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Predicting future default on the Covid-19 Bounce Back Loan scheme: The £46.5 billion question

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Keywords:	Loan Guarantee Schemes, Covid-19, Loan Default, Small Business, Small Business Policy
Abstract:	The UK has had a commitment to loan guarantee schemes since 1981 when it introduced the Small Firms Loan Guarantee (SFLG) scheme to address access to debt finance issues for smaller firms. Over the last 40 years its' support has been unwavering and in the Covid-19 crisis it once again turned to loan guarantees as a means of supporting smaller firms through the crisis induced slump in trading activities. Of its three core Covid-19 guarantee schemes, the Bounce Back Loan scheme was the most numerous with 1,531,095 loans issued amounting to a total of £46.5bn in lending. The BBL scheme provided a 100% capital guarantee on loans between £2,000 and £50,000, and firms were allowed to borrow up to 25% of their trading income, with a fixed interest rate of 2.5% of which the first years interest was paid by the government to the lending bank. Our findings suggest that the government losses may range between £7bn and £12bn depending on the underlying assumptions. But we estimate Covid-19 guarantee schemes may have protected 118,639 businesses and 1,117,849 jobs. Looking to the future we suggest that a new loan guarantee is justified which is more like the former SFLG than the restrictive EFG as more than 1 million small businesses will be heavily indebted and unable to borrow to invest in future growth opportunities. This would support the 'levelling-up' agenda and help prevent a post-Covid-19 low investment - low growth scenario.

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Predicting future default on the Covid-19 Bounce Back Loan scheme: The £46.5 billion question

Introduction

Loan guarantee schemes have been the favoured public policy response to address credit rationing which has been identified as a persistent problem for smaller and younger firms (Jaffee and Modigliani, 1969; Blinder, 1983). Their specific relevance has been particularly obvious in crises when credit rationing increases in general and more firms are constrained in their ability to access external finance (Cowling, 2010). It is likely that the Covid-19 crisis would have ultimately led to a significant increase in firm bankruptcy and liquidation amongst the UK SME population with an estimate of 120,000 smaller firms in the UK being at particularly at risk of running out of cash within six months of the outbreak of Covid-19 and a further 850,000 in a prolonged economic lockdown (Cowling, Brown, and Rocha, 2020). One of the most important of the special Covid-19 measures was the UK Bounce Back Loan scheme (BBL) which accounts for £46.5bn of the total of £70bn under guarantee across the three Covid-19 loan guarantee schemes and is very specifically focused on the youngest and smallest businesses seeking to borrow up to £50,000. It follows that understanding what the fiscal and economic consequences of one of the key special Covid-19 measures might be is important as the legacy will determine government spending and taxation policy for many years to come. Future loan guarantee default is central to understanding the long-term consequences of this massive expansion in guaranteed lending during Covid-19 and this is the focus of our paper.

In this paper we use a comprehensive data set containing the whole population of UK Enterprise Finance Guarantee loans over the period 2009 to 2020 pre-Covid-19. In total we have 32,747 individual loans under guarantee. We use this data to estimate default patterns for loans that 'match' those issued under the Bounce Back Loan (BBL) scheme in terms of loan size and loan-to-

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sales restrictions in non-crisis and crisis periods using the period of the Global Financial Crisis (GFC) as our crisis parameter. The matching is based on the Covid-19 guarantee data set which contains the full portfolio of 1,048,575 guaranteed loans including 971,302 BBL guaranteed loans. We then roll our default estimates forward to the Covid-19 BBL scheme period and use these parameter estimates to predict the future outcomes of the BBL portfolio. This is particularly important for the UK government as to date 971,302 BBL loans under guarantee have been issued to the small business population with a contingent liability to the Treasury (and ultimately the UK taxpayer) of £46.5bn. For reference, this cash figure is the same amount as the UK government spent on defence in 2016-17 and £12bn more than it spent on housing and the environment. For context, the other two UK Covid-19 guarantee schemes, the Coronavirus Business Interruption Scheme (CBILS) provides an 80% guarantee on loans up to £5m and supported around 77,000 firms, and the large firm counterpart, the Coronavirus Large Business Interruption Scheme (CLBILS) provides loan facilities up to £200m and an 80% guarantee and supported 569 businesses. Other relevant business measures include the 'furlough' job protection scheme which supported workers who were unable to work through a large wage subsidy starting at 80% and recently scaled down to 60%. This scheme was estimated to cost the UK government around £70m and supported 1.9 million workers through Covid-19. Additional support was available through a Value Added Tax (VAT) deferral scheme and £30bn in VAT has been deferred to date.

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The Importance of Loan Guarantees

Loan guarantee (sometimes referred to as partial credit guarantee) schemes are a direct public policy response to perceived credit rationing of good type borrowers (Beck, Klapper, and Mendoza, 2010). They are the primary financial instrument to resolve credit rationing and typically have a clear focus on small firms, although in severe crises such as GFC and Covid-19 schemes have often extended their reach (Corredera-Catalan, di Pietro, and Trujillo-Ponce, 2021). The authors also

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present a clear justification for why guarantee schemes are useful and relevant public policy instruments and their benefits over and above those achieved by direct lending programmes. Their case is argued on the following basis: "(i) Credit guarantee systems resemble market-friendly instruments, as the lending decision mostly stays with the private sector. This may confer elements of legitimacy to these schemes that (given the failures of the past) are no longer shared by directed credit and other intervention mechanisms; (ii) the cost of the credit guarantee scheme is usually low, with potential liabilities incurred only in the case of a large institution failure or a systemic crisis; and (iii) relatively small cash outlays can leverage large numbers of loans and volumes of lending." They concluded that improved access to finance for smaller business that are supported by the existence of a guarantee scheme, and particularly in a severe crises, improves overall economic welfare through an employment maintenance effect and through improving the survival chances of the supported companies themselves.

The key parameters of the loan guarantee scheme are the loan amount (typically a floor and a ceiling), the loan term (maturity), the guarantee coverage (the share of the outstanding debt that is underwritten by the government guarantee), and an interest rate premium over and above that charged by a lending institution. The loan amounts typically reflect equivalence with observed small business lending patterns, but loan maturities allow for access to longer-term finance, as well as short-term crisis related working capital needs. Across the world the typical loan guarantee coverage is between 70% and 80% of the total loan. Below a 70% rate the willingness of private sector lenders to participate diminishes substantially (Cowling, 1995). The government interest rate premium is typically in the range of 1% to 2% and borrowers are particularly sensitive to this rate as it is over and above the bank interest rate. The general principle is that by providing a guarantee the government de-risks the loan for a lending bank that would normally reject loans without collateral at that end of the risk distribution. This effectively straightens up the backward bending loan supply

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curve which is a key feature of the Stiglitz and Weiss (1981) model as rather than make high interest rate offers on risky loans the bank reduces its supply as the expected marginal profit from making these loans is negative. This has been empirically supported by Shen (2002) using a large sample of lending contracts.

The Enterprise Finance Guarantee

The UK Enterprise Finance Guarantee scheme replaced the long-standing Small Firms Loan Guarantee scheme in 2009, in the immediate GFC period which was the deepest (and last) great crisis the country faced since the 1930s. It had a much wider remit in terms of its scale and the breadth of coverage with a significant increase in the maximum loan amount available from £250,000 to £1.2m. This significant change was introduced to support lending to much larger SMEs who were capital constrained during the GFC induced credit crunch. An additional and highly significant change to the EFG scheme compared to the SFLG scheme was that banks were allowed to secure lending against EFG loans for all types of collateral other than an individuals' personal primary domestic residence (typically in the UK ones family home). In return for a government guarantee of 75% on unrecovered outstanding balances, there was an additional interest premium of 2.0% paid to government over-and-above the loan interest rate charged by the lending bank. This general interest rate – collateral trade-off is particularly interesting as borrowers of different types are more likely to choose different (incentive compatible) contract features which, in turn, signal to the lending bank important information about the quality of the borrower in respect of observable risk and private information (Han, Storey, and Fraser, 2009). There was also an expansion in the number of institutions permitted to offer loans under the scheme. In total 60 institutions are eligible including some of the new UK challenger banks, and regional economic development agencies. In addition, there were some key structural changes that may have fundamentally changed the lending behaviours of big banks in particular. While the exposure guarantee for the borrower was the same

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between both schemes (75%), in the EFG the lenders faced a clawback in coverage if the rolling portfolio default rate exceeded a pre-set level (at times for some lenders, it was 9%, for other lenders it was 20%). It follows that this key change might have incentivised lenders to target EFG lending at a narrower and 'safer' gap in the loan market as borrowers had to meet all the normal lending criteria and were probably close to being offered a commercial loan.

The Bounce Back Loan

Introduced in May 2020, the BBL scheme was the smallest of the UK governments guaranteed lending schemes in terms of its maximum loan ceiling which was £50,000. It was explicitly designed to support lending to the cash constrained small businesses at the lower end of the size spectrum. The scheme was formally closed for new loans and top-up funds on March 31st 2021. Formally, the BBL scheme was aimed at providing financial support to businesses that had suffered revenue losses and were experiencing cash-flow problems as a direct result of the Covid-19 outbreak. It also recognised that the needs of the smallest businesses were more pressing and immediate (in a literal sense) than those of larger sized businesses and the administrative process was streamlined and much quicker from application to approval than other Covid-19 special schemes. This aspect was supported by a relaxation of the need to comply with the terms and conditions of the Consumer Credit Act. Importantly, there is no portfolio cap associated with BBL lending as the need to get as many loans to struggling businesses was paramount.

There are potential consequences of this streamlined process which took any decision-making role away from banks who became a simple conduit to channel urgently needed loan funds to Covid-19 hit firms. Firstly, even when loan decisions and contract terms are set by bank loan officers, research has shown that when loan officers are time constrained (and in this case swamped with 1 million BBL

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loan requests), loan quality worsens (Cambell, Loumioti, and Wittenberg-Moerman, 2019). Secondly, by pre-determining the loan contract parameters, the government took any heterogeneity away from specialist and informed loan officers (Bushman, Gao, Martin, and Pacelli, 2021). Thirdly, in crisis periods Yang (2021) established that the average quality of information brought to bear in the loan decision is lower and this leads to an increase in fraudulent borrowing. Finally, given the huge volume of BBL lending and the uncertainty around when the Covid-19 crisis will abate, as well as what shape any post-Covid-19 economic recovery might take, it is highly likely that there will be significant asymmetries between non-performing loans and (government) loan loss provision (Basu, Vitanza, and Wang, 2020). Table 1 below outlines some key parameters of the 'matched' EFG and BBL schemes.

[INSERT TABLE 1 ABOUT HERE]

From Table 1 we note that the interest rate of 2.5% set for BBL scheme lending is 1/3rd of that set for comparable EFG loans. This is important as the cost of servicing BBL loans is considerably less onerous for small firms. However, the withdrawal of the government premium interest rate of 2.0% on EFG means that the total interest rate (bank rate plus government premium) is dramatically lower at 2.5% compared to a total lending interest rate of 9.44% on average. Again this is designed to reduce the burden of repayment on smaller firms as they emerge from the Covid-19 crisis. It does, however, have consequences for banks and government. However, the lower interest rate is also consistent with the risk reducing effect of the 100% guarantee on unrecoverable outstanding loan balances in default and with the findings for the UK SFLG identified by Ughetto, Scellato, and Cowling (2017. Page 319) who stated that, "the higher the incidence of the publicly guaranteed debt over the total amount of outstanding loans, the lower, on average, the [interest rate margin] spread."

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Both banks and government lose a significant share of their loan income stream which is used to offset default costs. For banks they also lose their fee income which Cowling (2021a) estimated to be between £1,000 and £6,000 for each £100,000 lent under the EFG scheme. The other key parameter change was the reduction in the maximum loan term from 10 years under EFG to 6 years under BBL, although later adjustments allowed borrowers to extend their loan term back up to 10 years. There are also a number of key BBL scheme features that add flexibility to repayment terms but also restrict firms to a one-hit approach, aside from the BBL top-up allowance. Taken as a whole, this scheme, although on the surface it looks like a standard UK loan guarantee scheme, is a hugely generous and flexible financial policy instrument with a clear rationale and focus on supporting the most at risk smaller businesses to manage their way through the Covid-19 crisis.

The EFG Data

We have the complete population of EFG guaranteed loans from its inception in 2009 right up until the Covid-19 outbreak in early 2020. In total this records the loan details for 32,747 individual loan contracts. The management information system at the British Business Bank records data relating to 27 individual aspects of the guaranteed lending facility that can be broadly grouped into 2 categories:

- Business characteristics at loan origination – age, sales turnover, industry sector, geographic region
- Loan characteristics – bank interest rate, government interest premium, loan amount, loan term, fixed or variable rate loan, type of security, loan purpose, lending institution, type of loan facility, draw date, date lender considers loan is in default claim, date lender makes a

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guarantee claim to government, date government settles guarantee claim by bank, total outstanding balance

From this data we construct a BBL dummy variable coded 1 if the EFG loan amount was between £2,000 and £50,000 & the loan to sales ratio was between 0.01 and 0.25% and zero otherwise. We were not able to augment this BBL dummy with an interest rate restriction as less than 5% of the total EFG portfolio loans attracted interest rates at or below the current BBL interest rate. This *BBL dummy* variable is one of the two key parameters that will inform our subsequent future default prediction on the actual BBL scheme. The second key parameter is a *GFC dummy* variable which is coded 1 in the GFC year of 2009 and zero for years from 2010-2020. This is our empirical proxy for a crisis at the point of loan origination. In total 29.41% of our total EFG loan portfolio were classified as a BBL match and 18.83% as a crisis match. We did not have access to individual level credit reference agency data and we recognise this as a potential limitation.

[INSERT TABLE 2 ABOUT HERE]

Using these two dummy variables Table 2 shows the raw default rates on BBL match EFG loans. The total default rate on these comparable loans is 26.14%. But the default rate for loans that originated in the GFC crisis is 37.26% compared to only 23.41% for loans that originated after the GFC crisis and up until the onset of Covid-19. However, whilst these findings suggest that the realised liability for the UK government will be severe given the cumulative loan portfolio of £46.5bn, estimated loss given default (LGD) for the UK SFLG over the period 2000-2005 was calculated as only 14.54% according to Calabrese and Cowling (2021). This reflects the difference in the loan contracts between defaulters and repaying firms, and in particular differences in loan amounts and the term structure of lending and default. For the EFG portfolio as a whole over the period 2009-2020,

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Cowling (2021b) estimated that the net government loss (after premium income and recoveries) was only 4.17% on the entire total cash amount in the loan portfolio. Formal evaluations of the EFG (Allinson, Robson, and Stone, 2013) show that once the benefits attributed to the UK economy from supported firms have been taken into account the EFG made a modest, but positive net economic contribution. Similar conclusions were drawn for its precursor the SFLG (Cowling, 2010; Cowling and Siepel, 2013).

Default Modelling

In this section we estimate the probability of default based on observable firm and loan characteristics at the point of loan origin. In this first set of default models we use a simple binary classification which is coded 1 if a loan was classified by a lender as being in default and zero otherwise. The base model is a probit model to reflect the binary outcome for the dependent variable which is loan default.

Table 3 reports the base default model and is well specified using conventional significance measures. On firm base demographics, we find that firm size (measured as log of sales at loan origination) is not significant which implies that default is not dependent upon firm size. Age of firm does have an effect and the age and age squared terms show that default probability is diminishing in firm age at an increasing rate. In short, younger firms are more likely to default which is consistent

[INSERT TABLE 3 ABOUT HERE]

with the majority of empirical work on small firm's survival and loan default (for general firm age and survival profiles see Saridakis, Mole, and Storey, 2008; Holmes, Hunt, and Stone, 2010; for loan default profiles see Glennon and Nigro, 2005; Cowling and Michell, 2003). Industry sector was found

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to be important with higher default rates in construction and accommodation and food services and low default rates in human health and social work. The relative differences in default probability in these three industries was large.

In relation to loan contract and scheme parameters, we find that the longer the term structure of the loan the higher the probability of default. This suggests that the option of extending BBL loans upwards from the 6 year maximum to a ceiling of 10 years would potentially lead to an increase in default rates across the portfolio of loans. The lending bank interest rate (the cost of borrowing) is positively associated with default. The fact that BBL loans have a fixed rate of 2.5% suggests that default will be lower than would be the case where the lending bank sets the rate as per conventional loans. Higher loan rates increase the serviceability requirements on firms via an increase in per period payments and entail generating more free cash. There is also the issue of moral hazard and the potential for firms borrowing at high interest rates switching from safe to risky projects. We note that EFG interest rates, on average, were more than double the comparable bank interest rate on the SFLG (predecessor) scheme (Ughetto, Scellato, and Cowling, 2017).

We also find that loans made under a fixed or variable rate of interest were no more (less) likely to default. This is interesting as the nature of the banks interest rate offer has been identified as a key loan contract parameter in the context of risk and credit rationing (see Thakor, 2005; Melnik and Plaut, 1982; Berger and Udell, 1992; Cowling, 2010; Cowling, Matthews, and Liu, 2017) and gives the lender an opportunity to insure favoured customers against adverse economic conditions. We also find that loan size is negatively associated with default probability which suggests that the BBL scheme may have higher default than its larger sister the Coronavirus Business Interruption Loan (CBILS) scheme. Within the parameters of the BBL scheme the weighted average loan size for BBL match loans is £31,579.32 which is above the mid-point of the BBL scheme loan size range. This

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suggests that default may not be as high as anticipated if there were a large concentration of very small loans in the BBL portfolio.

The EFG scheme was different from its predecessor in that it allowed (non-family home) collateral. Using no security was attached to an EFG loan as our reference category (maximum government and bank exposure in default), we find that the inclusion of commercial property and firms who provided a combination of various types of security had a significantly lower probability of default. Both may reflect a borrowers' commitment to repayment in the sense that the former has placed their business premises at stake and the latter has made the effort to build a bundle of security and guarantees to offer against their loan. Perhaps surprisingly, borrowers who offered more personal assets and guarantees were no less likely to default than borrowers who offered no security at all.

On the precise nature of the EFG loan we find that borrowers using their loans to refinance existing debts and debt consolidation had the highest default probabilities and those who borrowed to establish a revolving credit guarantee facility has the lowest default probability. In addition, new term loans under partial guarantees had higher predicted default than similar facilities without a guarantee. These initial findings suggest that firms who were seeking to refinance or consolidate their existing debts were high risk and were using EFG as a last resort. This latter aspect was a requirement for the original SFLG scheme. However, we also find that the precise purpose for which the loan provided funding for had no apparent effect on default. This is important in the context of the BBL scheme which largely focused on the Covid-19 induced demand and revenue effects which constrained a firms cash-flows and not on the specific use of the funds for growth enhancing activities.

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There was a geographic aspect to EFG default and it was mainly concentrated amongst poorer and peripheral areas of the UK such as the North East, Wales, North West, and Scotland. The one notable exception to this was that loans originating in London (the capital city) in the wealthiest region of the UK also had higher default rates. In general, outside of London, our results suggest that demand-side issues may be affecting firms' ability to generate enough surplus cash to repay the capital and interest on new borrowing. In London, this is unlikely to be the case and it may be the high levels of competition that are driving down prices and profit. This latter effect was also identified in respect of default on the SFLG by Cowling, Ughetto, and Lee (2018) who found that default rates were higher in economically buoyant regions. In respect of what the potential implications are for firms in peripheral regions there is the obvious and direct consequence of default and failure to regional economies. For those that survive, many will have a significant debt burden for the next six or seven years and this may reduce their ability to finance future growth opportunities and invest in productivity enhancing capacity. As noted in Brown and Cowling (2021) study of the potential spatial Covid-19 impact on the 100 largest UK cities and towns, firms in peripheral regions entered the crisis in a more precarious position and it may be the case that many exit the crisis in a position of relative inequality. Whilst the fate of firms in London should not be ignored, the dynamism and relative resource munificence of the environment may mean that these effects are less serious for the region.

The final results from our baseline default model are critical to developing our understanding of potential default under the BBL scheme and for estimating future default, loss given default (LGD), and overall scheme costs to government. Using not-BBL compliant and not-in-GFC crisis as our reference category of loans, we find that BBL match EFG loans *per se* had comparable default rates to our reference loan group. We also found that all larger (i.e non-BBL compliant) loans that originated in the GFC period had a substantially higher default rate. This suggests that new

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borrowing during a significant crisis is much riskier than new borrowing in periods of economic stability and growth. Finally, our class of BBL compliant loans made within the GFC crisis were no more likely to default than larger loans made during a non-crisis period. This implies that the default rate for the larger loan sister scheme (CBILS) of BBL may actually suffer from higher default rates in the future.

From Default to Government Losses

We use our baseline default model to predict the probability of default for each loan in the data. Table 4 reports our model predicted default rates for BBL compliant (EFG matched) loans and BBL compliant loans issued during GFC. We include an additional default estimate which in chronological time is the last and final settlement figure after a defaulter has been pursued by the lending bank for recoverable assets which are then reported in the adjusted outstanding loan figures. This will provide us with a default floor, or best case scenario. The GFC crisis BBL compliant loans portfolio generates the ceiling for our subsequent LGD and government net cost estimates.

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[INSERT TABLE 4 ABOUT HERE]

From Table 4 we observe that default rates are substantially higher for guaranteed loans originating in a crisis period at 37.20% which compares to an overall default rate of 23.49%. However, it is also the case that after additional asset recoveries after the loan is first deemed in default by the lending bank the rate and scale of recovery is such that final default is only 18.63% and 29.63 in the crisis period. This implies that the government should encourage banks to actively seek to recover BBL outstanding debts if minimising short-term scheme losses is the primary goal. However, for obvious

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reasons caution might be exercised as firms slowly emerge from the Covid-19 crisis and seek to rebuild their businesses. To some degree the government has taken this into account through the 'pay-as-you-grow' option on the BBL scheme which was announced by the UK Chancellor on February 6th 2021. Under this suite of options businesses with a BBL scheme loan could:

- request an extension of their loan term to 10 years from six years, at the same fixed interest rate of 2.5%
- reduce their monthly repayments for six months by paying interest only – this option is available up to three times during the term of their Bounce Back Loan
- take a repayment holiday for up to six months – this option is available once during the term of their Bounce Back Loan

Borrowers can use these options individually or in combination with each other. However, they remain responsible for repaying their Bounce Back Loan and are fully liable for the debt. Borrowers taking up one of these options will pay more interest overall and the length of the loan will increase if they take a repayment holiday option. Our evidence suggests that extending the loan term will increase default, as will any increase in the interest rate paid. However, this must be balanced against increasing the ability of businesses to meet the loan (capital and interest) servicing requirements.

Estimating the Costs of Default across the Loan Portfolio

In this section we estimate the costs of defaulting loans to the UK government given our three default scenarios outlined in Table 4. The key components are the loan amount, default rate, timing of default, the outstanding balance and the interest rate as the government pays the first 12 months interest on BBL loans. Our starting point is the total number of loans issued under the BBL scheme

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which is 1,531,095 at an interest rate of 2.5%. Table 5 below reports the baseline figures that enter the loan repayment calculation.

[INSERT TABLE 5 ABOUT HERE]

We observe that repaid loans are slightly larger on average than defaulting loans and generally have shorter term profiles. There is a degree of consistency in the average months to default for loans that are not fully repaid and a typical default occurs between 2 years and 2 years and 4 months after origination (approximately one third of the way through its full-term). The outstanding balance reflects this default timing and ranges typically falls between £19,000 and £21,000 per defaulting loan on average. In the worst case scenario around 570,000 loans end in default of the 1.5m loans issued under guarantee on the BBL scheme, and in the best case scenario 287,000 loans. The final settlement balances show that the initial lender default case is significantly worse than the final outcome as between 4.73% and 7.57% of loans originally classified as in default have additional asset recovery.

Government Net Costs and Loan Profiles

We have established the predicted default rates under various assumptions and now separate our hypothetical BBL loan portfolio into 'good' and 'bad' loans defined as loans under guarantee that are fully repaid and those that end in default with an outstanding balance. The next step is to use these parameters to calculate the loan repayment schedule including capital and interest rate repayments, including those paid by the government for the first 12 months of a newly issued BBL loan. We calculate these 'good' and 'bad' loan repayment schedules using a standard loan model repayment schedule for a fixed interest rate loan.

We have four parameters thus;

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- A = Payment amount per period (months)
- P = Principal (loan amount)
- r = interest rate per period (months)
- n = total payment periods (months)

The formula to calculate the monthly payment is;

$$A = P\ [r(1+r)n] / [(1+r)n-1]$$

Where r is expressed as annual interest rate divided by 12 months in this instance.

[INSERT TABLE 6 ABOUT HERE]

From Table 6 we observe that there is a range of estimates of potential losses on the BBL scheme for the UK government across its portfolio of 1,048,575 guaranteed loans totalling some £46.5bn. The largest predicted losses arise from loans that originated in a crisis period with estimated cash losses to Treasury of between £10.3bn and £12.0bn. This scale of predicted losses equates to between 21.3% and 26.2% of total borrowing under guarantee. For comparative purposes losses on the original SFLG scheme over six years of reasonable economic growth from 2000-2006 were calculated to be 14.5%, although this was at a guarantee rate of 75% and a government interest rate premium of 2%. More recent estimates, under the EFG scheme from 2009 to the Covid-19 crisis in the UK, again with a 75% guarantee and a government interest rate premium of 2%, were calculated to be 4.2%. The lowest losses were estimated to be between £7.3bn and £7.5bn equating to loss rates of 15.1% and 15.6%.

This loan origination in crisis effect is large and important and even though at the time the GFC induced the biggest economic downturn since the 1930s in the UK at that time, it is evident that the Covid-19 crisis has led to an even larger deterioration in economic activity. In this respect, our crisis estimates may under-represent the potential scale of losses. However, the generosity and duration

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of the worker furlough scheme may allow businesses to re-establish their trading activities more quickly and at scale where historically workers were laid off into unemployment and had to be re-hired when business activity picked up.

One potentially distortionary factor that could significantly alter outcomes and losses is the 'pay as you grow' option on BBL guaranteed loans. This gives borrowers the option to extend the loan term and also defer capital and/or interest payments. The implied change in default rates for a 17% increase in loan term (equivalent to extending a 6 year loan term to 7 years) is 5.5%, which would imply an increase in underlying default from 23.49% to 24.78% under scenario 1. In respect of deferments, there are clear short and medium-term implications. In the short-term deferment increases the probability that a businesses will not end in default *per se* through their inability to service the relevant loan payments. However, deferment also has a negative side as it stacks up interest and capital repayments into a short time frame thus increasing the cash requirement that businesses must generate to service their loans. The key question that can't be addressed at this moment in time is whether firms in the post-Covid-19 period can grow and generate cash at a rate that can service their outstanding debt.

Conclusion

We have used recent data from the pre-Covid-19 UK loan guarantee scheme to identify a group of loans and businesses that 'match' the parameters of the UK Covid-19 Bounce Back Loan scheme. Using know default and predictions from an econometric model of loan outcomes and outstanding balances at default, we then set up a portfolio of 'good' (repaid) and 'bad' (defaulting) loans with their average characteristics. These loan portfolios were then input into standard fixed rate loan repayment schedules and aggregated up to the whole Bounce Back Loan guaranteed loan portfolio to calculate predicted loss given default and the governments guarantee claims plus the government share of the interest repayment to lenders.

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Under different assumptions and scenarios, we estimate that the predicted net losses on the Bounce Back Loan scheme to be between £7bn and £12bn which equates to 15.1% to 26.2% of the total loans under guarantee which is £46.5bn. For the most part this relates to the 100% default guarantee and to a smaller degree the lack of government interest rate premium and the fact that the government paid the first 12 months interest on loans. What is clear is that the net loss arising from default is always much lower than the actual share of default in the total volume of loans issued under guarantee. This occurs as on average default occurs more than two years after the loan origination and some assets are recovered at a later date.

What we cannot really incorporate into our modelling at this point in time is the number of businesses with guaranteed loans that will choose one of the 'pay as you grow' options. This could significantly alter repayment and losses. Equally, predicting the rate of post-Covid-19 economic recovery is more problematic than is the case after a 'normal' crisis and this will impact directly on firms' cash balances and ability to repay. It is the case, however, that guaranteed loan that originate in crises on average have higher default and net losses. In addition, there may be some recoveries on defaulting loans after the fact depending on the ability and willingness of the lending banks and government to pursue defaulters. We have allowed for this to some extent in the modelling by using scenarios where the final (post-recovery) settlement outstanding balances have been used in our calculations but for the Covid-19 BBL sample the potential for recovery is a relative unknown.

In respect of our predicted starting point, with a potential loss of £7bn - £12bn, what can we say about potential benefits? Here we draw upon recent evidence from Cowling, Brown, and Rocha

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(2020) and Brown and Cowling (2021). They estimated that 8.6% of UK businesses were at immediate risk during the Covid-19 crisis as they had no cash savings at all. This represents some 118,639 firms who provide employment for 1,117,849 workers, which represents around 5.9% of the UK labour force. If we assume these types of businesses had a very high probability of requesting a Covid-19 guaranteed loan then we can infer that the schemes may have cost between £59,000 and £101,000 for each saved firm and between £6,300 and £10,735 per saved job. In business facing public policy evaluations this would be regarded as a very cost-effective job creation intervention. For example between 2016 and 2020 the average costs of the very modest 1.2 gross jobs created per firm on the Start-Up Loan Scheme averaged £18,900 per gross job. Whilst not all these BBL supported jobs were in micro and small businesses, the fact that (a) they are the numerically dominant size classes, and (b) they were the most likely to enter the Covid-19 crisis with no savings suggests that this is the most relevant point of focus for potential benefits of Covid-19 guarantee schemes such as BBL. However, this is likely to under-estimate the benefits as both studies identified a further 843,909 firms at medium-term risk as there were not boosting their cash balances heading into the crisis. Given the duration of the crisis to date it is likely that the BBL and other Covid-19 schemes have saved a lot more firms and employment. Overall, we conclude that the BBL scheme was an appropriate policy response to the Covid-19 crises and was justifiably targeted at the smallest and youngest firms who were at the highest risk of running out of cash during the exceptional economic lockdown and reduced trading conditions. Whilst the costs are significant, it is likely that the benefits outweigh the financial burden of default.

It is evident given the huge take-up of BBL loans is that it has been a massive public policy experiment attempting to tackle a very unique crisis. Arguably, it had a two very specific and related targets – to save hundreds of thousands of firms from failing due to lack of income and liquidity pressures – and to save potentially millions of jobs in those firms. In the post-Covid-19 era, we estimate that some will default on their loans and fail and ultimately those jobs will be lost at a cost

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to the UK treasury. But even more will survive intact but they will be burdened with significant debts and repaying those debts will require a substantial financial commitment for the next six or seven years. This may mean that their future income streams will be diverted into debt repayments instead of new investment in growth. And this also has a regional angle to it with peripheral region economies potentially being at a relative disadvantage through higher default rates and job losses and this may constrain their capacity take advantage of new opportunities going forward.

So would a return to an EFG type loan guarantee scheme be appropriate and relevant to smaller firms in the post-Covid-19 era? On this our response is an unequivocal no. Why? Because the parameters and lending processes were too restrictive and the frequent changes to the lending cap were confusing for banks as they had to adjust their guaranteed loan portfolios accordingly. This also impacted on firms through the bank lending channel as *in extremis* a borrower who could have accessed a guaranteed one day could be excluded the next. Our view is that the relative purity of a genuine loan guarantee such as the former SFLG, rather than a partial-partial guarantee scheme like EFG, is more appropriate for the post-Covid-19 era when firms have significant accumulated debts, asset prices are low, but growth opportunities exist. This broadening of the scope of a new era loan guarantee scheme would allow a significant uplift in guaranteed lending activity which, we argue, will be needed in the near future to avoid a low-investment and low-growth economic scenario. An expanded and broader scheme would also be supportive of a 'levelling-up' agenda.

One final point relates to the BBL effectively being a 'free-hit' for banks and borrowers with the 100% guarantee in the sense that the bank might have an incentive to foreclose on a loan it thinks might be in danger and call In the government guarantee to shore up its balance sheet. Equally, an entrepreneur can walk away in default with no come-back. Our evidence suggests that this does not seem to be a significant feature of BBL lending. For banks, foreclosing on loans and potentially putting a firm into bankruptcy or liquidation is not conducive to long-term profit maximisation which is built through a multi-period relationship which effectively locks a business customer into a current

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account and repeated lending relationship where it can also sell other banking services. For the entrepreneur, it is well established that any incidence of credit delinquency can have serious and negative consequences for future borrowing on a business and personal level. In this respect we suggest that in the Covid-19 crisis most firms and banks have behaved in a supportive and honest way.

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Table 1: Comparing EFG (BBL match) and BBL Scheme parameters

Parameter	**EFG (BBL) Match**	**BBL**
Bank interest rate	7.44%	2.50%
Government interest premium	2.0%	0%
Minimum Loan £	2,000	2,000
Maximum Loan £	50,000	50,000
Maximum Loan Term	10 years	6 years (with potential to extend to maximum of 10 years)
Government Guarantee	75%	100% (on outstanding capital in default minus recovered balance)
Key Restrictions	Commercial bank conducts 'normal' due diligence on loan requests	Loans can be up to a maximum of 25% of total sales income
Key Scheme Rule	Firm pays all interest accruing over full term of loan. Firm pays bank fees for loan arrangement.	Government pays first 12 months of interest to commercial bank on behalf of the firm. Lenders are not permitted to charge fees. No capital or interest payments by firm for first 12 months.

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		Early repayment is permitted with no fees attached. Businesses are allowed 1 BBL loan. A business cannot apply for a BBL loan if it has another Covid-19 guaranteed loan facility.

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Table 2: Raw EFG default rates for BBL match loans

Loan Class	**Default rate %**
BBL Match	0.2614
BBL Match – In GFC crisis	0.3726
BBL Match – Out GFC crisis	0.2341

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Table 3: Default Modelling

	Default Probit (1)			
Firm Characteristics	**Coefficient**	**Std Error**	**Z-stat**	**Pr>Z**
lnSales	-0.0030	0.0026	-1.17	0.24
Age_Year_at_Loan	**-0.0071**	0.0008	-8.80	0.00
Age_Year_at_Loan2	**-0.000007**	0.0000	-3.83	0.00
Scheme Parameters				
lnLoanTerm	**0.3198**	0.0189	16.95	0.00
lnEFG_Interest	**0.5835**	0.0309	18.88	0.00
ln_Loan_Amount	**-0.0732**	0.0138	-5.31	0.00
Fixed_Rate	-0.0027	0.0246	-0.11	0.91
Security Type (Ref=None)				
Commercial property	**-0.1608**	0.0511	-3.15	0.00
Debenture or floating charge	0.0203	0.0395	0.51	0.61
Personal guarantee	0.0349	0.0586	0.60	0.55
Personal vehicle, boat, other asset	0.0005	0.0498	0.01	0.99
Other security	**0.0985**	0.0466	2.12	0.03
Combination of security	**-0.1541**	0.0548	-2.81	0.01
Loan Issue Time				
Day	-0.0003	0.0009	-0.37	0.71
Month	**-0.0096**	0.0026	-3.71	0.00
Year	**-0.0710**	0.0048	-14.88	0.00
Loan Purpose (Ref=Asset Finance)				
Capital investment	-0.0001	0.3053	0.00	1.00
Growth	-0.0105	0.3041	-0.03	0.97
Other	0.0074	0.3206	0.02	0.98
Start-up capital	0.1724	0.3051	0.57	0.57
Working capital	0.1845	0.3043	0.61	0.54
Lending Facility (Ref=New Term Facility with No Security)				
New Term Facility with Partial Security	**0.0573**	0.0309	1.86	0.06
New Term Facility for Overdraft Refinancing	**0.2299**	0.0453	5.07	0.00
New Term Facility for Debt Consolidation or Refinancing	**0.2836**	0.0726	3.91	0.00
Revolving Credit Guarantee	**-0.1984**	0.0882	-2.25	0.03
Invoice Finance Guarantee Facility	0.1604	0.1092	1.47	0.14
Industry Sector (Ref=A: agriculture, forestry, fishing)				
B: mining and quarrying	-0.2067	0.3481	-0.59	0.55
C: manufacturing	0.1056	0.1099	0.96	0.34
D: electricity, gas, steam, and air conditioning supply	0.0385	0.3002	0.13	0.90
E: water supply, sewerage, waste management	0.0877	0.1435	0.61	0.54
F: construction	**0.3693**	0.1117	3.30	0.00
G: wholsesale and retail trade, repair of motor vehicles	0.0848	0.1088	0.78	0.44
H: transportation and storage	0.1353	0.1178	1.15	0.25
I: accommodation and food service activities	**0.1854**	0.1100	1.68	0.09
J: information and communication	-0.0621	0.1145	-0.54	0.59
K: financial and insurance activities	-0.0908	0.1567	-0.58	0.56

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L: real estate activities	-0.1053	0.1250	-0.84	0.40
M: professional, scientific and technical activities	-0.1161	0.1115	-1.04	0.30
N: administrative and support service activities	0.0298	0.1123	0.27	0.79
P: public administration and defence	0.1046	0.1232	0.85	0.40
Q: human health and social work activities	**-0.3076**	0.1156	-2.66	0.01
R: arts, entertainment and recreation	0.0049	0.1182	0.04	0.97
S: other services	0.0282	0.1176	0.24	0.81
Region (Ref=East Midlands)				
East England	0.0267	0.0421	0.64	0.53
London	**0.0834**	0.0388	2.15	0.03
North East	**0.1992**	0.0523	3.81	0.00
North West	**0.1162**	0.0391	2.97	0.00
Northern Ireland	0.0974	0.1010	0.96	0.34
Scotland	**0.1139**	0.0475	2.40	0.02
South East	-0.0154	0.0389	-0.40	0.69
South West	0.0105	0.0411	0.26	0.80
Wales	**0.1350**	0.0516	2.61	0.01
West Midlands	0.0615	0.0419	1.47	0.14
Yorkshire & Humberside	0.0650	0.0422	1.54	0.12
BBL and GFC Status (Ref=0,0)				
BBL not GFC	-0.0362	0.0257	-1.41	0.16
GFC not BBL	**0.1856**	0.0476	3.90	0.00
BBL & GFC	-0.0013	0.0550	-0.02	0.98
Constant	140.6977	9.6207	14.62	0.00
Plus 60 Lending Institutions	Yes			
Number Observations	32,570			
LR Chi-sq (105)	3,763.19			
Prob> Chi-sq	0.00001			
Pseudo R2	0.1055			

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Table 4: Predicted default

	Default %	**Repaid %**
BBL match loan	0.2349	0.7651
BBL match loan in GFC	0.3720	0.6280
BBL match loan final settlement	0.1863	0.8137
BBL match loan final settlement in GFC	0.2963	0.7037

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Table 5: Loan repayment schedule

Parameters	BBL match loan		BBL match loan in GFC		BBL match loan final settlement		BBL match loan final settlement in GFC	
	Default	Repaid	Default	Repaid	Default	Repaid	Default	Repaid
Loan Size £s	30,495.50	31,912.08	28,686.39	30,487.69	30,952.74	31,677.78	29,015.50	30,153.75
Loan Term (months)	65.96	57.13	72.78	67.91	65.88	57.95	71.95	68.79
Months to Default	25.22		26.52		23.70		24.42	
Outstanding Balance	20,467.07		19,038.06		21,259.66		20,048.67	
Number of Loans	359,642	1,171,453	569,567	961,528	287,233	1,243,862	453,663	1,077,432
Default Rate %	0.2349		0.3720		0.1876		0.2963	

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Table 6: Net losses to government for BBL match portfolio under different scenarios

Item	**BBL match loan**	**BBL match loan in GFC**	**BBL match loan final settlement**	**BBL match loan final settlement in GFC**
Total Default Loss	6.338bn	10.843bn	6.106bn	9.095bn
Government interest paid first 12 months	1.195bn	1.128bn	1.194bn	1.192bn
Net Cash Loss	7.533bn	11.972bn	7.300bn	10.287bn
Net Loss %	-15.58%	-26.22%	-15.12%	-21.33%

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