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Flexible Project Investments

A proposal for a new form of debt finance for SMEs

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Executive summary

This paper addresses the need to develop new financial products, as was expressed in the report of the industry-led taskforce on alternative debt markets: Boosting Finance Options for Business¹.

This Taskforce, chaired by Tim Breedon, was given this objective by Vince Cable, Secretary of State for Business, Innovation and Skills:

"To examine structural and behavioural barriers to the development of alternative debt markets in the UK, building on recent work on this subject, and to make evidence-based recommendations to Government ahead of Budget 2012 on practical measures to facilitate the development of these markets."

As the Taskforce report explains, financing for small and medium-sized enterprises (SMEs) has suffered due to the lack of supply of their main source of funding: bank loans and credit. Further, the ability and willingness of banks to lend to businesses is likely to be constrained in future as banks become more risk averse and are required to build up capital requirements to reduce macroeconomic volatility in the future².

The report proposes a variety of ways that other forms of financing can be provided to SMEs. This paper presents a new form of financing for SMEs, which is a variant of project bonds. To meet the specific needs of SMEs, appropriate features of other financial instruments have been drawn upon.

The definition of a project used here is that of the Project Management Institute: "A project is a temporary endeavour undertaken to create a unique product, service, or result."³

This new form of financing, a 'Flexible Project Investment', is a series of project bonds for SMEs. Each SME project bond is tailored to each stage of the SME project and can be adjusted if circumstances change. The organisation that underwrites each bond would also provide project monitoring and on-going risk management for each SME's project to help the project be successful. The bond underwriter would be a private sector organisation, called the Project Investment Manager, which combines the skills of investment banking, asset management and private equity.

¹ Industry Taskforce (2012), "Boosting Finance Options for Business", Department for Business, Innovation and Skills

² Ibid., paragraph 18, page 15

³ Project Management Institute (2008), "A Guide to the Project Management Body of Knowledge" - Fourth Edition

The individual features of the proposed form of financing are not new. The paper makes clear where each of these features have been derived from. What is new is how these features are combined in a way that meets the practical needs of SME projects and those who invest in them.

The appendix contains a worked example to show how a Flexible Project Investment can be configured to suit estimated project cash flows and how it can be adjusted to respond to changes in the project.

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1. Introduction

SMEs are a vital part of the UK economy, and a dynamic growing SME sector is likely to contribute significantly to future economic growth. However, since the credit crisis began in 2007, SMEs have been facing a funding shortfall. Firms have delayed investment plans due to economic uncertainty, leading to a reduction in demand, but supply has also fallen as banks have also become more risk averse: a survey of SMEs showed 74 per cent of SMEs who sought finance managed to obtain finance in 2010, compared with 90 per cent during the 2007/08 survey⁴.

Unless changes are made, this funding shortfall will continue, undermining economic recovery. A paper on the obstacles to growth for SMEs showed that nearly a third of 'high growth' firms cited obtaining finance as an obstacle to growth⁵, whilst the Taskforce report estimates that the funding gap for the business sector in the next five years to be between £84bn and £191bn, of which between £26bn and £59bn would "relate to smaller businesses"⁶.

Past and current funding shortfall

In response to the credit crisis, banks have become more risk averse. Although the risk profile of firms has deteriorated as a result of the recession, banks have also tightened their lending criteria over and above that explained by a rise in the riskiness of SMEs⁷. Examples of this risk aversion are that SME credit facilities are taking longer to approve, loans have shortened maturities, there are additional fees for loans and SMEs have to meet higher collateral requirements⁸.

Compared to other European countries, the UK had one of the highest SME loan rejection rates and there has been a much sharper decrease in the supply of loans to SMEs⁹. The Taskforce Report cites a survey where one-third of SMEs applying for a loan were rejected

⁴ Department for Business, Innovation and Skills (2012), "SME Access to External Finance", BIS Economics Paper No.16, pp14-16

⁵ Lee, N. (2012), "Free to grow? Assessing the obstacles faced by actual and potential high growth firms", Big Innovation Centre, p30

⁶ Industry Taskforce (2012), "Boosting Finance Options for Business", Department for Business, Innovation and Skills, p16

⁷ Department for Business, Innovation and Skills (2012), "SME Access to External Finance" BIS Economics Paper No.16, p17

⁸ Industry Taskforce (2012), "Boosting Finance Options for Business", Department for Business, Innovation and Skills, p18

⁹ Ibid., paragraph 10, page 13

and they had no credit facility by the end of the application process¹⁰.

Future funding shortfall

Supply and demand problems in bank lending are expected to become acute, leaving a significant funding shortfall¹¹. Changing national and international regulatory environments are increasing the pressure on banks and increasing the likelihood that supply of credit to SMEs will continue to be constrained. The increased capital requirements of SME lending and overdrafts are likely to mean that lending to SMEs will further decline in the future as lending to SMEs becomes capital expensive for banks. The Basel III Accords will require banks to hold higher levels of assets for Tier I capital, the riskiest of assets. SMEs are more affected by these regulatory requirements because, compared to larger businesses, SMEs tend to be riskier and have higher risk weightings applied to them.

There's a risk the supply of finance for investment and working capital will not match demand.¹² If this funding shortfall happens, it will undermine SMEs' growth and make sustainable economic recovery less likely.¹³

Obstacles to access to debt finance for SMEs

There is a need to provide innovative debt financing for SMEs that address issues with existing debt finance.

These issues include:

- Costly credit ratings
- Information asymmetry
- Illiquidity
- Issue size
- Permissive regulation
- Over-zealous regulation
- Funding not matching project's lifecycle
- Final repayment of principal

¹⁰ Industry Taskforce (2012), "Boosting Finance Options for Business", Department for Business, Innovation and Skills, paragraph 10, page 12. This figure was for 2011Q2; the latest, provisional figure, for 2012Q2, is 42% - www.sme-finance-monitor.co.uk

¹¹ Ibid., Introduction, page 9

¹² Ibid., paragraph 2, page 2

¹³ Ibid., paragraph 21, page 16

Issues with debt finance

An issue that the Taskforce report highlights, which pre-dates the credit crisis, is the exclusion of SME corporate bonds from public bond markets. SMEs are prevented from directly accessing the capital markets due to lack of credit information, illiquidity and issue size¹⁴.

The lack of credit information is due to the resource requirement of analysing the credit risk of small companies, which makes such investment uneconomical. This is an aspect of information asymmetry, which is faced by potential investors in SMEs. Information asymmetry is a common feature of SMEs, particularly young ones, because information relevant to investors in SMEs is not readily available, often due to not being legally required for unincorporated businesses.

There is a need for institutional investors to invest in liquid securities. This restricts the size of corporate bonds that can access the public bond markets to large issuances. In particular, pension funds prefer large liquid issues because fund performance is measured against benchmark indices and funds also have to meet mark-to-market requirements.

The report's Recommendation 3 proposes aggregation to overcome lack of credit information, illiquidity and issue size. This proposal is to aggregate a large number of SME loans and finance them via the corporate bond markets.

A barrier specific to Private Placements is that advisory and legal fees can be high. The report proposes standardised documentation to reduce these costs.

Two related issues with debt finance for SMEs are permissive regulation and over-zealous regulation. The Taskforce report points out the need for appropriate regulation for emerging forms of finance – a lack of regulation may lead to investor uncertainty, whilst over-zealous regulation would stifle the development of innovative debt products.¹⁵

Other issues

Other issues of debt finance, which pre-date the credit crisis, are that:

- loan amounts and timings are not designed to match SME project lifecycles
- corporate bonds usually have a final repayment of principal

These are not covered in the report but are addressed by Flexible Project Investments.

For Flexible Project Investments, a project is a temporary endeavour, as defined by the

¹⁴ Industry Taskforce (2012), “Boosting Finance Options for Business”, Department for Business, Innovation and Skills, paragraphs 3-4, page 21

¹⁵ Ibid., paragraph 14, page 34

Project Management Institute¹⁶, to create a unique product, service, or result.

A project for a Flexible Project Investment is not simply a spending request. To be appropriate for this type of investment, a project must have a measurable outcome, which is the result of value having been created, after a pre-defined time period. Generic needs for cash by SMEs will have to be met by existing financing methods, such as bank loans.

Standard bank loans and standard corporate bonds¹⁷ are not designed to match SME project lifecycles. Instead, they provide a single sum for the SME that would have to finance the entire project. During the initial period, when the net cash flows are outflows, the SME has to make repayments using part of the loan or bond. So, part of the loan or bond issue has to be used to pay for itself. The sum raised by the bond issue has to be larger than the sum required by the project simply to cover the initial repayments.

Revolving credit can match project lifecycles by allowing SMEs to draw-down cash when they need it. Likewise, an overdraft is only used when needed. So, these give financing flexibility that would match project cash flows. The price paid for this flexibility is that the interest rates are higher than for a standard bank loan.

The final repayment of principal, i.e. the value of the bond, is appropriate for agriculture and merchants. In such cases the products are brought to market in a brief period. In modern industrial and post-industrial societies, this is no longer appropriate. Deferred interest bonds are more appropriate to projects.

Time to market – the time between an idea being conceived and ending up as a product for sale – can often be delayed by inadequate financing. In the UK, seed-capital and start-up funds account for only 18 per cent of venture capital, compared to 59 per cent in the US market¹⁸, suggesting that venture capital in the UK is failing to adequately finance firms at the earliest stage in their innovation process. A lack of debt finance available at early stages in the lifecycle of a firm or product can have a negative effect on firm growth, and market share, as other competitors can gain first mover advantage¹⁹.

Demand issues

The Taskforce report discusses issues surrounding demand, such as where SMEs lack financial expertise or face informational or behavioural barriers to take up opportunities for credit. Whilst these issues are significant, they fall outside the scope of this paper.

¹⁶ Project Management Institute (2008), “A Guide to the Project Management Body of Knowledge” - Fourth Edition

¹⁷ An organisation that issues standard bonds pays regular interest to those who buy the bonds and, finally, repays the value of the bond, aka the principal

¹⁸ Brinkley, I., Levy, C. and Sameen, H. (2012), Autumn Statement Submission, The Work Foundation: [http://www.theworkfoundation.com/DownloadPublication/Report/325_Autumn%20Statement%202012%20final%20\(2\).pdf](http://www.theworkfoundation.com/DownloadPublication/Report/325_Autumn%20Statement%202012%20final%20(2).pdf), p 15

¹⁹ http://www.kodak.com/global/mul/business/solutions/files/accelerating_product_time.pdf, p4

2. Flexible Project Investments

Overview of Flexible Project Investments

A Flexible Project Investment is a series of bonds. Each of the bonds has a deferred first repayment to match the return profile of those projects whose net cash flows to the project are not positive until a while after the project starts. The first repayment would take place after the project has a positive net cash flow. Each bond's repayments are of the same amount – there is no final repayment of principal. The amount to be raised by any bond can be adjusted before it is issued – to match changes in the project's financing needs.

Each Flexible Project Investment would be managed by an organisation that would be a specialist in investment risk management. This organisation, which underwrites the bonds and monitors the project, would be the Project Investment Manager (PIM). The PIM owns most of the risk and would be largely staffed by investment risk professionals. If the project fails, the PIM would be legally obliged to continue repayments to bondholders. The SME would have no such obligation. For a failed project, the downside for the SME is generally restricted to the loss of potential earnings. If the SME pledged collateral to reduce its interest payments then this collateral could also be lost.

Purpose of Flexible Project Investments

The business philosophy behind Flexible Project Investments is that investment in small and medium-sized enterprises' projects should be win-win-win. Investment should benefit investors, SMEs and society.

This business philosophy is that i) investors should make a good reliable income without having to make gains at others' expense, ii) SMEs should have a reliable source of loans at reasonable rates and iii) employees, retailers, the public and government should benefit from economic growth and a stable financial sector.

For investors, Flexible Project Investments allow them to make gains from their investment without having to make gains at the expense of other investors or of the public. Their investment gains are derived from the project's return.

It is assumed that each individual and organisation that lends or borrows acts in their own interests. No social conscience or social responsibility would be expected of lenders or borrowers. It is the investment method itself that brings wider benefits to society.

Product benefits

The main benefits for investors would be that i) the projects are closely supervised by the PIM and ii) the deferred project bonds' repayments are higher than investments with comparable risk.

The main benefit for SMEs would be that Flexible Project Investments (FPIs) provide loans that match their industry lifecycle of products and services; with loan repayments beginning after the investment has begun to pay off.

Although the SME benefits from the PIM owning the project in event of project failure, this comes at the price of the SME having to cede some control of the project to the PIM.

Product features

The Flexible Project Investment's main features are:

- flexible bond amounts and issue and repayment dates, to match a project's cash flows
- deferred first repayment
- no final principal repayment
- frequent repayments
- continuing risk management
- ownership of the project by an Special Purpose Vehicle

None of the FPI's features on their own are unique. Other financial instruments that have these features are as follows:

Financial instrument	Similar features
Project bond	<ul style="list-style-type: none">• rely on project revenues for repayments• project monitoring and continuing risk management• use Special Purpose Vehicles
Self-supporting bond	<ul style="list-style-type: none">• rely on project revenues for repayments
Deferred interest bond	<ul style="list-style-type: none">• deferred first repayment
Annuity bond	<ul style="list-style-type: none">• no final principal repayment

Financial instrument	Similar features
Bank loan	<ul style="list-style-type: none"> • frequent repayments, i.e. monthly, bi-monthly or quarterly • no final principal repayment
Private equity	<ul style="list-style-type: none"> • project monitoring and continuing risk management • can take sole ownership of a Special Purpose Vehicle

What is unique about FPIs is the way these features are combined to benefit the SME and bondholders.

Deferred first repayment

The date of the first and last repayments and the repayment frequency would be set as part of the FPI bond indenture²⁰.

After the first repayment, subsequent repayments would follow according to the agreed frequency, which could be monthly, bi-monthly or quarterly. A project should be able to deliver repayments at least quarterly.

The SME and the PIM would determine a suitable period after the project's expected break-even point for the first repayment to be made. So, the project would make its repayments from its profits.

No final principal repayment

Unlike most bonds, the final repayment would not include a repayment of the principal. The repayment of principal would be included in the regular repayments – like for an annuity bond or a bank loan.

This matches the cash flows of those projects which, following the break-even point, regularly return a profit of similar order of magnitude. Such projects do not return a large part of their profits in a single large amount, of a sufficient magnitude to repay the principal.

Special Purpose Vehicle

The project would be owned by a Special Purpose Vehicle (SPV). The SPV would be the legal entity that issues the deferred project bonds, manages the project's cash flows, owns assets and profits from the project and would be responsible for the project's liabilities. The SPV would be created and jointly owned by the SME and the Project Investment Manager.

The Project Investment Manager would have ultimate control of expenditures by the SPV. The PIM would approve significant expenditures by the SPV – even if a cash expense had been in the original cash flow estimates.

²⁰ Legal document issued to lenders and describes key terms such as the interest rate, maturity date, convertibility, pledge, promises, representations, covenants, and other terms of the bond offering

The SPV would stay in existence during the pre-agreed lifetime of the project, after which it would normally dissolve. The SPV could only remain in existence beyond the project's pre-agreed lifetime with the continuing agreement of both the SME and the Project Investment Manager.

If the project's cash flows stay within pre-agreed limits, at the end of the project the SME would own the SPV's assets and profits.

If the project's net cash flows go below a pre-agreed limit, the Project Investment Manager would take ownership of the SPV. In this case, the PIM – through the SPV – would control the project's subsequent cash flows, own its assets and profits and be responsible for the project's liabilities.

To make the above work, a self-regulatory industry body, which can mediate between the SME and the PIM, is required. Such an industry body would regulate its membership, and highlight deficiencies in the industry to maintain high standards of risk management. It would also use part of its membership fees to assist, or even take over, any of its members that had financial difficulties. As the industry develops, the regulatory framework may evolve.

Repayment rate setting

The first Deferred Project Bond would be issued at $t=0$, i.e. month 0, and subsequent DPBs would be issued later. In the formula below, a subsequent bond is issued at $t=l$, i.e. month l .

For the DPB, the net present value of the bond repayments equals the amount of the bond.

$$A = NPV = \sum_{i=m}^n \frac{A \times p_{DPB}}{(1 + r_d)^{i-l}}$$

where:

A is the total amount to be raised by the bond;

NPV is the repayments' net present value;

p_{DPB} is the repayment rate for the deferred project bond;

r_d is the discount rate;

the deferred project bond is issued at $t=l$, i.e. month l ;

the first repayment is at $t=m$, i.e. month m , and;

the final repayment for the deferred project bond is at $t=n$, i.e. month n .

Discount rate

The Deferred Project Bond's repayment rate will be calculated using a discount rate. The method of determining the discount rate is designed to make costs and fees explicit. Such cost and fee transparency allows every party involved in FPIs – i.e. the investors, SME, PIM, credit rating and legal services etc. – to see how much each party is due to make. Although there are a few components in the discount rate, their cumulative value should be such that there is a reasonable financial benefit to all parties. This benefit to each party should be commensurate with the service they provide, the effort they expend and the risk they take.

The discount rate is based on the opportunity cost. The opportunity cost would be the market rate of return for investments in SME projects. The opportunity cost could be calculated by an FPI industry body and, for example, could be the upper quartile market rate for investment in SMEs and their projects.

To attract investors, a spread would be added to the opportunity cost. This spread would be set by the SME at a competitive rate that will suitably reward investors.

To pay the PIM for its services, a management fee is then added.

The final addition to the discount rate would be a credit rate that would be based on the project's credit rating. The credit rate could be lowered if the SME pledges collateral.

The proportion of the repayment amount due to the opportunity cost and the spread would go to bondholders. The proportion of the repayment amount due to the management fee and the credit rate would go to the PIM.

The Deferred Project Bond's repayment rate would be directly proportional to the discount rate. So, a higher opportunity cost, spread, management fee or credit rate would increase the repayment rate.

Repayment rate calculation

To summarise the above, the method used to calculate repayment rate paid by the SPV would be:

- (1) calculate the opportunity cost
- (2) add the spread
- (3) add the management fee
- (4) calculate and then add the credit rate
- (5) this gives the discount rate
(discount rate = opportunity cost + spread + management fee + project's credit rate)

- (6) calculate the repayment rate that makes the repayments' net present value equal to the amount of the bond

$$A = NPV = \sum_{i=m}^n \frac{A \times p_{DPB}}{(1 + r_d)^{i-l}} = A \times p_{DPB} \times \sum_{i=m}^n \frac{1}{(1 + r_d)^{i-l}}$$

which is equivalent to:

$$p_{DPB} = \frac{1}{\sum_{i=m}^n \frac{1}{(1 + r_d)^{i-l}}}$$

where the terms are as mentioned previously.

This can also be expressed using a present value function:

$$p_{DPB} = \frac{1}{[PV(r_d, m - l - 1, 1, 0) - PV(r_d, n - l, 1, 0)]}$$

where $PV(r, k, P, FV)$ is the present value of a series of k payments, each of amount P , with a future value of FV , at a discount rate of r .

Up-front fees

Up-front fees would be paid to third parties that provide services before an FPI bond can be issued. These parties would include credit rating agencies, which would rate the bonds, and legal advisors, which would draft legal agreements for the SPV and for payment obligations between the PIM, SPV, SME and bondholders. The payment obligations would primarily be to protect bondholders. The fees would be deducted from the total FPI bond amount. The remainder of the total FPI bond amount would be the loan to the SPV.

A particular benefit of up-front fees is that it prevents an overly-cosy relationship between the SPV and a credit rating agency. This conflict of interest for credit rating agencies, where the credit ratings are paid for by the bond issuers, has been attributed as a cause of the credit crisis²¹.

Rate of return

The project's rate of return has to cover:

- return to bondholders
- return to the SME
- return to the PIM

²¹ Strier, F. (2008), "Rating the raters: Conflicts of interest in the credit rating firms", *Business and Society Review*, Vol. 113, Issue 4, pp. 533-553

- protection to cover losses on some of the PIM's other projects

From the repayments made by the SPV, the bondholders will receive the proportion due to the opportunity cost plus the spread. The PIM will receive the proportion due to the management fee plus the credit rate.

A deferred project bond's rate of return to investors and the PIM cannot be made so high that it greatly reduces the profit to the SME. If there is not a reasonable profit to SMEs, there is no incentive for SMEs to seek these investments.

The management fee pays for the PIM's services, without which Flexible Project Investments could not work. This fee would be a competitive rate based on the costs of providing services, tempered by the level of competition between PIMs.

To protect the PIM, and for the collective benefit of investors and SMEs, the repayments include a credit rate element that is paid to the PIM. If investors and SMEs want protection from losses, they have to accept an element of each project's return would be used to cover losses on some projects. The risk of widespread project failure during economic recession means that such protection is essential to prevent systematic failure.

The credit rate would be less for loans where the SME pledges collateral to back the loan or uses a third-party facility, such as a public or private guarantee on SME lending of the types mentioned by the OECD²².

Pre- and post-issue risk management

The project's risk management would be over two distinct phases:

- pre-issue risk management
- post-issue continuing risk management

Pre-issue risk management would be done before a bond is issued and mainly involves conventional underwriting methods.

Continuing risk management would take place after a bond is issued and until the bond is fully repaid.

Even with the best underwriting and credit assessment, circumstances can change and the SPV could become unable to keep up repayments. Until the project has finished, the FPI would continue to be monitored by the Project Investment Manager to manage its risk.

²² OECD (2009), "The Impact of the Global Crisis on SME and Entrepreneurship Financing and Policy Responses"

Monitoring and follow-up

The Project Investment Manager would monitor the project at least monthly. The cash burn would be compared to expectations. Estimated future cash flows would be re-evaluated and re-estimated if necessary. Risks and issues would be reviewed and any significant changes to SME and project personnel considered. The impact on the project of external factors, such as the competitive environment, interest rates and the general economy would be taken into account.

The reporting for this monitoring should be an integral part of the project reporting, without becoming an unnecessarily time-consuming burden on project managers.

During a project's lifetime, many factors can change from what was expected, and could affect the first bond's repayments and the amounts, issue dates and repayments of subsequent bonds.

These factors include:

- changes within the project and the SME
- the market for the project's products and services
- the wider economy
- rates that affect the discount rate:
 - the opportunity rate
 - the spread over the opportunity rate
 - the management fee
 - the project's credit rating
- actual cash flows
- revised expectations of cash flows

Changes in the above factors could require the project's cash flows to be re-forecasted. Should a project's re-forecasted cash flows be outside the pre-agreed variation then various actions can be taken to put the project on track or, in the worst case, terminate the project to stem further losses.

For a project that is underperforming, the options could be:

- no action would be taken – for underperformance that is expected to be rectified
- the PIM takes temporary control of the project – for a fee – until it is back on track

- the PIM takes full control of the project – and ownership of the project’s assets and liabilities

Potential taxation feature

The Taskforce’s Recommendation 5 includes increasing the UK retail investor appetite for corporate bonds through introducing additional tax incentives for investing in SMEs.

In the report, the proposal was for an Enterprise Savings Account (ESA), which could be structured like an ISA. The Government response rejected this because the ESA could complicate and undermine the ISA scheme²³.

Here, another way to meet the recommendation is proposed. FPIs could be given a beneficial tax treatment – similar to the way that shares in small and medium-sized enterprises have.

For example, many governments have tax credits for venture capital investments or tax reductions on capital gains from venture capital investments²⁴.

With a new tax policy, investing in shares in a Project Investment Manager and buying FPI bonds could bring tax relief for each of those types of investor. Such a new tax policy would indirectly benefit SMEs by encouraging Flexible Projects Investments, which would give them funding suited to their needs.

Suited to SME project financing

A Flexible Project Investment is intended to be better suited to SME project financing than a standard corporate bond, a standard bank loan or revolving credit. Although SMEs do not currently have access to the corporate bond market in the UK, this may change with the new Business Bank²⁵.

Nevertheless, unlike a standard bank loan or a standard corporate bond, no part of the FPI's bond issue would be used to pay for itself.

Each Deferred Project Bond’s first repayment is deferred until after the project has positive net cash flows. However, with a standard bank loan or a standard corporate bond, the SME may have to start repayments before the project has positive net cash flows. If the project does not yet have positive net cash flows, the SME has to use their savings or part of the loan or bond to meet the first repayments.

Whereas project bonds are designed for large infrastructure projects²⁶, Flexible Project

²³ Department for Business, Innovation and Skills (2012), “Boosting Finance Options for Business - Government response to the industry taskforce”, Department for Business, Innovation and Skills

²⁴ OECD (2009), “The Impact of the Global Crisis on SME and Entrepreneurship Financing and Policy Responses”

²⁵ <http://www.bis.gov.uk/news/topstories/2012/Sep/new-business-bank-to-boost-lending>

²⁶ Davis, H. A. and Fabozzi, F. J. (2008), “Project Financing”, Handbook of Finance

Investments are designed for projects in small and medium-sized enterprises.

The amounts to be raised by FPIs are far less than those required for large infrastructure projects. So, the underwriting can be lighter and could be done by a peer-to-peer marketplace like Funding Circle.

The Flexible Project Investment would be tailored to the project being financed:

- financing parameters of each bond would be tailored to each stage of the project
- the project budget would be monitored throughout and financing parameters adjusted as required

Each bond's financing parameters are:

- total amount to be raised by the bond
- repayment interest rate
- repayment amount
- issue date
- first repayment date
- last repayment date
- repayment frequency

Each of the series of bonds, which would make up a Flexible Project Investment, is a deferred first repayment project bond. The first repayment of each bond is deferred until the project is expected to break-even. The phrase "deferred first repayment project bond" is shortened to a Deferred Project Bond (DPB). The bond that is bought by an investor is an FPI bond. This FPI bond could be a DPB, or the FPI bond could be an aggregation of many projects' DPBs.

From now on, the bond amount will refer to the total amount to be raised by each deferred project bond issue, i.e. the aggregated principal amount of that bond. It is not a reference to the face value of an FPI bond to be sold to bondholders.

Example

A series of Deferred Project Bonds can be used to provide the main set of cash inflows required by a project.

For example, if the significant project cash flows are:

- a significant outflow at the start of the project
- moderate outflows over the next few months
- a significant outflow six months later
- moderate outflows over the next few months
- inflows sufficient to make repayments starting in nine months

Then:

- the first bond would be issued for the start of the project
- the second bond would be issued six months later
- the repayments would begin soon after the ninth month

The Deferred Project Bond's repayment rates can be adjusted by the PIM for accurate estimates, underestimates and overestimates of the cash outflows.

For example, the initial bond may have a repayment rate of 7% and a second bond have an expected repayment rate of 6%.

If, when the second bond is issued, it is required to raise close to the originally expected amount of money then the project is within an acceptable budgetary variation and the risk in the project is lower than when the project began. So, the lower repayment rate of 6% reflects the reduced risk in the project.

But, if underestimates of cash outflows required the second bond to raise more money than the expected amount, its repayment rate could be 8% – reflecting the increased risk in the project.

If the second bond is required to raise less than the originally expected amount, this could lead to different effects on the repayment rate. This might lower, leave the same or even increase the repayment rate. If less money is to be raised because cash outflows from operations were overestimated, this could be due to factors that would reduce risk or it could be due to poor planning and estimating – which wouldn't reduce risk to the project. In the latter case, the repayment rate might not be reduced.

How FPIs address debt finance issues

Costly credit ratings

All SME projects would be rated by a credit rating agency as part of the creation of a Flexible Project Investment for the project. Initially, until the market for FPIs matures, the cost of such

ratings would probably be too high for small projects. As credit rating agencies gain experience of FPIs and SME projects, a template is likely to be used, which would reduce the cost of ratings and make them economical for smaller projects.

Information asymmetry

A key requirement of an FPI would be oversight by the PIM, who would therefore know in detail the SME's project. The PIM would then be able to provide potential investors with the project's expected cash flows, and any relevant economic information, without the level of information asymmetries often characterised by SME debt finance.

Illiquidity and issue size

The PIM can aggregate loans for multiple projects, with the same credit rating, into a larger loan. These larger loans can also have a longer maturity than the life of the individual SME projects. Larger loans with longer maturities would be more attractive to institutional investors. The PIM would have to manage the different loan amounts and the different repayments' start and end dates to create a single bond. The FPI bond would be an aggregation of different projects' loans.

Permissive or over-zealous regulation

The need for appropriate regulation can be met by regulation that grows stricter as the market for the financial products grows. Regulation could start as self-regulation. For example, the peer-to-peer (P2P) marketplace is being self-regulated by the P2P Finance Association²⁷, which has the largest peer-to-peer marketplaces as its members. Such self-regulation could be overseen by a regulatory body, such as the Prudential Regulation Authority. As this market grows, the regulatory body could become the regulator.

It will be important for the government to monitor the market, ensuring that it does not inhibit innovation and growth with excessive regulation, whilst also being prepared to give clarity about future regulation to ensure that investors have clarity and confidence in the market.

Funding not matching project's lifecycle

The project would be financed by a series of bonds. Bond issuance would be timed to match the project's projected cash flows. Should the actual cash flows differ from expectations, the subsequent bond amounts and timings can be adjusted.

With an FPI, by deferring the first repayment until the project's net cash flows will have become inflows, no part of the bond issue would be used to pay for itself.

Flexible Project Investment is intended to give the flexibility of revolving credit or an overdraft but, due to the FPI's hands-on risk management, at lower interest rates.

²⁷ www.p2pfinanceassociation.org.uk

Final repayment of principal

FPI bonds would have no final repayment of principal. Instead, principal would be repaid along with the interest.

3. Project Investment Manager

The Project Investment Manager would be the organisation that i) manages the Flexible Project Investment, ii) underwrites the Deferred Project Bonds, iii) jointly owns the Special Purpose Vehicle with the SME and iv) monitors and helps run the project.

The PIM would be an investment risk management specialist and its expertise would enable it to de-risk SME projects and Flexible Project Investments.

The Project Investment Manager is similar to:

- an investment bank because it underwrites the bonds
- an asset manager because it manages a portfolio of investments in projects
- private equity because it provides project management skills and could take over the SPV

The Project Investment Manager would jointly run the project with the SME, through a Special Purpose Vehicle.

The use of a SPV is common for project bonds²⁸. A deferred project bond is like a project bond in that the DPB also is project financing using cash flows from operating assets.

While the project is being monitored, the financing parameters of bonds yet to be issued may be adjusted by the PIM. Changing cash flow needs could bring forward or delay a bond issue or change the total amount to be raised by a bond. Project performance below an agreed benchmark could mean bonds to be issued would have a higher repayment rate that reflects the increased risk in the project.

If the project goes very badly, no more bonds would be issued and a claim may be made against any collateral the SME had pledged. Should the project fail, the PIM would take ownership of the project, its assets and liabilities and continue to make the repayments due to bondholders.

This form of risk management is intended to address what Potter and Thompson²⁹ consider to be among the main challenges for strengthening the financial system for SMEs. The first of these challenges is to provide risk management and risk sharing between SMEs, financial

²⁸ Davis, H. A. and Fabozzi, F. J. (2008), "Project Financing", Handbook of Finance

²⁹ Potter, J. and Thompson, J. (2011), "Government responses to the impact of the global crisis on finance for young and small enterprises". Strategic. Change, Vol. 20, pp. 145–159

institutions and the public sector and improve information flow between SMEs and financial institutions. The PIM is to provide risk management and the PIM and the SPV are to improve risk sharing and information flow.

The PIM should belong to an industry association that would protect bondholders in the event of a PIM running into financial difficulties. The actions the industry association could carry out, should the PIM run into difficulties, would range from providing temporary financing to taking-over the PIM and its assets and liabilities. Public sector oversight of this industry association would help share the risk and would strengthen the protection to bondholders.

Stages of development

FPIs would evolve as they mature. Initially, they would be more suited to larger investors investing in larger SME projects. As the market for FPIs matures, they would become suitable for small private investors in smaller SME projects. After the market for FPIs has matured, FPI bonds could be sold directly to small private investors using peer-to-peer financing.

Seed capital

Investors are unlikely to invest in FPI bonds until the products have a good track record. A PIM would have to have a significant sum up-front to invest in SME projects for a considerable period. Establishing this track record would be made much easier were the government to lend seed capital to newly-formed PIMs.

Aggregation

By aggregating DFBs for multiple projects into a single large FPI bond issue, they can be packaged to be suitable for larger investors. Until FPIs are proven and trusted by investors, it is likely PIMs will create FPI bonds composed of DPBs from multiple projects with the same credit rating. These bonds could be sold to institutional and large private investors. At this stage, FPI bonds would be an aggregation of different projects' DPBs.

Peer-to-peer financing

Once FPIs are proven and are trusted by investors, they could be sold directly to small private investors through a peer-to-peer marketplace. Initially, the P2P marketplace could be used by investors of all sizes to invest in aggregated FPI bonds. As this market matures, individual DPBs for large projects could be bought by large and small private investors. Finally, once this market has fully matured, small private investors could invest directly in DPBs for small SMEs. At this stage, an FPI bond would be a DPB.

Further work

The structure of the Project Investment Manager has been outlined here. Much more work is needed to detail how the PIM would function. In particular, this work would include i) what the payment obligations between the PIM, SPV, SME and bondholders would be and ii) how the PIM would perform underwriting, measure credit risk, forecast and manage projects' cash flows, sell FPI bonds to investors and manage its portfolio of project investments.

This work could include deciding whether the PIM would be best to operate through a peer-to-peer banking structure.

Also, the SPV has simply been mentioned, without going into any detail of its legal, financial and operational relationships with the project.

4. Conclusions

This paper has proposed a new form of finance, a 'Flexible Project Investment', aimed at SMEs. An FPI would be a series of project bonds tailored to each stage of an SME's project, adjustable if circumstances change.

The Industry Taskforce, chaired by Tim Breedon, highlighted a lack of supply of conventional forms of finance as a constraint on SME growth, and put forward the case for the development of new financial products. Flexible Project Investments would be one such new financial product; furthermore, they address the following issues raised in the Taskforce's report:

- Costly credit ratings and information asymmetry
- Illiquidity and issue size
- Permissive or over-zealous regulation

FPIs also address these additional issues with loans and bonds:

- Funding not matching a project's lifecycle
- Final repayment of principal

Further research on Flexible Project Investments may benefit from studying how the Project Investment Manager and the SPV would be organised.

To move forward with Project Investment Managers, the next stage should be for financial institutions to work with government to plan how to form Project Investment Managers and a self-regulation body.

It would greatly assist the Flexible Project Investments' success should government provide seed capital to Project Investment Managers while the PIMs establish a track record of successful investment in, and management of, SME projects.

5. Annex: Example scenario

Here an example scenario will be presented, with sample cash flows, of a Flexible Project Investment for a new product launch.

In this scenario, actual cash flows and expected cash flows and interest rates for the project are detailed. A spreadsheet of the full set of calculations will gladly be provided, on request.

To keep the figures simpler, taxation is not included. Also, to keep the example simple, the interest the SPV would earn from its bank deposits is not included.

Following monitoring, the cash flows are reforecast based on the variation between actual and expected cash flows and between actual and expected discount rates.

If the variations in cash flows and/or discount rates are significant, adjustment might be made to subsequent bonds.

The stages in this scenario are:

- (1) First bond issue, for the day the first Deferred Project Bond is issued, where expected cash flows and interest rates for the project are detailed
- (2) Monitoring, three months after the bond was issued, where the actual cash flows, variations from estimated cash flows and changes to the opportunity rates are reviewed
- (3) Reforecasting , three months after the bond was issued, where the cash flows and opportunity rates are re-estimated
- (4) Adjustments, three months after the bond was issued, where the subsequent Deferred Project Bond is redefined

Monitoring will have taken place at one month and at two months after the first bond was issued. In the scenario, no action was taken at these monitoring points.

month	months from when the first bond was issued at time $t = 0$
cash inflows	project's estimated future cash inflows from sales
cash outflows	project's estimated future cash outflows for expenses
net cash flow from operations	project's net estimated sales inflows minus expenses outflows

In the scenario, the months are from the start of the project. So, month 0 is the month the project starts and month 12 is twelve months after the project began. The cash flows during a month are noted at the beginning of the next month.

For example, if the bond is issued on the 4th January, the values in the row for month 0 are the values on the 4th January. The values in the row for month 1 are the cash flows from 5th January to 4th February, expressed as cash flows on the 4th February. And so on.

The events listed in the first column of the above table are explained below.

event	explanation
1 st bond issue	the date the first bond is issued and when the SPV has the first cash instalment of £460,000 from that bond, made available by the PIM
expansion	the month the project's operations ramp-up to be ready for product launch
2 nd bond issue	the date the second bond is to be issued and when the SPV should have its first cash instalment of £350,000 from that bond, made available by the PIM
product launch	the month the product is expected to be launched and its sales begin
positive cash flow	the month recorded cash inflows are expected to exceed cash outflows
1 st bond repayments	the date the regular repayments begin for the first bond
2 nd bond repayments	the date the regular repayments begin for the second bond
1 st bond paid off	the date of the final repayment for the first bond
2 nd bond paid off	the date of the final repayment for the second bond

Purpose of cash flows in the example

The cash flows to be covered by the first bond – before the second bond is issued – are the cash outflows made by the project in the initial period as it creates its organizational and technical infrastructure and employs its core staff. The first cash outflow from the project, £460,000 at month 0 when the bond is issued, is to set-up this infrastructure. The next cash outflow from the project, £340,000 after one month, is mainly to hire additional staff and train them. The next few months, up to and including month 8, are expected to require a constant expenditure of £100,000.

The cash flows from the second bond in the scenario – after the month 8 cash outflow is paid for by the first bond – are for the cash outflows made by the project in the ramp-up period as it takes on more operational, sales and marketing staff and completes its organizational and technical infrastructure to prepare for the launch of its products and services. The £350,000 outflow at month 9 is a large cash outflow of £250,000 to hire additional staff and train them – on top of the constant expenditure of £100,000 that is expected to have been required since month 2. From month 11, the cash outflows are expected to have become £200,000, and are expected to remain at that level for the remainder of the project.

The product is to be launched at the beginning of month 12 and sales are to be first recorded in month 13. In the first month of sales, the expected inflow from sales is expected to be £40,000. This expected inflow is recorded a month after product launch, at month 13. Over the next few months, sales are expected to increase until they reach a steady £400,000 by month 18.

The project's operations are expected to have a positive cash flow during month 15 and this would be recorded in month 16. Once the project has a sufficient and regular positive net cash flow, no more cash would be required from the bonds. The bonds would have completed their provision of cash for expenses.

There is expected to be a gap between the expected positive cash flow and the time when the project begins paying back the bondholders. This gap is a buffer to provided contingency for the project, in case net cash flows are lower than had been expected. It's expected that the project would begin paying back the bondholders at month 18; over two months after positive cash flow are expected to begin during month 15.

In the table below, the estimated cash flows from the bond issues and the cash flows for bond repayments are detailed. The bond repayments are calculated based on the expected discount rate on the date the bond is issued.

These are the bond repayments made by the SPV. For simplicity, the value of the individual bonds sold to investors is not detailed.

The amount of each bond issued is determined by the net cash flows to the project. The

bond amount should be sufficient to cover the cumulative net cash flows until the next bond is issued or until the project can afford to begin repayments.

Table 2. Cash flows from and to bonds

events	month	opportunity cost rate	net cash flow from operations	cash flow from bonds	cash flow to bonds
1 st bond issue	0	4.00%	(£460,000)	£460,000	
	1	4.00%	(£340,000)	£340,000	
	2	4.00%	(£100,000)	£100,000	
	3	4.00%	(£100,000)	£100,000	
	4	4.00%	(£100,000)	£100,000	
	5	4.00%	(£100,000)	£100,000	
	6	4.00%	(£100,000)	£100,000	
	7	4.00%	(£100,000)	£100,000	
	8	4.25%	(£100,000)	£100,000	
2 nd bond issue	9	4.25%	(£350,000)	£350,000	
	10	4.25%	(£250,000)	£250,000	
	11	4.25%	(£200,000)	£200,000	
product launch	12	4.50%	(£200,000)	£200,000	
	13	4.50%	(£160,000)	£200,000	
	14	4.50%	(£110,000)	£200,000	
	15	4.50%	(£40,000)	£200,000	
positive cash flow	16	4.50%	£60,000	£200,000	
	17	4.50%	£120,000	£200,000	
1 st bond repayments	18	4.25%	£200,000		(£57,026)
	19	4.25%	£200,000		(£57,026)
	20	4.25%	£200,000		(£57,026)
2 nd bond repayments	21	4.25%	£200,000		(£115,629)

1 st bond paid off	48	4.00%	£200,000		(£115,629)
	49	4.00%	£200,000		(£58,602)

2 nd bond paid off	60	4.00%	£200,000		(£58,602)

The cash flow figures from month 21 to month 48 are the same and the figures from month 49 to month 60 are the same. The opportunity cost rate is expected to change from 4.25% to 4.00% between month 21 and month 48. It is then expected to stay at 4.00% until month 60.

The new columns in the above table are explained below.

opportunity cost rate	market rate for bonds and loans for SME projects
cash flow from bonds	cash that will come from the bonds to cover outflows until the project can afford to start making repayments
cash flow to bonds	cash that will be used for bond repayments

Bond parameters

The interest rates and resulting bond repayments calculations are as follows.

First bond parameters

issue month	month 0
first repayment month	month 18
final repayment month	month 48
loan to SPV	£1,500,000
up-front fees	1.80%
total bond amount	£1,527,000
opportunity cost rate	4.00%
spread	25 bps
management fee	75 bps
credit rate	50 bps
annual discount rate	5.50%
monthly discount rate	0.4472%
annual repayment rate	55.27%
monthly repayment rate	3.7345%
repayment	£57,026.38

Second bond parameters

issue month	month 9
first repayment month	month 21
final repayment month	month 60
loan to SPV	£2,000,000
up-front fees	1.60%
total bond amount	£2,032,000
opportunity cost rate	4.25%
spread	25 bps
management fee	75 bps
credit rate	40 bps
annual discount rate	5.65%
monthly discount rate	0.4591%
annual repayment rate	40.66%
monthly repayment rate	2.8840%
repayment	£58,602.26

The monthly repayment rate is calculated using Excel's present value function:

$$p_{DPB} = 1 / [PV(r_d, m - l - 1, 1, 0) - PV(r_d, n - l, 1, 0)]$$

where $PV(r, k, P, FV)$ is the present value of a series of k payments, each of amount P , with a future value of FV , at a discount rate of r .

In this example:

r_d is the monthly discount rate

the bond is issued at $t=l$, i.e. month l

the first repayment is at $t=m$, i.e. month m

the final repayment is at $t=n$, i.e. month n .

The monthly discount rate and the monthly repayment rate are presented rounded to four decimal places. However, they are used in the bond repayment calculations with sufficient

decimal places to give the monthly repayments accurate to 1 pence.

It is expected that when the second bond is issued in nine months, the opportunity cost rate will have risen to 4.25%. The spread and the management fee are expected to be unchanged. The credit rate is expected to reduce to 40 bps because, if the project is on schedule at month 9, it will be considered to have a slightly lower risk.

The bond parameters are explained below.

issue month	month the bond will be issued
first repayment month	month the first repayment is made for a bond
final repayment month	month the last repayment is made for a bond
loan to SPV	amount from the bond issue to be paid to the SPV
up-front fees	fees for external advisors, e.g. credit rating agency and legal advice, with the percentage in a range based on the loan amount
total bond amount	total amount to be raised by the bond issue
opportunity cost rate	market rate for bonds and loans for SME projects
spread	addition to the rate to attract investors
management fee	addition to the rate for the PIM's services
credit rate	addition to the rate, based on project's credit rating
annual discount rate	sum of the opportunity cost rate, spread, management fee and credit rate
monthly discount rate	monthly conversion of the annual discount rate
annual repayment rate	annualized conversion of the monthly repayment rate
monthly repayment rate	monthly rate that makes the repayments' net present value equal to the bond amount
repayment	monthly repayment rate multiplied by the bond amount

Now the net cash flow to the project will be calculated.

Table 4. Cumulative cash outflows to month 8

month	cash outflows	cumulative outflows
0	(£460,000)	(£460,000)
1	(£340,000)	(£800,000)
2	(£100,000)	(£900,000)
3	(£100,000)	(£1,000,000)
4	(£100,000)	(£1,100,000)
5	(£100,000)	(£1,200,000)
6	(£100,000)	(£1,300,000)
7	(£100,000)	(£1,400,000)
8	(£100,000)	(£1,500,000)

The amount lent to the SPV from the first bond, £1,500,000, is designed to cover the cumulative cash outflows at month 8 of £1,500,000.

The second bond is planned to cover cash outflows until a short period after the project has positive cash flow. The cumulative cash outflows from month 9, when the second bond is planned to be issued, and month 17, the month before repayments are to begin, are below.

Table 5. Cumulative cash outflows to month 17

month	cash outflows	cumulative outflows
9	(£350,000)	(£350,000)
10	(£250,000)	(£600,000)
11	(£200,000)	(£800,000)
12	(£200,000)	(£1,000,000)
13	(£200,000)	(£1,200,000)
14	(£200,000)	(£1,400,000)
15	(£200,000)	(£1,600,000)
16	(£200,000)	(£1,800,000)
17	(£200,000)	(£2,000,000)

The amount lent to the SPV from the second bond, £2,000,000, is designed to cover the cumulative cash outflows from month 9 to month 17 of £2,000,000.

The first bond repayments are then planned to begin at month 18, followed later by the second bond's repayments at month 21. The first bond repayments are planned to end at month 48. After the second bond repayments would have completed in month 60, the SPV would close and the net cash flows would be a source of profit for the SME.

Project cash flows' NPV

To calculate the net present value of project cash flows, the present value of each month's net cash flow to the project is discounted at the initial monthly discount rate of 0.4472%. This rate is the monthly equivalent of an annual discount rate of 5.50%. The parameters that determine the bonds' repayment rates are tabulated above in the First bond parameters.

The net present value of the net cash flows to the project is calculated to be £4,562,000.

2. Monitoring

Projects would be monitored at least monthly and the variation of actual cash flows from expected cash flows would be measured. If the variation is that the actual net cash flows are greater than expected, this monitoring could lead to a reduction in the amount of subsequent bonds. If the variation is that the actual net cash flows are less than expected, this monitoring could lead to an increase in the amount of subsequent bonds and/or bringing forward the bond issue dates.

The monitoring after three months has been recorded below.

The actual cash outflows have been greater than expected. The cash outflows on the day the bond was issued, and the three months after that, were to have been: £460,000, £340,000, £100,000 and £100,000. But the actual cash outflows have been: £460,000, £415,000, £110,000 and £115,000. As expected, there have been no cash inflows.

Table 6. Actual versus expected cash flows

events	month	expected		actual	
		cash outflows	net cash flow from operations	cash outflows	net cash flow from operations
1 st bond issue	0	(£460,000)	(£460,000)	(£460,000)	(£460,000)
	1	(£340,000)	(£340,000)	(£415,000)	(£415,000)
	2	(£100,000)	(£100,000)	(£110,000)	(£110,000)
	3	(£100,000)	(£100,000)	(£115,000)	(£115,000)

The actual cash outflows for months 1 to 3 are, respectively, 22%, 10% and 15% more than was originally expected.

The expected opportunity cost rate is as was originally expected.

3. Reforecasting

Based on the actual cash outflows and any changed circumstances that will affect the project, the expected cash outflows are reforecast.

Also, any expected changes to the opportunity cost rates would be made here. In this scenario, there are no changes to the forecast opportunity cost rates.

In the table below, the reforecast cash flows are detailed. There are no changes to the expected cash inflows but the cash outflows have been reforecast. In this scenario, the only significant change is that expenses are now expected to be 20% higher than originally expected.

Table 7. Reforecast cash flows from operations

events	month	cash inflows	cash outflows	net cash flow from operations
1 st bond issue	0		(£460,000)	(£460,000)
	1		(£415,000)	(£415,000)
	2		(£110,000)	(£110,000)
	3		(£115,000)	(£115,000)
	4		(£120,000)	(£120,000)
	5		(£120,000)	(£120,000)
	6		(£120,000)	(£120,000)
	7		(£120,000)	(£120,000)
	8		(£120,000)	(£120,000)
expansion & 2 nd bond issue	9		(£420,000)	(£420,000)
	10		(£300,000)	(£300,000)
	11		(£240,000)	(£240,000)
product launch	12		(£240,000)	(£240,000)
	13	£40,000	(£240,000)	(£200,000)
	14	£90,000	(£240,000)	(£150,000)
	15	£160,000	(£240,000)	(£80,000)
	16	£260,000	(£240,000)	£20,000
positive cash flow	17	£320,000	(£240,000)	£80,000
1 st bond repayments	18	£400,000	(£240,000)	£160,000
	19	£400,000	(£240,000)	£160,000
	20	£400,000	(£240,000)	£160,000
2 nd bond repayments	21	£400,000	(£240,000)	£160,000

1 st bond paid off	48	£400,000	(£240,000)	£160,000
	49	£400,000	(£240,000)	£160,000

2 nd bond paid off	60	£400,000	(£240,000)	£160,000

The figures from month 21 to month 48 are the same and the figures from month 49 to month 60 are the same.

The annualized Internal Rate of Return for the above net cash flow from operations is calculated to be 34%.

The product launch is still scheduled to take place in month 12 and positive cash flow is still expected to be recorded in month 16 but with a lower value than originally expected.

The cumulative cash outflows up to month 8 – the month before the second bond is planned to be issued are below.

Table 8. Cumulative cash outflows to month 8

month	cash outflows	cumulative outflows
0	(£460,000)	(£460,000)
1	(£415,000)	(£875,000)
2	(£110,000)	(£985,000)
3	(£115,000)	(£1,100,000)
4	(£120,000)	(£1,220,000)
5	(£120,000)	(£1,340,000)
6	(£120,000)	(£1,460,000)
7	(£120,000)	(£1,580,000)
8	(£120,000)	(£1,700,000)

The cash invested from the first bond, which was to last for until month 9, is £1,500,000. But now, in the reforecast cash outflows paid from bonds, the sum of initial outflows up to month 8 is £1,700,000. Now, there's a shortfall from the first bond of £200,000. So, the cash from the first bond is now expected to run out before the second bond is issued. If the project cannot provide that sum itself, the subsequent funding could be brought forward.

The planned subsequent funding itself is insufficient. The cumulative cash outflows from month 9, when the second bond is planned to be issued, and month 17, the month before repayments are to begin, are below.

Table 9. Cumulative cash outflows to month 17

month	cash outflows	cumulative outflows
9	(£420,000)	(£420,000)
10	(£300,000)	(£720,000)
11	(£240,000)	(£960,000)
12	(£240,000)	(£1,200,000)
13	(£240,000)	(£1,440,000)
14	(£240,000)	(£1,680,000)
15	(£240,000)	(£1,920,000)
16	(£240,000)	(£2,160,000)
17	(£240,000)	(£2,400,000)

In the reforecast cash outflows paid from bonds, the sum of initial outflows for bond 2 – from month 9 to month 17 inclusive – is £2,400,000. But the amount from the second bond was planned to be £2,000,000. So, there is additional shortfall of £400,000 – on top of the shortfall from the first bond of £200,000.

4. Adjusting

To meet the shortfall of £200,000, which would have been incurred before the second bond was issued after 9 months, and the additional £400,000 shortfall, following that bond's issue, the amount of the second bond can be changed.

The timing of the bond's issue could be changed as well. In the reforecast cash outflows paid from bonds, the cumulative initial outflows at month 6 are £1,460,000. So, there would be £40,000 left of the £1,500,000 from the first bond by month 7.

To cover these shortfalls and to meet the project's remaining cash flow needs, the second bond will be brought forward to month 7. £80,000 of the money raised by the second bond will cover the remainder of the cash outflows for month 7.

The cumulative cash outflows to be covered by both bonds are below.

Table 10. Adjusted cumulative cash outflows

month	outflows covered by first bond		outflows covered by second bond	
	cash outflows	cumulative outflows	cash outflows	cumulative outflows
0	(£460,000)	(£460,000)		
1	(£415,000)	(£875,000)		
2	(£110,000)	(£985,000)		
3	(£115,000)	(£1,100,000)		
4	(£120,000)	(£1,220,000)		
5	(£120,000)	(£1,340,000)		
6	(£120,000)	(£1,460,000)		
7	(£40,000)	(£1,500,000)	(£80,000)	(£80,000)
8			(£120,000)	(£200,000)
9			(£420,000)	(£620,000)
10			(£300,000)	(£920,000)
11			(£240,000)	(£1,160,000)
12			(£240,000)	(£1,400,000)
13			(£240,000)	(£1,640,000)
14			(£240,000)	(£1,880,000)
15			(£240,000)	(£2,120,000)
16			(£240,000)	(£2,360,000)
17			(£240,000)	(£2,600,000)

To cover the reforecast cumulative outflows from month 7 to month 17, the loan to the SPV from the second bond is increased to £2,600,000.

The second bond parameters are shown below. For comparison, the original parameters are shown above the adjusted parameters.

Original second bond parameters

issue month	month 9
first repayment month	month 21
final repayment month	month 60
loan to SPV	£2,000,000
up-front fees	1.60%
total bond amount	£2,032,000
opportunity cost rate	4.25%
spread	25 bps
management fee	75 bps
credit rate	40 bps
annual discount rate	5.65%

monthly discount rate	0.4591%
annual repayment rate	40.66%
monthly repayment rate	2.8840%
repayment	£58,602.26

Adjusted second bond parameters

issue month	month 7
first repayment month	month 21
final repayment month	month 60
loan to SPV	£2,600,000
up-front fees	1.40%
total bond amount	£2,636,400
opportunity cost rate	4.00%
spread	25 bps
management fee	75 bps
credit rate	70 bps
annual discount rate	5.70%
monthly discount rate	0.4630%
annual repayment rate	41.16%
monthly repayment rate	2.9143%
repayment	£76,832.21

Reflecting the increased risk of the project, the credit rate has been increased from 40 bps to 70 bps. The expected opportunity cost rate expected at month 7, of 4.00%, is less than at month 9. The spread is still 25 bps and the management fee is still 75 bps. So, the annual discount rate increases only slightly to 5.70%. The increased bond amount means the adjusted repayment of £76,832.21 is much larger than the originally expected repayment of £58,602.26.

In the table below, the reforecast cash flows from the bond issues and for the revised bond repayments are detailed.

Table 11. Adjusted cash flows to and from bonds

events	month	opportunity cost rate	net cash flow from operations	cash flow from bonds	cash flow to bonds
1 st bond issue	0	4.00%	(£460,000)	£460,000	
	1	4.00%	(£415,000)	£415,000	
	2	4.00%	(£110,000)	£110,000	
	3	4.00%	(£115,000)	£115,000	
	4	4.00%	(£120,000)	£120,000	
	5	4.00%	(£120,000)	£120,000	
	6	4.00%	(£120,000)	£120,000	
	7	4.00%	(£120,000)	£120,000	
2 nd bond issue	8	4.25%	(£120,000)	£120,000	
	9	4.25%	(£420,000)	£420,000	
	10	4.25%	(£300,000)	£300,000	
product launch	11	4.25%	(£240,000)	£240,000	
	12	4.50%	(£240,000)	£240,000	
	13	4.50%	(£200,000)	£240,000	
positive cash flow	14	4.50%	(£150,000)	£240,000	
	15	4.50%	(£80,000)	£240,000	
	16	4.50%	£20,000	£240,000	
1 st bond repayments	17	4.50%	£80,000	£240,000	
	18	4.25%	£160,000		(£57,026)
	19	4.25%	£160,000		(£57,026)
2 nd bond repayments	20	4.25%	£160,000		(£57,026)
	21	4.25%	£160,000		(£133,859)

1 st bond paid off	48	4.00%	£160,000		(£133,859)
	49	4.00%	£160,000		(£76,832)
2 nd bond paid off
	60	4.00%	£160,000		(£76,832)

Now the adjusted net cash flow to the project will be calculated.

Table 12. Adjusted cash flows to the project

month	net cash flow from operations	cash flow from bonds	cash flow to bonds	net cash flow to the project
0	(£460,000)	£460,000		£0
1	(£415,000)	£415,000		£0
2	(£110,000)	£110,000		£0
3	(£115,000)	£115,000		£0
4	(£120,000)	£120,000		£0
5	(£120,000)	£120,000		£0
6	(£120,000)	£120,000		£0
7	(£120,000)	£120,000		£0
8	(£120,000)	£120,000		£0
9	(£420,000)	£420,000		£0
10	(£300,000)	£300,000		£0
11	(£240,000)	£240,000		£0
12	(£240,000)	£240,000		£0
13	(£200,000)	£240,000		£40,000
14	(£150,000)	£240,000		£90,000
15	(£80,000)	£240,000		£160,000
16	£20,000	£240,000		£260,000
17	£80,000	£240,000		£320,000
18	£160,000		(£57,026)	£102,974
19	£160,000		(£57,026)	£102,974
20	£160,000		(£57,026)	£102,974
21	£160,000		(£133,859)	£26,141
...
48	£160,000		(£133,859)	£26,141
49	£160,000		(£76,832)	£83,168
...
60	£160,000		(£76,832)	£83,168

As before, the net present value is discounted at the initial monthly discount rate of 0.4472%, which is the monthly equivalent of an annual discount rate of 5.50%.

The net present value of the net cash flows to the project is calculated to be £2,505,000.

Project profitability

With the change in the expected cash flows and the increased bond amount, the project has become less profitable.

Internal rate of return

The project's operations' internal rate of return, in the adjusted figures, is about 58% of what had originally been in the first bond issue figures.

The annualized internal rate of return in the first bond issue figures is 59% whereas it is down to 34% in the reforecast figures.

In terms of operations, the project is now expected to be less profitable than had originally been expected.

Net cash flows

The project's net cash flows' net present value in the adjusted figures, is about 55% of what had originally been in the first bond issue figures.

The net present value of net cash flows to the project has declined from the original value of £4,562,000 to the adjusted value of £2,505,000.

Taking into account the operational cash flows together with the project's use of bonds, the project is now expected to be less profitable than had originally been expected.

Reduced but continuing pre-tax profits

From month 18, the originally expected net cash flow from operations was expected to be £200,000. The bond repayments from month 21 to month 48 were expected to be £115,629. So, during this period, 58% of the cash flow from operations was to be used for bond repayments.

With the adjusted figures, from month 18, the net cash flow from operations is now expected to be £160,000. The bond repayments from month 21 to month 48 are now expected to be £133,859. Now, during this period, 84% of the cash flow from operations is to be used for bond repayments.

From the above, it can be seen that the project is expected to deliver less profit to the SPV, and hence the SME, than had been originally expected. But the project is still profitable. From month 61, with no bonds to repay, the project's monthly operational net cash flows are expected to be £160,000. For as long as the cash flows stay at the level, this would be a continuing source of pre-tax profit.

6. Glossary

Basel Accords – recommendations on banking regulations issued by the Basel Committee on Banking Supervision, which comprises of representatives from the world's major central banks

Bond – debt financing, where the borrower makes regular repayments (coupons) to the lender at an agreed interest rate (coupon rate), and returns the amount borrowed (the principal) at the end of the loan period

Final repayment of principal – the payment of the original monies borrowed (the principal) at the termination of the agreement

Indenture – legal document issued to lenders and describes key terms such as the interest rate, maturity date, convertibility, pledge, promises, representations, covenants, and other terms of the bond offering

Information asymmetry – where one party in a transaction has more information than another. A business owner, for instance, may have greater information on his firm than a bank

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Brett Douglas is a self-employed project analyst, with 15 years' experience working in technology projects and business change programmes for small, medium and large companies. These projects have been for product development, fund management and e-commerce within the retail, finance and media sectors. Project teams have ranged from small co-located groups to globally distributed and offshore teams. Early projects followed a waterfall methodology and, in the last ten years, a variety of Lean, Kanban and Agile methods have been used.

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