure stands for higher risk.

the basis that the lender believes the project has upside potential and may signal lender private information (Leland and Pyle 1977).[31] $EqRaise$ is a binary variable that equals one if it is disclosed within the loan announcement that the lenders require the borrower to raise further equity before a loan can be drawn down, and zero otherwise. If a PF loan is dependent on the firm issuing more equity, a negative coefficient is expected as seasoned equity offerings are generally associated with negative stock price reactions (Mikkelson and Partch 1986). $Offtake$ is a binary variable that equals one if an offtake agreement is either proposed or in place and disclosed in the PF announcement, and zero otherwise. We expect a positive association between the presence of an offtake agreement and the market reaction to the announcement of the loan as there is a guaranteed purchaser of the mine production output.[32]

We also include several firm-level controls in the regression model. $Log(MCap)$ measures firm size and is computed as the natural logarithm of the borrower's market capitalization five days before the loan announcement. We expect firm size to have a negative relation with abnormal returns. Smaller firms are likely to have higher levels of information asymmetry and benefit more from signals of successful financing (Fama 1985; Diamond 1989; Slovin, Johnson, and Glascock 1992). In addition, the same amount of extra value created would translate into a smaller percentage gain for larger firms. $Volatility$ is measured as the standard deviation of daily stock returns in the 12 months preceding the announcement date of a loan. Stock volatility is a measure of total firm risk, proxying for investors' perception of the uncertainty regarding the expected future cash flows of the MEE. Firms with higher volatility would benefit more from the PF loan, which helps to lower the uncertainty surrounding future project cash flows. Thus, we expect a positive association between stock volatility and

[31] Banks holding equity in non-financial companies is illegal in the US and many other countries. In Australia, it is allowed, enabling us to explore this unique bank-borrower signal.

[32] Offtake agreements often involve counterparties providing technical and even financial support to the mine developer during the construction process, suggesting similarities to collaborative alliances in the biotech sector. They are more common for base metals projects and other commodities with very specific end users and outputs requiring further processing.

announcement returns. $Top20$ is the percentage shareholding of the top-20 shareholders in the MEE. Large shareholders play a significant monitoring role in the corporate governance structure of firms to mitigate agency problems (Claessens et al. 2002).[33] We expect a positive association between top-20 shareholding and announcement returns. $MgntShdg$ is the percentage shareholding of the corporate insiders (directors and CEO). A higher percentage of insider shareholding implies a better alignment of management incentives with the interests of the shareholders and therefore a positive association with abnormal returns is expected. As suggested by Leland and Pyle (1977), a manager's investment in a project serves as a signal of project quality. In addition, we control for price changes in the commodities market by including CRB, computed as the return on the Thomson Reuters/Core Commodity CRB Index over the 12 months immediately preceding the PF loan announcement and we predict positive commodity price changes are associated with higher abnormal returns.

The model specification in Equation (7) and the augmented model with lender identity are estimated using a pooled OLS regression procedure with robust standard errors (Petersen 2009) to correct for potential industry and time clustering.

3.5 Cross-sectional results

Table 8 presents OLS regression results for the determinants of market reactions to PF loan announcements. In estimating the pooled cross-sectional regression model (Equation 7), we restrict the sample to include first-or-sole approval announcements only given that they are likely to be most informative and associated with higher abnormal returns (Table 6). This results in 114 observations being used in estimating the model.[34] The dependent variable used is the 3-day cumulative abnormal return, $CAR(-1, 1)$.

[Insert Table 8 here]

[33] The 'Top 20' shareholders is a mandatory filing to be included in ASX-listed companies' annual reports.
[34] We deleted one observation due to missing loan quantum, resulting in a final sample of 114 first-or-sole PF loan approvals.

Column 1 reports regression results for the baseline model. Consistent with our predictions, the coefficient on $LoanTA$ is positive and significant at p<0.01. This indicates larger loans (scaled by total assets) are associated with stronger stock price reactions. The coefficient on $Volatility$ (proxying for total firm risk) is positive and significant at p<0.05, indicating high-risk firms have stronger market reactions. The other control variables are, however, not significant in explaining the cross-sectional variation in the announcement CAR.

Column 2 reports results on the effect of hedging requirements. When the hedging variable is added to the model, the estimated coefficient on $Hedge$ (−0.041) is negative and significant (p<0.05). This result suggests MEE investors perceive hedging requirements negatively, consistent with Smith and Stulz (1985), who argue hedging results in a wealth transfer from equityholders to debtholders. The negative association also implies the perceived costs of hedging are larger than the benefits. In testing the effect of GPU on loan announcement abnormal returns, we include an additional variable GPU in Column 3 with an estimated coefficient of 0.077, significant at p<0.05. This result suggests firms with projects located in high political risk jurisdictions are associated with higher announcement returns. When GPU is added, the coefficient on $Hedge$ in Column 3 drops slightly to −0.039 but remains significant at the 5% level.

Columns 4–6 exhibit results for testing our lender identity proxies. When the lender type variable $NonBank$ is added to the model (Column 4), the estimated coefficient is positive (0.030), but not significant. This result indicates that project loans issued by non-bank lenders are associated with market reactions no different to loans issued by banks, consistent with prior studies (Preece and Mullineaux 1994; Billett, Flannery, and Garfinkel 1995), though it is worth noting the small sample of non-bank lenders (13 out of a total of 114 PF deals). The effect of specialist lender is assessed by including $SpBank1$ and $SpBank3$ in the model. However, the estimated coefficients on both $SpBank1$ (Column 5) and $SpBank3$ (Column 6) are

insignificant, indicating no support for the reputation or certification hypothesis. In contrast, the absence of any difference in terms of announcement CAR for the specialist lenders is more consistent with the market or bargaining power argument (Stomper 2006; McCahery and Schwienbacher 2010). These results may suggest that any positive lender reputation effect is offset by market awareness of tougher loan terms imposed by specialist banks—a conjecture that we will explore further in later sections. Overall, these regression results are not consistent with either a non-bank or a specialist lender effect on PF loan announcement return. We note that controlling for lender type in the model has little effect on the estimated coefficient and significance level on GPU but the significance level on $Hedge$ drops to the 10% level only. Nevertheless, the coefficient on both $LoanTA$ and $Volatility$ remains positive and highly significant across all model specifications.

To ascertain the robustness of our primary results, we consider controlling for other project attributes, including projects with multiple sponsors (i.e., joint ventures) and commodity type. Unreported results show that controlling for joint venture projects and oil and gas projects in the model has no impact on the market reaction results reported in Table 8. We note that there is one observation with a debt to total assets ratio of 0.79 before the PF loan (see fn. 19), which corresponds to the largest 3-day CAR of 39%. To ascertain that our primary results are not driven by this outlier, we exclude this outlier and untabulated results show that the previously significant coefficient on $LoanTA$ is no longer significant. However, the coefficients on $Volatility$, $Hedge$ and GPU remain qualitatively very similar in terms of both the magnitude and level of significance. Thus, our primary results are robust to the exclusion of outliers.

3.6 Determinants of hedging requirements

In this section, we explore the determinants of hedging requirements in PF loans. It is likely that hedging requirements are not assigned randomly but the equilibrium outcome of

negotiations between the lender and borrower.[35] We start by modelling the incentives of lenders and borrowers to have hedging required. *Ceteris paribus*, lenders would prefer to include hedging requirements in the loan terms in order to minimize bankruptcy costs and protect the loan and they may use their bargaining power to achieve it.[36] Murfin (2012) argues borrowers with limited access to alternative sources of financing are exposed to considerable lender-induced contract variation because they only have limited outside options. Borrowers in our MEE sample typically do not have many choices and are considered "locked-in" by their PF lender. More reputable specialist banks, because of their market and bargaining power, are likely to impose hedging requirements to protect their reputation. Since banks also act as a counterparty to the hedging program, they stand to gain from the upside price movements of the underlying commodities and earn a fee for the hedging product. Hedging may also provide banks with accounting flexibility to front-load the profit from hedge contracts, which is important for investment banker bonuses.[37] In contrast, Rampini, Sufi, and Viswanathan (2014) argue that managers of small firms may rather utilize their limited resources to finance project investment than to hedge. We thus use our specialist bank variables, *SpBank1* and *SpBank3*, to proxy for lenders' bargaining power in the model and expect loans originated by these banks are more likely to include hedging requirements. On the other hand, we use firm size ($Log(MCap)$) to proxy for borrowers' bargaining power (Dennis and Sharpe 2005) and predict a negative association with hedging.

[35] We thank the anonymous referee for this insightful suggestion.

[36] Consistent with this argument, we observe anecdotally companies disclosing their ability to avoid hedging. The following are a few examples from companies' announcements. Dioro Exploration NL (3 July 2003): "There are no mandatory hedging requirements imposed by Rothschild in relation to the provision of the loan facility". Doray Minerals Limited (17 September 2012): "The facility requires no mandatory hedging by the bank and has typical draw-down and project completion requirements". Jabiru Metals Limited (31 October 2005): "The facility will not require any metal or currency hedging. The complete avoidance of mandatory hedging is a significant bonus to the Jaguar Project during a time when zinc and copper prices are expected to average a significant premium because of the demand from China and when most long-term base metals prices are backward dated".

[37] We are grateful to a former major bank treasury manager who was experienced in writing hedge contracts for this suggestion.

At the firm level, we control for managers' ownership in the firm, with higher management shareholding ($MgntShdg$) expected to be more likely associated with hedging (Smith and Stulz 1985). We also include blockholding (we use top-20 shareholdings, $Top20$) to control for the effect of large shareholders on firms' hedging propensity. Smith and Stulz (1985) argue that large shareholders, who are unlikely to hold well-diversified portfolios, have incentives for the firm to hedge the variance of its returns. Transaction costs of bankruptcy increase the propensity to hedge (Smith and Stulz 1985) and we thus control for financial distress using the debt-to-assets ratio ($Leverage$). To control for alternative financial policies, we use cash balance scaled by total assets ($Cash$).

For project-level characteristics, we control for precious metals ($Precious$ = 1 or 0) and the existence of offtake agreements ($Offtake$ = 1 or 0). Precious metal projects, mainly gold, are particularly conducive to hedging on the basis that it is frequently produced to a high level of purity on site and requires little further refining. Besides its industrial use, gold is traditionally a store of value and an investment asset actively traded in a global market and has currency-like properties. Gold projects are rarely, if ever, associated with offtake deals. Thus, hedging is the main revenue protection mechanism available to lenders for gold projects. Offtake deals occur where the mineral product at the mine gate may require further processing (for example, base metal outputs like copper, nickel and lead concentrates that require refining or smelting).[38] Offtake arrangements bear similarities to long-term sales agreements guaranteeing the sale of a substantial portion (if not all) of the mine output, but can include alliance-like collaborative elements, including technical assistance and/or financing support for the MEE. The presence of an offtake agreement would imply a substantial reduction in the risk of a project's future revenue stream and thus lowers the propensity to have hedging.

[38] In such cases, offtake agreements are written with third-party processing facilities (such as smelters, utilities, specialist end-users like manufacturing firms, or intermediaries like commodity traders), who guarantee the purchase of stated amounts of concentrates and arrange for further processing and sale of the end product.

Foreign currency is a common source of risk that may require hedging. Given that the underlying commodities in most projects are traded in US dollars, we include a dummy variable for non-USD denominated loans ($nonUSDLoan$ = 1 or 0) to control for the demand for currency hedging. Other control variables include returns on a broad-based commodities price index (CRB) to control for the demand for hedging at different points in the commodity price cycle, political uncertainty of the project host country (GPU), and appropriate year dummies to control for years with above-average demand for project loans. We specify our hedging model as follows.

$$Prob(Hedge_i = 1) = \beta_0 + \beta_1 Precious_i + \beta_2 LenderIdentity_i + \beta_3 Offtake_i + \beta_4 NonUSDLoan_i + \beta_5 MgntShdg_i + \beta_6 Top20_i + \beta_7 CRB_i + \beta_8 Log(MCap)_i + \beta_9 GPU_i + \beta_{10} Cash_i + \beta_{11} Leverage_i + \varepsilon_i \quad (8)$$

The model depicted in Equation (8) is estimated using probit regression for the sample of 114 PF loan approvals and the results are reported in Table 9. We find a positive and highly significant (p<0.01) coefficient on $SpBank1$ ($SpBank3$) in Column 1 (2). This highlights the importance of supply-side factors in hedging for mine developers, where a bank with greater bargaining power over the project sponsor is able to impose the use of hedging as a risk-mitigation strategy. This result is consistent with the market or bargaining power argument of specialist lenders but not the certification hypothesis of dominant banks (Ross 2010). The fact that $SpBank3$ (Column 2) is also highly significant suggests the bargaining power of specialist banks is not confined to the top lender (Macquarie Bank) only. We do not include $NonBank$ in the hedging model as no projects funded by non-banks have hedging. This is interesting owing to the lower-quality lending book of non-bank private debt intermediaries (Denis and Mihov 2003). However, hedge contracts are likely to be very specialised instruments and thus it may be unsurprising that non-bank intermediaries do not offer hedging products.

Across both model specifications, the positive and significant (p<0.05) coefficient on $Precious$ suggests that hedging requirements are more commonly associated with gold projects. The coefficient on $Offtake$ is negative and significant at the p<0.05 (Column 1) and p<0.10 (Column 2) levels, consistent with offtake arrangements serving as a substitute risk-mitigation strategy to hedging. The positive coefficient on $NonUSDLoan$ (p<0.05) in Columns 1 and 2 implies non-US dollar loans are more likely associated with hedging requirements, consistent with the underlying commodities being traded in US dollars. Further, the positive and significant coefficient on $Top20$ (p<0.05) in Column 1 is consistent with a large shareholder preference for risk mitigation outweighing the costs of hedging. As a last observation, the negative, albeit insignificant, coefficient on the firm size proxy ($Log(MCap)$) may suggest the low bargaining power of smaller firms, due to their lack of access to alternative sources of financing, makes it difficult for them to resist any hedging requirements imposed by specialist banks. Prior literature (Stulz 1986; Rampini, Sufi, and Viswanathan 2014) suggests that hedging is not common among small firms. It is possible that the bargaining power exerted by specialist lenders over smaller borrowers in our setting is one reason why hedging is observed for smaller firms.

[Insert Table 9 here]

In summary, we show that supply-side factors, such as lender identity, play an important role in the choice to include hedging in the PF loan contract. Project-level characteristics, including commodity type, non-USD loans and potential substitutes to hedging in the form of offtake agreements, are additional significant factors. Large shareholders with less diversified holdings also prefer firms to hedge. These supply-side and project- and firm-level characteristics appear to drive the choice to hedge for mine developers in a PF loan setting as

distinguished from the demand-side characteristics that drive the hedging activity for gold producers in Tufano (1996).[39]

3.7 Endogeneity issues

Though the finding of a negative association between hedging requirements and announcement return is consistent with a shareholder-debtholder wealth transfer argument (Smith and Stulz 1985), this result may be subject to potential endogeneity issues. One such issue is the omitted variables bias. Despite our effort in controlling for loan, firm and lender characteristics, there may still be unobservable variables that are correlated with both hedging and announcement returns, biasing our results. In addition, the analysis in Section 3.6 suggests hedging requirements in our PF setting are likely to be endogenously determined. To address the potential endogeneity concerns, we re-examine the relation between hedging requirements and announcement returns using a treatment effects model approach.

Based on the selection model of hedging developed in Equation (8), we estimate a treatment effects model similar to the approach of Bharath et al. (2011). Table 10 (Columns 1 and 2) reports the results of the treatment effects model with $SpBank1$ as the proxy for specialist lenders. The estimated results of the first-stage hedging regression (Column 1) are very similar to those shown in Table 9 Column 1. We use the predicted probability of hedging from the first stage in the second-stage CAR regression. Column 2 shows that, controlling for endogenous treatment effects, the association between hedging requirements and loan announcement CAR becomes insignificant. The endogeneity-adjusted coefficient on hedging ($Pr(Hedge)$) becomes slightly positive, though far from statistically significant at conventional levels. Results on other determinants of CAR are largely consistent with those reported in Table 8. In

[39] Tufano (1996) specifies a model of hedging for gold producers, while our sample consists entirely of pre-production mine developers of various minerals. Tufano (1996) models the relations between the extent of hedging activity engaged by gold producers and their firm characteristics based on various theories of corporate risk management but not in a setting in which firms are seeking project finance for developing their mines.

particular, the estimated coefficient on GPU remains significant at the 5% level. We repeat this analysis by replacing $SpBank1$ with $SpBank3$ and the results (Columns 3 and 4) are qualitatively similar.

[Insert Table 10 here]

To ensure that the insignificant result of hedging from the treatment effects model is not caused by omitted variables that correlate with both hedging and announcement CAR, we use the geographic distance between the lead lender of a loan and the borrower's project location as a potential omitted variable. We argue that the farther the distance is between the lead lender and the borrower's project location, the more difficult it is for the lender to monitor the progress of the project. In order to redress the increased risk due to reduced monitoring, the lender is more likely to impose hedging requirements in the loan contract. It is probable that distance may also be negatively correlated with loan announcement CAR. A lower level of monitoring by the lender would mean greater agency problems which may affect shareholder value negatively. Geographical distance has been widely used in prior banking and investment literature as a proxy for information gathering and processing by lenders and mutual fund manager (Berger et al. 2005; Bharath et al. 2011; Coval and Moskowitz 2001; Dass and Massa 2011). For each PF loan, we search the location of the project based on company filings and obtain project longitude and latitude data from S&P Market Intelligence and Google Maps. We repeat the same exercise to locate the longitude and latitude of lender headquarters. Following Bharath et al. (2011), we calculate the distance between the lender and the project and express it as a log-transformed variable to address potential skewness in the data. When geographic distance is included as an additional variable, untabulated results show the coefficient on $Log(1 + Distance)$ is positive and significant (p<0.1) in the first-stage hedging regression, suggesting the distance between the lead lender and borrower's project location is associated with an increased propensity of hedging as expected. In the second-stage CAR regression, the

distance variable also loads significantly (p<0.1) but negative, consistent with reduced lender monitoring hurting shareholder wealth. Nevertheless, the endogeneity-adjusted coefficient on hedging becomes slightly negative but is still far from statistically significant. The inference on the political risk GPU variable remains robust.

As a further attempt, we use project quality as a potential instrument for hedging requirements. We argue that borrowers with higher quality projects will have relatively greater bargaining power when negotiating the terms of their loan, implying a lower likelihood of hedging. On the other hand, the quality of a mining project is known and disclosed to the market in the form of feasibility studies typically months before loan negotiation starts. Since this quality signal is already in the information set of the market long before the loan approval, thus we argue project quality may not be correlated with loan announcement CAR. Measuring the quality of a mining project is not an easy task as it involves many technical details. We make use of the market's assessment, in terms of stock price response (3-day CAR) to MEEs' disclosure of feasibility studies to the market, to proxy for project quality where the disclosure dates can be readily identified through ASX's announcement platform. Additional treatment effects model results (unreported) show this quality proxy is not significantly correlated (albeit negative) with hedging in the first-stage regression and the endogeneity-adjusted coefficient on hedging in the second-stage regression remains insignificant.

Overall, our initial OLS results show that hedging requirements in PF loan contracts are negatively associated (at p<0.1) with loan announcement CAR. Using the treatment effects model, this negative association becomes insignificant, confirming the presence of endogeneity biasing the initial results. This insignificant result for hedging is consistent with Jin and Jorion (2006), who find that hedging has no effect on firm value. It is also consistent with the view that the costs and benefits associated with hedging in our sample are balanced out.

4. Additional Analysis

4.1 Loan pricing

In this section, we examine the pricing of PF loans obtained by MEEs. Our objective is to provide descriptive evidence on the loan spread as well as explore its determinants. In particular, we examine the effect that specialist lenders and hedging requirements would have, if any, on the pricing of project loans.

4.1.1 Pricing data

We source our pricing data from annual report disclosures for a total of 77 projects (out of 115) which routinely are variable rate loans with pricing based on a base rate plus a spread.[40] Of the 77 projects with loan pricing data, 40 (54%) use the London Interbank Offered rate (LIBOR, primarily US dollar denominated) while another 29 (39%) use Bank Bill Swap Rate/Bank Bill Swap Bid Rate (BBSY/BBSY, primarily Australian dollar denominated) as the base rate. The remaining borrowers use Singapore Interbank Offered rate (SIBOR, 2 firms), Euro Interbank Offered Rate (EURIBOR, 1 firm), Johannesburg Interbank Average Rate (JIBAR, 1 firm), Australia commercial bank prime lending rate (1 firm) and undisclosed (3 firms). We are able to collect interest rate spread data for a total of 67 project loans. This spread, together with the historical base rate data (we assume the 3-month rate which is typical for PF loans), enables us to compute the total variable rate for these loans. There are also three loans for which only the total loan rate is disclosed, but not the spread or base rate.

Table 11 provides descriptive statistics on the base rate, rate spread, total loan rate, and loan maturity for the reduced sample. The mean (median) base rate for the sample loans is 362 (468) basis points. Of the 67 loans with spread data, the mean (median) rate spread or margin is 387 (350) basis points. As a comparison, Kleimeier and Megginson (2000) report an average spread for PF loans of 130 basis points. Again, this highlights the high-risk nature of the projects

[40] Since loan pricing data is not routinely disclosed by borrowing firms in Australia, especially towards the earlier years of the sample, we only managed to obtain loan pricing and maturity information on a reduced sample of firms.

engaged by MEEs in our sample. The lowest spread observed is 145 basis points while the highest is 1,465 basis points, which is 10 times the lowest. As for the total loan rate, the mean (median) is 738 (746) basis points, with the minimum and maximum rate at 400 and 1,500 basis points, respectively.

An interesting feature of some loans is that the pricing of the margin is adjusted once the mine construction is completed and the project has entered into the production phase (which is referred to as 'post-completion' or 'post-construction'). A completion discount is disclosed in 12 loans. The range of discounts provided for 'post-completion' is between 10 and 125 basis points, with an average discount of 74 basis points. In terms of loan maturity, data shows that our sample project loans have a mean (median) maturity of 4.6 (4) years and a minimum (maximum) duration of 1.5 (12) years. This compares with an average loan maturity of 8.6 years reported by Kleimeier and Megginson (2000).

4.1.2 Determinants of project loan spread

To examine how PF loan spread is determined, we construct a loan pricing model using predictors similar to those used in Blanc-Brude and Strange (2007) and Sorge and Gadanecz (2008) as follows:

$$\begin{aligned} LoanSpread_i = {} & \beta_0 + \beta_1 BaseRate_i + \beta_2 SpBank_i + \beta_3 NonBank_i + \beta_4 Log(Loan)_i \\ & + \beta_5 Syndic_i + \beta_6 Secured_i + \beta_7 EqRaise_i + \beta_8 Offtake_i \\ & + \beta_9 Log(MCap)_i + \beta_{10} Volatility_i + \beta_{11} Top20_i + \beta_{12} MgntShdg_i \\ & + \beta_{13} CRB_i + \beta_{14} Hedge_i + \beta_{15} GPU_i + \beta_{16} Maturity_i + \varepsilon_i, \end{aligned} \quad (9)$$

where $LoanSpread$ is the loan spread (in basis points) above the benchmark rate, $BaseRate$ is the benchmark rate utilized (in basis points), $Log(Loan)$ is the natural log of the loan amount, and $Maturity$ is the loan term in years. The other variables are as previously defined. The model specification includes separate year dummies for 2006, 2007 and 2011, corresponding with years with above-average number of PF deals.

Regression results are shown in Table 12. In Column 1, we exclude $Maturity$ from the model specification and obtain an adjusted R-squared of 0.437, with the F-statistic significant at the p<0.01 level. In terms of significant coefficients, we observe that $BaseRate$ is negatively signed and significant at p<0.01, suggesting that at times when base rate is high, lenders are willing to charge a lower spread in order to lower the overall loan rate and make the loan more affordable to borrowers. At times when the base rate is low, lenders have more room in charging a higher spread as the overall loan rate remains reasonably low. This interesting result could be likened to "dynamic pricing" where banks adjust the pricing of their loan products depending on prevailing economic conditions (PwC 2019).[41] The coefficient on $NonBank$ is positive and significant (p<0.1). Non-bank lenders typically have a higher cost of funding than banks. They are also likely to have a less diversified loan book than their bank counterparts given that MEEs with good projects would prefer to first seek loans from more reputable bank lenders. Thus, non-bank lenders need to charge a higher spread to compensate for borrowers with higher risks (Denis and Mihov 2003). The coefficient on $MgntShdg$ is positive and significant (p<0.05) in the loan pricing model. We argue that higher ownership encourages managers to act more like shareholders and become more risk-seeking. In such circumstances, debtholders are concerned that managers may take actions to benefit shareholders (because they hold call options on the underlying project) at the expense of debtholders (who have only fixed payoff), resulting in a wealth transfer from debtholders to shareholders (Jensen and Meckling 1976). Further, higher management ownership may make it more difficult for lenders to initiate governance changes. Accordingly, in order to protect their interests, lenders charge a higher spread for PF borrowers with higher management shareholding.

[Insert Table 12 here]

[41] 'Pricing innovation in banking: The next frontier'. *PricewaterhouseCoopers Private Limited* (2019). https://www.pwc.in/assets/pdfs/research-insights/2019/pricing-innovation-in-banking.pdf (link accessed, 10/04/2021).

In Columns 2–4, we augment the model specification with $Maturity$, resulting in a loss of seven observations due to missing data, but the adjusted R-squared is similar to that reported in Column 1. In Column 2, the coefficient on $Maturity$ is negative (indicative of a downward sloping term structure) but not significant. When $log(Maturity)$ is added to the model in Column 3, no significant hump-shaped term structure as in Sorge and Gadanecz (2008) is observed. However, $NonBank$ becomes more significant at the 5% level. On adding year dummies to the model in Column 4, the positive coefficient on $Volatility$, a measure of the overall risk of the borrower, becomes significant at p<0.1, implying lenders charge a higher spread for projects with higher risks.

The insignificant coefficients on both the specialist lender proxy ($SpBank1$) and hedging requirements variable ($Hedge$) across all model specifications are somewhat surprising. Similar results are obtained when $SpBank1$ is replaced by the $SpBank3$ proxy. The results indicate that specialist lenders do not charge a lower (possibly higher) interest rate, as evidenced by the positive coefficient (albeit insignificant) estimated. In addition, loans with hedging requirements are not rewarded with a lower spread despite hedging helps mitigate the default risk of a loan. Though the negative coefficient on $Hedge$ tends to suggest a discount on loan spread, the *t*-statistic is far from significant at conventional levels. Overall, these results are not consistent with the reputation or certification effects of dominant banks (Ross 2010; Gatti et al. 2013). It is, however, consistent with the rent extraction argument (Stomper 2006; McCahery and Schwienbacher 2010) that specialist banks, with high market share and bargaining power, are able to impose hedging requirements on the project sponsor to lower their default risk without having to lower the spread on the loan. In additional, the fees charged for arranging the hedging facility and the potential upside gains from acting as the hedging counterparty add to the rents being extracted. Nonetheless, the insignificant coefficients on

specialist lender and hedging might have been driven by the small size of the reduced sample, which we acknowledge as a potential limitation of this study.

4.2 Post-loan performance

Prior literature argues that better screening and monitoring of clients by banks should result in fewer loan defaults (Lee and Sharpe 2009). Better bank screening and monitoring would also imply superior post-loan operating performance of the borrowers, especially in a setting where the information environment is opaque and the borrowing firms (like MEEs) offer little in the way of collateral (Holmstrom and Tirole 1997; Bharath et al. 2011). To investigate if this is in fact the case, we provide descriptive evidence in Table 13 on the operating performance of MEEs in the five years after obtaining PF loans and compare them with a group of MEEs which have their projects all-equity financed.

4.2.1 Accounting performance and bankruptcy events

Table 13, Panel A, presents the post-loan accounting performance measures (in median) of the sample firms in the subsequent five fiscal years after obtaining PF loans.[42] Their accounting performance in the fiscal year prior to obtaining PF loans is also reported for comparison. In terms of operating and total revenue to total assets, these measures show a substantial increase over the 5-year post-loan period, which coincides with the construction completion and production 'ramp-up' phase. The negligible revenue to total assets ratio in year 1 reflects the fact that most projects remain in the construction phase during the first year after the PF approval. In terms of profitability, the sample firms remain loss-making on average, albeit at a decreasing rate after production commencement. In year 2, the median net profit to total assets is –4.92%, decreasing to –3.99% by year 5. Similarly, the median net profit to total equity figure is –7.69% in year 2, and drops to –0.64% by year 5. This evidence suggests, on average,

[42] Only median values are reported, instead of mean, to avoid the impact of outliers due to extreme low measures of total assets or, sometimes, negative book equity.

mining firms remain risky even after obtaining loans for developing and operating their mine (Shah and Thakor 1987).

[Insert Table 13 here]

These accounting profitability results are even starker considering the effect of survivorship, with the number of observations in the sample dropped to 88 by year 5. Panel B shows the incidence of bankruptcy or financial distress events for sample constituents over the subsequent 5-year period. A total of 15 firms entered administration or liquidation, 12 firms engaged in some form of loan restructuring and 13 firms experienced premature mine closure or disposal. Unreported analysis also shows 18 firms merged with (or acquired by) another mining company during the 5-year post-loan period.

4.2.2 Comparison with firms with all-equity financed projects

In further comparison, we examine the subsequent operating performance of a sample of 11 all-equity MEEs which financed their projects with equity only instead of PF loans.[43] Panel C shows that the median profitability measures of all-equity MEEs are worse than their PF loan counterparts in Year 1 and 2, but the trend reverses in Year 3 and 4 with the measures becoming positive. In Year 5, profitability becomes negative again. We conduct univariate analysis (untabulated) to test if the medians of the subsequent accounting measures are different between the all-equity sample and PF loan sample and the results are all insignificant. We also look for bankruptcy/financial distress events by examining the announcement history of these firms. We find (untabulated) one case of a firm under bankruptcy administration in Year 3 and two incidences of premature mine closure (one in Year 2 and one in Year 5). One other firm was acquired and delisted from the ASX in Year 3. Thus, the proportion of firms experiencing

[43] All-equity financed mineral projects are less common among MEEs. So far, we have only identified 11 firms financing their project development with equity raisings. For each of these 11 cases, we manually collect the date equity raisings were completed for the purpose of developing the mine and track their accounting performance and bankruptcy events in the subsequent five years. Where a number of equity tranches are involved, we choose the date of the equity tranche closest to the construction commencement.

bankruptcy/financial distress is comparable to that of the project loan sample when only administration and mine closure events are considered as the all-equity sample would not have any loan termination or restructuring. Overall, we do not find significant differences in subsequent performance between PF loan firms and all-equity financed firms, suggesting lender monitoring appears to have less impact on post-loan performance of PF borrowers in this setting.[44]

5. Conclusions

Mining exploration and development is a high-risk business endeavour. Sponsors of mining projects are characterized by long project life-cycles, high information asymmetry, low success rate, poor operating performance and a thirst for capital. Using a hand-collected sample of PF deals announced by Australian MEEs, we provide evidence showing PF loan approvals convey important information to the capital markets, consistent with theoretical suggestions in John and John (1991).

The insignificant relation between hedging requirements and PF loan announcement return is perplexing. It illustrates the complexity of the issue and further work needs to be done to identify appropriate instrumental variables. The absence of differential abnormal returns for PF loans originated by specialist banks is consistent with a lender bargaining power explanation as opposed to lender reputation or certification effects. Our hedging selection model shows that PF contracts are more likely to include a hedge facility where the lender is a specialist bank. Given that hedge contracts protect the default risk of a loan and specialist banks stand to gain from the fees charged for arranging the hedge facility and potential upside by being the hedging counterparty, the evidence is consistent with the view of rent extraction by specialist banks with market and bargaining power. The additional findings of specialist banks not charging a

[44] We also investigate and find no significant difference in post-loan performance of borrowers obtaining PF loans from specialist banks as opposed to other lenders.

lower spread and hedging requirements not associated with a discount in interest rates in PF loan pricing further support the market or bargaining power interpretation.

We acknowledge the following potential limitations of our study. The identification issue is a common concern for studies in the finance literature. In our MEE setting, however, there are very few projects that are all-equity financed (we have identified only 11), so a "choice model" approach is not considered. In addition, it is difficult, if not impossible, to observe situations where a company seeks, but is then denied a PF loan (only three such disclosures are identifiable). For these reasons, we are unable to run conventional selection-mitigation procedures. Further, this study is subject to generalizability limitations in the form of a small sample of small-sized firms, confined to the development stage in the mining industry in Australia. These limitations notwithstanding, it has been recognised by other syndicated loan experts that our knowledge of PF loans is still in its infancy. The mining industry, which (according to Anglo American CEO Mark Cutifani) accounts directly and indirectly for 45% of the world's economic activity, may present unique opportunities to gain further insights into PF loans as sample sizes increase.

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Appendix 1:

Example of a project finance loan announcement by an ASX-listed mining exploration entity

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ASX and Media Release

21 December 2009

STOCK EXCHANGE CODES

ASX: ADU
TSXV: ADU
FSE: AXM

SHARE INFORMATION

Issued Shares: 284.9M

Unlisted Options: 24.7M

Cash : A$30M

MINERAL RESOURCES

Measured:
1.20Mozs
20.3Mt
1.84g/t

Indicated:
0.55Moz
9.90Mt
1.73g/t

Inferred:
0.36Mozs
6.98Mt
1.62g/t

ORE RESERVES

Proven:
854,000ozs
13.52Mt
1.96g/t

Probable:
214,000oz
3.02Mt
2.21g/t

ENTERPRISE VALUE/OZ

Per Resource Oz US$42

Per Reserve Oz US$83

CREDIT-APPROVED FINANCE PACKAGE

Macquarie Bank credit facility paves way for Adamus to become a significant gold producer

Adamus Resources Limited (ASX: ADU, "Adamus" or "the Company") is pleased to announce it has accepted a credit approved offer from Macquarie Bank to provide debt, bonding and hedging facilities ("the Facility") for the development of its Southern Ashanti Gold Project ("Southern Ashanti") in Ghana.

The Facility completes the debt financing requirements for Southern Ashanti, and will lead to Adamus becoming a 100,000+ ounce p.a. gold producer by early 2011.

The offer incorporates the following components:

Project Loan:	**US$60M or US$70M at Adamus' option**
Hedge Requirement:	**Minimum 252,000 ozs (US$60M loan)**
	Maximum 290,000 ozs (US$70M loan)
Bonding Facility:	**US$6M**

Formal documentation is expected to be completed in January 2010.

The Facility proceeds will be applied towards the development cost of the Southern Ashanti Project which is currently forecast at US$105M. This closely compares to Adamus' earlier estimates after allowing for exchange rate variations.

Drawdown of the Facility is not expected to be required until the June 2010 quarter. The loan amortisation schedule requires full repayment of the Facility by 30 September 2014.

The Facility has been structured so that Adamus can, having now received credit approval, take advantage of the current strong gold price as it has the ability to lock in its hedging at any time prior to completion of formal loan documentation or drawdown of the Facility.

Drawdown of the Facility is subject to usual conditions precedent including the completion of a minimum gold hedging programme of 252,000 ounces representing 24% of the 1,068,000 currently Proved and Probable Ore Reserve ounces.

Development of the Project is on schedule with plant construction set to commence in January 2010.

Selection Process

Adamus engaged independent consultant Optimum Capital to conduct a tendering process to ensure that the Company was provided with a competitive and suitably structured debt financing package. Proposals were received from a number of banks and non-bank financiers.

The Company is pleased with the outcome of this process. Commenting on the debt financing Managing Director Mark Bojanjac said:

"The debt financing selection process was rigorous and saw many options provided to Adamus. The competitive nature of the financing resulted in Adamus securing finance at considerably better terms than were offered earlier in the year."

"We believe the facility offered by Macquarie Bank is provided on attractive terms and is appropriately covenanted. There are no additional equity participation rights in relation to the Facility. This preserves the potential upside from Southern Ashanti for our shareholders."

"Adamus is also encouraged by Macquarie Bank's considerable experience in funding West African gold projects. Their debt financing support has provided Adamus with an independent stamp of approval for our project."

"Having achieved the debt financing milestone, Adamus is well positioned to becoming a mid-tier gold producer in early 2011."

About Adamus

Adamus Resources Limited is a Perth-based mineral exploration company, listed on Australian Securities Exchange (ASX), TSX Venture Exchange (TSX-V) and Frankfurt Stock Exchange Open Market (FSE).

The Company's primary focus is on exploring, realising and expanding the economic potential of the Southern Ashanti Gold Project in Ghana, West Africa. The Project encompasses approximately 665km² of tenure in the Ashanti Gold Belt – host to over 100moz of gold and the Project boasts excellent access to port and road infrastructure. Ghana is a stable West African country with a long history and some of the world's largest gold mining operations. Gold production is vital to the national economy. Members of the Adamus Board and management team have proven records in mineral exploration, project development and project financing.

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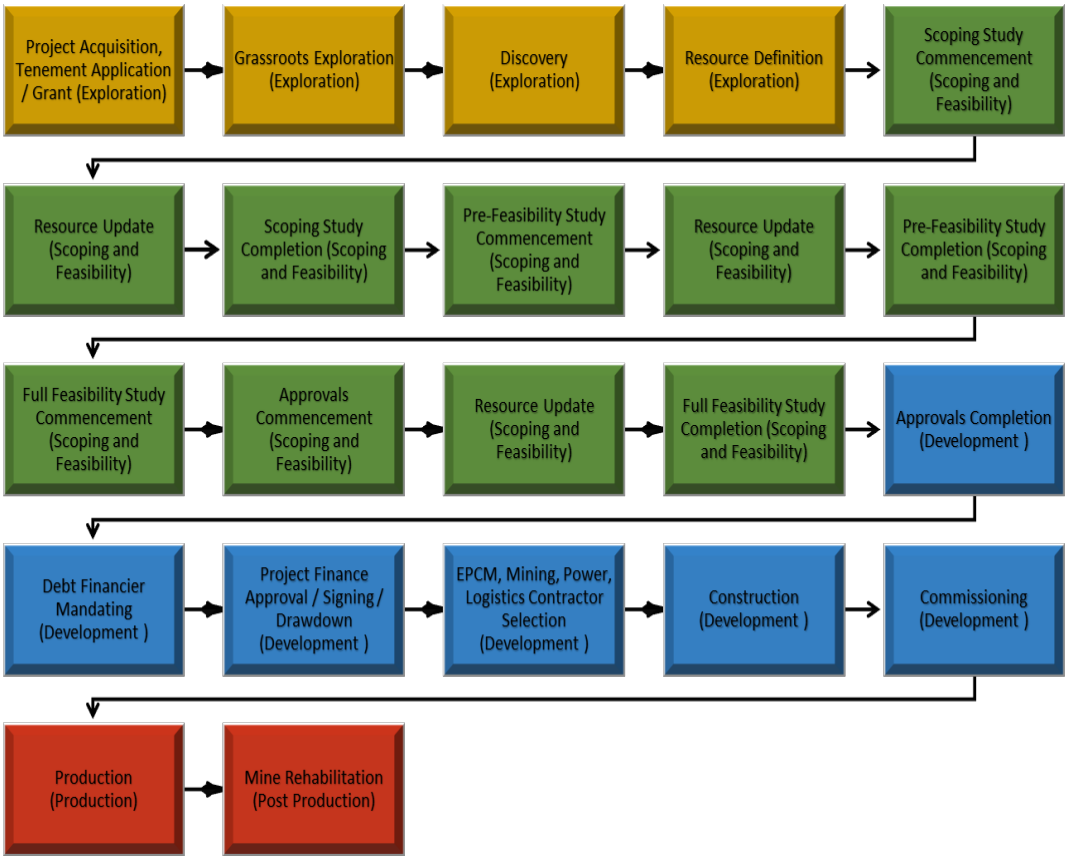
Appendix 2:

Mine Project Life-Cycle Stages



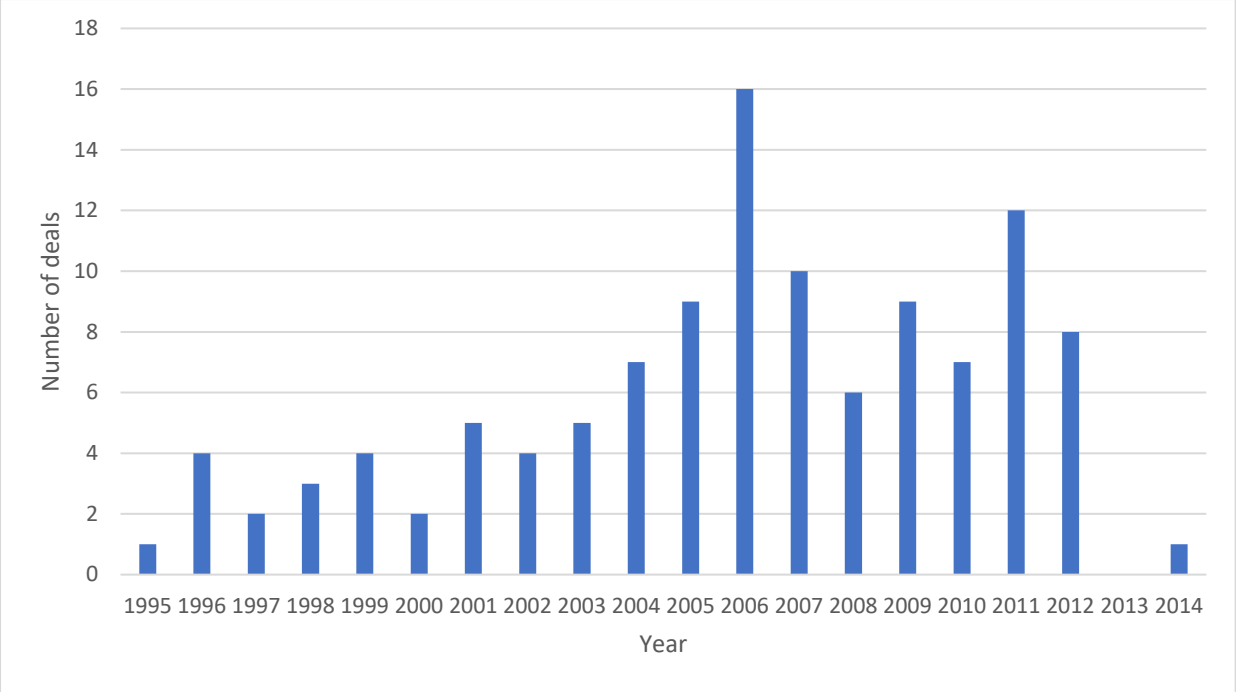


Figure 1
Distribution of sample project finance loan deals by year
This figure presents the number of project finance loan deals by year for the sample over the period 1995–2014.

Table 1
Sample composition and project finance announcement types

Panel A: Overall sample

	# Firms	# Projects	# Announcements
All project finance announcements (1995–2014)	119	120	247
Less: Observations that are convertible loans	1	1	2
Less: Observations with missing stock prices	4	4	6
Final sample	114	115	239

Panel B: By announcement type

	# Announcements	% Projects	% Announcements
Mentions	5	4.3%	2.1%
Mandates	45	39.1%	18.8%
First approvals	48	41.7%	20.1%
Revised approvals	9	7.8%	3.8%
Final approvals	47	40.9%	19.7%
Sole approvals	67	58.3%	28.0%
Drawdowns	18	15.7%	7.5%
All announcements	239		

The sample is drawn from public announcements made by ASX-listed mining exploration entities over the period 1995–2014, available on Morningstar's DatAnalysis Premium database. Panel A reports the number of firms, projects and announcements covered by the overall sample. Panel B provides a breakdown of the number of project finance announcements by type. *Mention* refers to an announcement made by a firm which casually mentions that it has initial contact or discussion with a lender regarding the possibility of a project loan. *Mandate* is an announcement formally mandating a lender to structure a financing package. Depending on the approval process of the lender, a firm may make one or more announcements regarding the loan approval. *First approval* refers to an announcement of the first or initial approval of the loan. *Revised approval* refers to a follow-up announcement revising the terms and conditions of the loan. *Final approval* refers to an announcement of the final approval of the loan. If a firm makes only one announcement throughout the loan approval process, this is referred to as a *Sole approval* announcement. *Drawdown* refers to an announcement that all the conditions precedent of the loan are met and the borrower can start drawing down the loan.

Table 2
Project finance loan deals by commodity type and project location

Panel B: By project country and commodity

	Commodity type							
Country	Coal	Oil & Gas	Ferrous metal	Non-ferrous metal	Precious metal	Specialty metal	Gemstone	Total
Argentina	0	0	0	0	0	1	0	1 (0.9%)
Australia	1	8	5	20	26	7	1	68 (59.1%)
Botswana	0	0	0	1	1	0	1	3 (2.6%)
Brazil	0	0	0	1	1	0	0	2 (1.7%)
Canada	1	0	0	0	0	0	0	1 (0.9%)
Chile	0	0	0	1	0	0	0	1 (0.9%)
China	0	0	0	0	1	0	0	1 (0.9%)
Congo	0	0	0	2	0	0	0	2 (1.7%)
Dominican Republic	0	0	0	0	1	0	0	1 (0.9%)
Finland	0	0	0	1	0	0	0	1 (0.9%)
Ghana	0	0	0	0	2	0	0	2 (1.7%)
Indonesia	0	0	0	1	1	0	0	2 (1.7%)
Italy	0	1	0	0	1	0	0	2 (1.7%)
Kenya	0	0	0	0	0	1	0	1 (0.9%)
Kyrgyz	0	0	0	0	1	0	0	1 (0.9%)
Laos	0	0	0	1	1	0	0	2 (1.7%)
Namibia	0	0	0	0	0	1	0	1 (0.9%)
New Zealand	0	2	0	0	0	0	0	2 (1.7%)
PNG	0	0	0	0	2	0	0	2 (1.7%)
Philippines	0	1	0	1	2	0	0	4 (3.5%)
Romania	0	0	0	0	1	0	0	1 (0.9%)
Saudi Arabia	0	0	0	1	0	0	0	1 (0.9%)
Senegal	0	0	0	0	1	0	0	1 (0.9%)
South Africa	0	0	0	0	1	0	0	1 (0.9%)
Sweden	0	0	0	0	1	0	0	1 (0.9%)
Thailand	0	0	0	0	1	0	0	1 (0.9%)
UK	0	0	0	0	0	1	0	1 (0.9%)
USA	0	4	0	0	0	2	0	6 (5.2%)
Zambia	0	0	0	2	0	0	0	2 (1.7%)
Total	2 (1.7%)	16 (13.9%)	5 (4.3%)	32 (27.8%)	45 (39.1%)	13 (11.3%)	2 (1.7%)	115 (100%)

This table reports the distribution of loan deals in the sample by commodity type and project host country.

Table 3
Lender participation in project finance loan deals

Lender Name	All cases	Sole lender/ lead arranger	Joint lender
Panel A: Bank lenders			
Macquarie Bank	25	25	0
Rothschild / Investec	15	11	4
Bank of Scotland	12	7	5
ANZ	9	6	3
Standard Bank	9	2	7
Commonwealth Bank	8	6	2
Rand Merchant Bank	7	5	2
Societe Generale	7	5	2
Westpac	7	6	1
BankWest	6	6	0
Barclays	6	4	2
Credit Suisse	5	1	4
BNP Paribas	4	2	2
WestLB	4	2	2
ABN Amro	3	2	1
Bayerische Hypo-und Vereinsbank AG	3	1	2
Deutsche Bank	3	3	0
Standard Chartered Bank	2	2	0
Bank of China	1	0	1
Bank of Tokyo-Mitsubishi UFJ	1	0	1
Dresdner Bank	1	1	0
ING Bank	1	0	1
Mees Pierson NV	1	0	1
Merrill Lynch	1	1	0
Mizuho Corporate Bank	1	1	0
Nedbank	1	0	1
Riyad Bank	1	0	1
Royal Bank of Scotland	1	0	1
Santander New York	1	0	1
Unicredit Bank	1	1	0
	147	100	47
Panel B: Non-bank lenders			
Government-affiliated financial institution	11	5	6
Investment fund	7	5	2
Commodity trader	6	3	3
Industry partner	1	1	0
Equipment supplier	3	1	2
	28	15	13

This table reports the identity of the lenders participated in the sample of project finance loan deals. Panel A reports all commercial bank lenders, with each bank individually listed together with the number of deals they involved in and their role as either the sole lender/lead arranger or a joint lender. Panel B reports the details for non-bank lenders, which are broadly classified into government-affiliated financial institutions, investment funds, commodity trading houses, industry partners, and equipment suppliers. Since multiple lenders may participate in a project finance deal (i.e., a syndicated loan), the total number of participations by all lenders exceeds the total number of project finance deals in the sample.

Table 4
Project loan and firm characteristics

	N	% Yes	Mean	Median	SD	Min	P25	P75	Max
Panel A: Loan characteristics									
Number of lenders	115		1.58	1.00	1.52	1.00	1.00	2.00	14.00
Loan amount (A$m 2014)	114		107.00	53.10	197.00	8.52	24.90	98.00	1,510.00
Loan/Total assets	114		2.31	1.24	5.29	0.15	0.71	2.42	54.28
Loan/Market capitalization	114		0.90	0.50	1.23	0.10	0.29	1.07	8.97
Joint venture project	115	27.8%							
Foreign project	115	40.9%							
Syndicated loan	115	35.7%							
Bank lender	115	79.1%							
Non-bank lender	115	11.3%							
Mixed lender	115	9.6%							
Specialist bank (Macquarie)	115	21.7%							
Specialist bank (top 3)	115	42.6%							
Offtake agreement mentioned	115	20.0%							
Hedging required	115	40.0%							
Secured loan	115	77.4%							
Equity raising required	115	13.9%							
Lender equity in borrower	115	23.5%							
Panel B: Firm characteristics									
Total assets (A$m 2014)	115		71.90	41.50	73.90	2.78	20.60	109.00	412.00
Market capitalization (A$m 2014)	115		198.00	100.00	252.00	7.22	40.30	223.00	1,210.00
Revenue/Total assets	115		0.06	0.01	0.14	0.00	0.00	0.06	1.09
Cash/Total assets	115		0.28	0.20	0.24	0.00	0.10	0.43	0.97
Net profit/Total equity	115		−0.19	−0.09	0.35	−2.55	−0.29	−0.04	0.65
Short-term debt/Total assets	115		0.03	0.00	0.08	0.00	0.00	0.01	0.39
Long-term debt/Total assets	115		0.04	0.00	0.10	0.00	0.00	0.01	0.79
Total debt/Total assets	115		0.07	0.00	0.13	0.00	0.00	0.08	0.79
Market-to-book equity	115		4.40	2.78	7.14	0.38	1.49	4.78	66.12
Top 20 shareholding	115		0.63	0.62	0.16	0.15	0.50	0.76	0.96
CEO shareholding	115		0.04	0.01	0.06	0.00	0.00	0.05	0.25
Directors shareholding	115		0.08	0.04	0.10	0.00	0.01	0.11	0.61
CEO & directors shareholding	115		0.11	0.07	0.13	0.00	0.02	0.19	0.61

This table reports descriptive statistics on key project loan attributes (Panel A) and selected firm characteristics (Panel B) of the sample. Variables in dollar amount (loan amount, total assets, market capitalization) are all converted to 2014 constant dollar terms using the Consumer Price Index compiled by the Australian Bureau of Statistics and expressed in millions of Australian dollars.

Table 5
Borrower stock price responses to project finance loan announcements

		Panel A: All Ordinaries Index as benchmark				Panel B: Small Ordinaries Index as benchmark			
	N	% positive	3-day $CAAR$	BMP test	CZ rank test	% positive	3-day $CAAR$	BMP test	CZ rank test
All announcements	239	61.5	0.0220	4.058***	2.906***	63.2	0.0227	4.259***	3.077***
By announcement type:									
Mentions	5	60.0	−0.0012	0.336	−0.696	80.0	−0.0001	0.396	−0.662
Mandates	45	75.6	0.0414	3.094***	2.448**	80.0	0.0411	3.129***	2.468**
First approvals	48	62.5	0.0231	1.399	1.170	66.7	0.0231	1.396	1.304
Revised approvals	9	44.4	−0.0337	−1.136	−0.984	44.4	−0.0336	−1.143	−0.908
Final approvals	47	57.5	0.0098	1.711*	0.620	57.5	0.0096	1.772*	0.595
Sole approvals	67	58.2	0.0283	2.442**	1.823*	56.7	0.0304	2.665***	1.983**
First-or-sole approvals	115	60.0	0.0261	2.788***	2.182**	60.9	0.0273	2.960***	2.396**
Final-or-sole approvals	114	57.9	0.0207	2.991***	1.981**	57.0	0.0218	3.207***	2.031**
Drawdowns	18	55.6	0.0139	1.355	0.956	55.6	0.0160	1.469	1.185

This table reports stock price reactions to firms making project loan-related announcements. In Panel A, abnormal returns are market-adjusted using ASX's All Ordinaries Index as the benchmark. In Panel B, ASX's Small Ordinaries Index is used as the benchmark. $CAAR$ is cumulative average abnormal return over the [−1, +1] event window centered around the announcement day (day 0). If an announcement is made after trading hours or during weekends or holidays, the next available trading day is taken as the announcement day. BMP test is a parametric test based on standardized residuals corrected for event-induced changes in volatility (Boehmer, Masumeci, and Poulsen 1991). CZ rank test is the Corrado and Zivney non-parametric rank test corrected for event-induced volatility of rankings (Corrado and Zivney 1992). ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 6
Borrower stock price responses to project loan announcements by hedging requirement, lender identity and political uncertainty

Panel A: Hedging vs. no hedging required

	Hedging required				No hedging required				2-sample	Ranksum
Announcement type	N	% positive	Mean	Median	N	% positive	Mean	Median	*t*-test	*z*-test
All announcements	97	56.7	0.0105	0.0090	142	64.8	0.0300	0.0270	−1.779*	−1.863*
Mentions	2	50.0	−0.0037	−0.0037	3	66.7	0.0006	0.0469	−0.047	−0.577
Mandates	19	63.2	0.0232	0.0124	26	84.6	0.0547	0.0605	−1.480	−1.838*
First approvals	19	42.1	−0.0230	−0.0075	29	75.9	0.0533	0.0550	−3.050***	−2.709***
Revised approvals	4	50.0	0.0042	−0.0044	5	40.0	−0.0640	−0.0062	0.979	0.735
Final approvals	19	68.4	0.0193	0.0149	28	50.0	0.0034	0.0004	0.872	0.975
Sole approvals	27	55.6	0.0210	0.0137	40	60.0	0.0332	0.0183	−0.500	−0.358
First-or-sole approvals	46	50.0	0.0028	0.0012	69	66.7	0.0417	0.0394	−2.184**	−1.987**
Final-or-sole approvals	46	60.9	0.0203	0.0143	68	55.9	0.0209	0.0106	−0.041	0.300
Drawdowns	7	57.1	0.0100	0.0010	11	54.6	0.0165	0.0010	−0.212	0.045

Panel B: Specialist vs. non-specialist lenders

	Specialist lenders				Non-specialist lenders				2-sample	Ranksum
Announcement type	N	% positive	Mean	Median	N	% positive	Mean	Median	*t*-test	*z*-test
All announcements	91	56.0	0.0143	0.0049	148	64.9	0.0268	0.0239	−1.117	−1.091
Mentions	1	0.0	−0.0098	−0.0098	4	75.0	0.0010	0.0246	n.a.	−0.707
Mandates	11	72.7	0.0296	0.0263	34	76.5	0.0452	0.0419	−0.623	−0.423
First approvals	22	54.6	0.0026	0.0102	26	69.2	0.0404	0.0493	−1.437	−1.221
Revised approvals	1	100.0	0.0036	0.0036	8	37.5	−0.0384	−0.0138	n.a.	0.387
Final approvals	22	59.1	0.0224	0.0064	25	56.0	−0.0013	0.0085	1.336	1.151
Sole approvals	27	48.2	0.0148	−0.0078	40	65.0	0.0374	0.0305	−0.925	−1.112
First-or-sole approvals	49	51.0	0.0093	0.0028	66	66.7	0.0386	0.0352	−1.645	−1.606
Final-or-sole approvals	49	53.1	0.0182	0.0037	65	61.5	0.0225	0.0241	−0.267	−0.220
Drawdowns	7	57.1	0.0051	0.0010	11	54.6	0.0196	0.0010	−0.475	0.045

Panel C: High vs. low government policy uncertainty

	High political uncertainty				Low political uncertainty				2-sample	Ranksum
Announcement type	N	% positive	Mean	Median	N	% positive	Mean	Median	*t*-test	*z*-test
All announcements	131	62.6	0.0264	0.0137	108	60.2	0.0167	0.0231	0.891	−0.117
Mentions	1	0.0	−0.0098	−0.0098	4	75.0	0.0010	0.0246	n.a.	−0.707
Mandates	31	67.7	0.0346	0.0329	14	92.9	0.0564	0.0422	−0.940	−1.177
First approvals	26	69.2	0.0447	0.0245	22	54.6	−0.0024	0.0135	1.812*	1.097
Revised approvals	5	40.0	0.0019	−0.0062	4	50.0	−0.0783	−0.0162	1.181	0.490
Final approvals	26	50.0	−0.0042	0.0004	21	66.7	0.0271	0.0459	−1.784*	−1.712*
Sole approvals	31	64.5	0.0341	0.0154	36	52.8	0.0233	0.0144	0.451	0.226
First-or-sole approvals	57	66.7	0.0390	0.0179	58	53.5	0.0135	0.0138	1.443	0.845
Final-or-sole approvals	57	57.9	0.0167	0.0095	57	57.9	0.0247	0.0303	−0.502	−0.887
Drawdowns	11	72.7	0.0251	0.0083	7	28.6	−0.0036	−0.0116	0.962	1.223

This table reports subsample results of stock price reactions (3-day CAR using the All Ordinaries Index as the benchmark) to firms making project loan-related announcements. Panel A reports market reactions stratified by loans with and without hedging required. Panel B compares loans issued by specialist (top three lenders in terms of number of PF deals in the sample) as opposed to non-specialist lenders. Panel C contrasts loans for projects in countries with high vs. low political uncertainty based on the median of the country political risk index compiled by the PRS Group, Inc. The 2-sample *t*-test is for testing the difference in mean CAR. The Ranksum *z*-test is for testing the difference in median CAR. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 7
Bid-ask spread response to project finance loan announcements

	N	% negative	3-day $CAAS$	BMP test	CZ rank test
All announcements	211	61.1	−0.0251	−2.622**	2.253**
By announcement type:					
Mentions	5	20.0	0.0321	2.155**	1.795*
Mandates	42	54.8	−0.0017	−0.529	0.967
First approvals	42	71.4	−0.0505	−1.468	0.202
Revised approvals	8	50.0	−0.0766	−1.120	0.945
Final approvals	43	53.5	−0.0312	−1.064	−0.385
Sole approvals	53	69.8	−0.0203	−1.785*	−0.722
First-or-sole approvals	95	70.5	−0.0337	−2.299**	0.790
Final-or-sole approvals	96	62.5	−0.0252	−1.864*	0.984
Drawdowns	18	61.1	−0.0133	−1.351	−2.054**

This table reports stock market reactions in terms of abnormal (mean-adjusted) bid-ask spread to firms making project loan-related announcements. $CAAS$ is cumulative average abnormal bid-ask spread over the [−1, +1] event window centered around the announcement day (day 0). If an announcement is made after trading hours or during weekends or holidays, the next available trading day is taken as the announcement day. BMP test is a parametric test based on standardized residuals corrected for event-induced changes in volatility (Boehmer, Masumeci, and Poulsen 1991). CZ rank test is the Corrado and Zivney non-parametric rank test corrected for event-induced volatility of rankings (Corrado and Zivney 1992). ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 8
Determinants of market reactions to project finance loan approvals

		CAR					
	Predicted	(1)	(2)	(3)	(4)	(5)	(6)
$Constant$		0.017	0.126	0.121	0.106	0.106	0.109
		(0.14)	(1.03)	(1.00)	(0.86)	(0.85)	(0.87)
$LoanTA$	+	0.006***	0.006***	0.006***	0.006***	0.006***	0.006***
		(7.86)	(8.51)	(8.74)	(8.47)	(8.39)	(8.39)
$Syndic$	–	0.016	0.020	0.015	0.018	0.018	0.018
		(1.01)	(1.32)	(0.97)	(1.15)	(1.13)	(1.10)
$LenderEq$	+	0.018	0.020	0.012	0.005	0.005	0.005
		(0.94)	(1.04)	(0.64)	(0.27)	(0.26)	(0.27)
$EqRaise$	–	−0.012	−0.015	−0.017	−0.022	−0.022	−0.021
		(−0.48)	(−0.63)	(−0.75)	(−0.93)	(−0.93)	(−0.92)
$Offtake$	+	−0.004	−0.017	−0.014	−0.018	−0.018	−0.018
		(−0.19)	(−0.86)	(−0.70)	(−0.88)	(−0.87)	(−0.90)
$Log(MCap)$	–	−0.003	−0.009	−0.008	−0.008	−0.008	−0.008
		(−0.52)	(−1.37)	(−1.38)	(−1.29)	(−1.28)	(−1.30)
$Volatility$	+	1.745**	1.568**	1.580**	1.614**	1.610**	1.619**
		(2.41)	(2.20)	(2.20)	(2.18)	(2.19)	(2.16)
$Top20$	+	−0.062	−0.043	−0.059	−0.060	−0.060	−0.057
		(−1.52)	(−1.07)	(−1.45)	(−1.50)	(−1.47)	(−1.43)
$MgntShdg$	+	0.063	0.047	0.048	0.051	0.051	0.051
		(1.04)	(0.78)	(0.85)	(0.92)	(0.91)	(0.91)
CRB	+	0.030	0.019	0.016	0.018	0.018	0.018
		(0.66)	(0.43)	(0.37)	(0.42)	(0.42)	(0.41)
$Hedge$	+/–		−0.041**	−0.039**	−0.035*	−0.035*	−0.033*
			(−2.36)	(−2.32)	(−1.96)	(−1.94)	(−1.91)
GPU	–			0.077**	0.077**	0.076**	0.074**
				(2.16)	(2.16)	(2.10)	(2.06)
$NonBank$	+/–				0.030	0.030	0.027
					(1.11)	(1.10)	(0.97)
$SpBank1$	+					0.001	
						(0.05)	
$SpBank3$	+						−0.006
							(−0.36)
Observations		114	114	114	114	114	114
Adjusted R^2		0.176	0.209	0.219	0.219	0.211	0.212
F-statistic		12.89	13.26	12.96	11.56	10.63	11.04

This table reports estimation of the pooled cross-sectional regression model of Eq. (7) for testing the determinants of market reactions to project loan approvals with additional controls for lender identity. The dependent variable is CAR, the 3-day cumulative abnormal returns. $LoanTA$ is loan amount divided by total assets. $Syndic$ is a binary variable for syndication (1 = yes, 0 = no). $LenderEq$ is a binary variable for lender equity ownership (1 = yes, 0 = no). $EqRaise$ is a binary variable for equity raising requirement (1 = yes, 0 = no). $Offtake$ is a binary variable for the existence of an offtake agreement (1 = yes, 0 = no). $Log(MCap)$ is natural logarithm of market capitalization. $Volatility$ is standard deviation of daily stock returns in the preceding 12 months. $Top20$ is percentage shareholding of the top 20 shareholders. $MgntShdg$ is percentage shareholding of directors and CEO. CRB is return on the Thomson/CoreCommodity CRB Index in the preceding 12 months. $Hedge$ is a binary variable for hedging requirement (1 = yes, 0 = no). GPU is a measure of government policy uncertainty (higher measure means higher risk) based on the country political risk index compiled by the PRS Group, Inc. $NonBank$ is a binary variable for non-commercial bank lenders (1 = non-commercial bank, 0 = otherwise). $SpBank1$ ($SpBank3$) is a binary variable for the top one (three) industry specialist bank lender(s) based on the greatest number of deals participated (1 = specialist bank lender, 0 = otherwise). *t*-statistics (in parentheses) are computed based on robust standard errors. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 9
Propensity model of hedging requirement for project finance loans

	(1)	(2)
$Constant$	−0.209	0.006
	(−0. 09)	(0.00)
$Precious$	0.735**	0.855**
	(2.12)	(2.52)
$SpBank1$	1.382***	
	(4.16)	
$SpBank3$		0.860***
		(2.90)
$Offtake$	−1.125**	−0.798*
	(−2.54)	(−1.86)
$NonUSDLoan$	0.840**	0.800**
	(2.08)	(2.05)
$MgntShdg$	−0.104	0.135
	(−0.09)	(0.12)
$Top20$	1.955**	1.332
	(2.11)	(1.42)
CRB	−0.233	−0.474
	(−0.31)	(−0.64)
$Log(MCap)$	−0.145	−0.144
	(−1.08)	(−1.09)
GPU	0.693	1.170
	(0.65)	(1.12)
$Cash$	1.014	0.960
	(1.40)	(1.29)
$Leverage$	1.544	0.480
	(1.28)	(0.39)
$Year2006$	0.582	0.371
	(1.48)	(0.91)
$Year2007$	−0.950	−1.279*
	(−1.27)	(−1.84)
$Year2011$	−0.352	−0.100
	(−0.62)	(−0.19)
Observations	114	114
Pseudo R^2	0.349	0.314
Chi-sq	52.66	46.70

This table reports probit regression results for a propensity model of hedging requirement for project finance loans as specified in Eq. (8). The dependent variable is, $Prob(Hedge = 1)$, the likelihood of hedging required for a project loan. $Precious$ is a binary variable for precious metals (1 = yes, 0 = no). $SpBank1$ ($SpBank3$) is a binary variable for the top one (three) industry specialist bank lender(s) based on the greatest number of deals participated (1 = specialist bank lender, 0 = otherwise). $Offtake$ is a binary variable for the existence of an offtake agreement (1 = yes, 0 = no). $NonUSDLoan$ is a binary variable for non-US dollar loans (1 = non-USD, 0 = USD). $MgntShdg$ is percentage shareholding of directors and CEO. $Top20$ is percentage shareholding of the top 20 shareholders. CRB is return on the Thomson/CoreCommodity CRB Index in the preceding 12 months. $Log(MCap)$ is natural logarithm of market capitalization. GPU is a measure of government policy uncertainty (higher measure means higher risk) based on the country political risk index compiled by the PRS Group, Inc. $Cash$ is cash and equivalent divided by total assets. $Leverage$ is total debt divided by total assets. $Year2006$, $Year2007$ and $Year2011$ are year dummies to control for years with above-average project loan approvals. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 10
Treatment effects model

	$Hedge$ (1)	CAR (2)	$Hedge$ (3)	CAR (4)
$Constant$	−0.021	0.050	0.150	0.012
	(−0.01)	(0.36)	(0.06)	(0.07)
$Pr(Hedge)$		0.012		0.033
		(0.18)		(0.37)
$SpBank1$	1.335***	−0.018		
	(4.13)	(−0.46)		
$SpBank3$			0.879***	−0.023
			(2.99)	(−0.84)
$Offtake$	−1.127***	−0.006	−0.877**	−0.001
	(−2.61)	(−0.22)	(−2.18)	(−0.02)
$MgntShdg$	−0.146	0.060	−0.041	0.072
	(−0.13)	(1.12)	(−0.04)	(1.23)
$Top20$	2.000**	−0.078*	1.502	−0.081
	(2.24)	(−1.75)	(1.57)	(−1.59)
CRB	−0.306	0.022	−0.480	0.026
	(−0.42)	(0.52)	(−0.71)	(0.58)
$Log(MCap)$	−0.159	−0.005	−0.164	−0.003
	(−1.14)	(−0.82)	(−1.14)	(−0.41)
GPU	0.647	0.082**	1.290	0.071**
	(0.63)	(2.33)	(1.37)	(1.98)
$LoanTA$		0.006***		0.007***
		(8.69)		(8.28)
$Volatility$		1.638**		1.633**
		(2.32)		(2.22)
$NonBank$		0.035		0.034
		(1.34)		(1.23)
$Syndic$		0.020		0.019
		(1.21)		(1.13)
$LenderEq$		0.004		0.004
		(0.23)		(0.24)
$EqRaise$		−0.023		−0.022
		(−1.03)		(−1.00)
$Precious$	0.697**		0.732*	
	(1.98)		(1.77)	
$NonUSDLoan$	0.871**		0.918***	
	(2.34)		(2.65)	
$Cash$	1.033		0.994	
	(1.37)		(1.27)	
$Leverage$	1.939*		1.125	
	(1.70)		(1.02)	
$Year2006$	0.526		0.334	
	(1.18)		(0.77)	
$Year2007$	−0.718		−0.887	
	(−0.81)		(−0.84)	
$Year2011$	−0.057		0.183	
	(−0.08)		(0.30)	
Observations	114	114	114	114
ρ	−0.414		−0.561	
Wald test of $\rho = 0$: $\chi^2(1)$	0.58		0.59	
Probability > χ^2	0.448		0.444	

This table reports results of the treatment effects model to control for endogeneity between hedging requirements and PF loan announcement returns. Columns (1) and (3) are results from the first-stage hedging regression and Columns (2) and (4) are results from the second-stage outcome regression. $Pr(Hedge)$ is the probability of hedging requirements estimated from the first-stage model. All other variables are as defined in Tables 8 and 9. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 11
Project loan pricing and maturity

	N	Mean	Median	SD	Min	P25	P75	Max
Base rate (bps)	72	362	468	236	23	51	549	786
Spread (bps)	67	387	350	233	145	235	450	1465
Loan rate (bps)	70	738	746	215	400	570	861	1500
Maturity (years)	85	4.6	4	2.3	1.5	3	6	12

This table reports descriptive statistics on loan pricing and maturity of a reduced sample. All rates are stated in basis points and maturity in years.

Table 12
Pricing regressions for project finance loans

	$LoanSpread$			
	(1)	(2)	(3)	(4)
$Constant$	−355.610	−869.086	−918.696	−1010.234*
	(−0.77)	(−1.50)	(−1.54)	(−1.71)
$BaseRate$	−0.431***	−0.431***	−0.427***	−0.502***
	(−3.85)	(−3.92)	(−3.77)	(−3.67)
$SpBank1$	81.012	107.851	93.307	97.427
	(1.24)	(1.51)	(1.29)	(1.35)
$NonBank$	209.863*	239.669*	253.840**	284.589**
	(1.75)	(1.95)	(2.03)	(2.09)
$Log(Loan)$	16.918	46.129	45.410	52.489
	(0.52)	(1.09)	(1.06)	(1.27)
$Syndic$	−2.141	−2.714	−7.113	14.665
	(−0.04)	(−0.04)	(−0.11)	(0.21)
$Secured$	−73.447	−30.702	−45.173	−25.560
	(−0.86)	(−0.33)	(−0.46)	(−0.31)
$EqRaise$	29.491	32.344	24.483	20.731
	(0.39)	(0.38)	(0.28)	(0.24)
$Offtake$	−25.343	−22.868	−16.724	−17.260
	(−0.53)	(−0.45)	(−0.32)	(−0.35)
$Log(MCap)$	26.370	24.244	25.892	28.064
	(1.09)	(0.93)	(0.98)	(1.04)
$Volatility$	3321.209	3385.336	3499.214	4398.091*
	(1.02)	(1.57)	(1.59)	(1.76)
$Top20$	−122.416	−19.921	−65.774	−155.469
	(−0.75)	(−0.10)	(−0.31)	(−0.68)
$MgntShdg$	573.850**	615.795**	624.652**	607.746**
	(2.31)	(2.34)	(2.36)	(2.17)
CRB	205.219	176.934	196.217	293.283
	(1.34)	(1.06)	(1.13)	(1.49)
$Hedge$	−44.909	−82.797	−70.811	−37.073
	(−0.73)	(−1.16)	(−0.96)	(−0.44)
GPU	−88.590	−56.208	−74.226	−46.579
	(−0.63)	(−0.38)	(−0.49)	(−0.29)
$Maturity$		−18.364	−44.563	−21.264
		(−1.21)	(−1.37)	(−1.40)
$Log(Maturity)$			113.126	
			(0.83)	
$Year2006$				−64.098
				(−0.96)
$Year2007$				161.720
				(1.38)
$Year2011$				−64.385
				(−0.65)
Observations	66	59	59	59
Adjusted R^2	0.437	0.434	0.426	0.436
F-statistic	3.55	3.84	3.88	3.62

This table reports regression results of the loan pricing model of Eq. (9). The dependent variable is $LoanSpread$, the loan rate spread in basis points above the benchmark rate. $BaseRate$ is the benchmark rate used in a loan. $SpBank1$ is a binary variable for the top specialist bank lender based on the greatest number of deals participated (1 = specialist bank lender, 0 = otherwise). $NonBank$ is a binary variable for non-commercial bank lenders (1 =

non-commercial bank, 0 = otherwise). $Log(Loan)$ is natural log of the loan amount. $Syndic$ is a binary variable for syndication (1 = yes, 0 = no). $Secured$ is a binary variable for loan security (1 = yes, 0 = no). $EqRaise$ is a binary variable for equity raising requirement (1 = yes, 0 = no). $Offtake$ is a binary variable for the existence of an offtake agreement (1 = yes, 0 = no). $Log(MCap)$ is natural logarithm of market capitalization. $Volatility$ is standard deviation of daily stock returns in the preceding 12 months. $Top20$ is percentage shareholding of the top 20 shareholders. $MgntShdg$ is percentage shareholding of directors and CEO. CRB is return on the Thomson/CoreCommodity CRB Index in the preceding 12 months. $Hedge$ is a binary variable for hedging requirement (1 = yes, 0 = no). GPU is a measure of government policy uncertainty (higher measure means higher risk) based on the country political risk index compiled by the PRS Group, Inc. $Maturity$ is loan maturity in years. $Year2006$, $Year2007$ and $Year2011$ are year dummies to control for years with above-average project loan approvals. *t*-statistics (in parentheses) are computed based on robust standard errors. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 13
Accounting performance measures and bankruptcy events in post-project financing years

Panel A: Accounting performance measures of firms obtaining project loans

		Pre-loan year	Post-loan announcement years				
			Year 1	Year 2	Year 3	Year 4	Year 5
Number of observations	N	115	113	109	102	91	88
Total revenue/Total assets	Median	0.0034	0.0112	0.1291	0.2755	0.3664	0.4444
Operating revenue/Total assets	Median	0.0000	0.0000	0.0779	0.1689	0.3633	0.2684
EBIT/Total assets	Median	−0.0899	−0.0674	−0.0387	−0.0490	−0.0422	−0.0513
Net profit/Total assets	Median	−0.0743	−0.0571	−0.0492	−0.0574	−0.0814	−0.0399
Net profit/Total equity	Median	−0.0911	−0.0884	−0.0769	−0.0279	−0.0351	−0.0064

Panel B: Frequency of bankruptcy events of firms obtaining project loans

	Post-loan announcement years					
Bankruptcy events	Year 1	Year 2	Year 3	Year 4	Year 5	Years 1-5
Administration/liquidation	1	4	3	4	3	15
Loan termination/restructuring	1	2	6	2	1	12
Unexpected mine closure/disposal	3	4	2	3	1	13
All events	5	10	11	9	5	40

Panel C: Accounting performance measures of all-equity financed firms

		Pre-equity finance year	Post-equity finance years				
			Year 1	Year 2	Year 3	Year 4	Year 5
Number of observations	N	11	11	11	9	9	9
Total revenue/Total assets	Median	0.0355	0.0112	0.0690	0.6274	0.5209	0.5356
Operating revenue/Total assets	Median	0.0000	0.0020	0.0354	0.5257	0.5123	0.2730
EBIT/Total assets	Median	−0.0567	−0.0547	−0.1028	0.0678	0.0066	−0.0724
Net profit/Total assets	Median	−0.0162	−0.1084	−0.0941	0.0366	0.0029	−0.0523
Net profit/Total equity	Median	−0.0193	−0.1239	−0.1251	0.0433	0.0031	−0.0696

This table reports subsequent accounting performance (Panel A) and frequency of bankruptcy events (Panel B) of MEEs in the sample in the five years after obtaining project loans. For comparison, Panel C reports the subsequent accounting performance of a sample of 11 all-equity financed MEEs that financed their projects with equity only instead of loan.