Economic impact evaluation of the Enterprise Finance Guarantee (EFG) scheme

RESEARCH REPORT

A report from London Economics, with support from Ipsos MORI

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Executive Summary

The evaluation results show that the Enterprise Finance Guarantee (EFG) scheme continues to create significant economic benefits to society. EFG supported loans to SMEs across 2010/11 to 2012/13 generated £415m of economic benefits, compared to £82m economic costs. Five-year societal benefit-to-cost ratios ranged from 7.2 (for the 2010/11 loan cohort) to 11.3 (for the 2012/13 loan cohort). Smaller businesses that received an EFG loan demonstrated turnover and employment growth that was 7.3% p.a. and 6.6% p.a. faster than a matched comparison group. Younger businesses and those of relatively small size demonstrated larger turnover and employment growth impacts, which could be because these businesses find it harder to obtain external finance due to lack of proven track record and collateral shortages.

SMEs form an essential part of the UK economy in terms of value added and employment. However, they face financing constraints, due to asymmetries of information between borrowers and lenders.

While banks can help SMEs overcome financing constraints through relationship lending in general, they had been limited in their ability to provide SMEs with access to finance in the years following the global financial crisis.

In light of these issues, and as a response to the global financial crisis initially, the UK government rapidly expanded its existing SME loan guarantee programme – launching the "Enterprise Finance Guarantee (EFG) scheme" in January 2009.[1]

The EFG scheme is a national loan guarantee scheme that facilitates lending to viable businesses that have been turned down for a loan or other form of debt finance due to inadequate collateral.

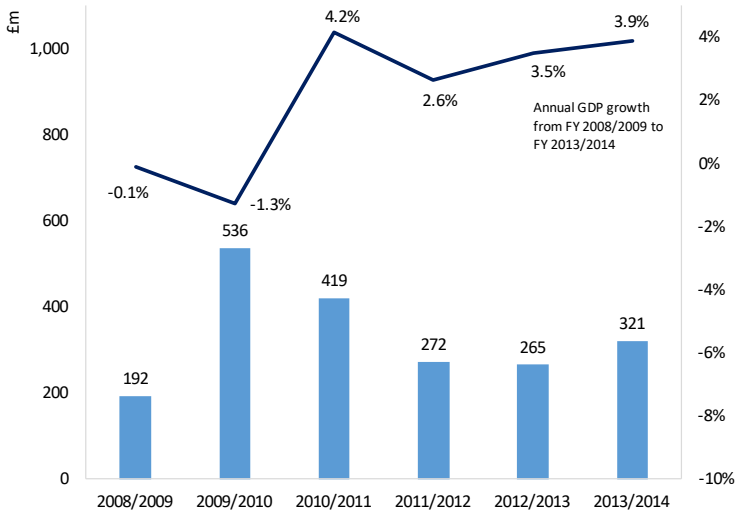
Over the period 2008/2009[2] and 2013/2014, guaranteed loans[3] worth £2bn were issued under the EFG scheme. New lending under the EFG scheme was at its height when UK GDP growth was at its lowest level after the onset of the global financial crisis, suggesting that the EFG scheme served as a form of countercyclical economic policy during this period.

[1] EFG is the successor scheme to the Small Firms Loan Guarantees (SFLG) scheme

[2] Only one quarter of data is included in 2008/2009 as the EFG scheme was introduced in January 2009. Prior to January 2009, loan guarantees were available through the Small Firms Loan guarantee (SFLG) scheme.

[3] The report covers EFG loans drawn by partnerships and companies only. Sole-proprietors could not be included due to data sharing restrictions.

1 **Total EFG loans (£m) and annual GDP growth (%), 2008/2009 - 2013/2014**



Source: British Business Bank, Office of National Statistics and London Economics calculations
Note: As the EFG scheme was introduced in January 2009, 2008/2009 only includes one quarter of data

A relatively large number of EFG beneficiaries were young firms with fewer than 10 employees. For instance, 25.4% of guaranteed loans issued under the EFG scheme were issued to start-ups[4].

The 2017 evaluation of the EFG scheme

The aim of the present evaluation is to provide the British Business Bank (BBB) with an evidence base on the EFG scheme to make future resource allocations.

Methodology

The last economic evaluation of the EFG scheme was published in 2013[5] and estimated the net economic benefit of the EFG scheme based on self-reported economic impacts provided by EFG beneficiaries that may be subject to bias. The present evaluation focuses on economic impacts reported in the end of year accounts of EFG beneficiaries, found in the Inter-Departmental Business Register[6], which are collected by the Office for National Statistics. Unless otherwise indicated, the results in this section are based on the aforementioned dataset.

[4] Firms under one year old

[5] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/85761/13-600-economic-evaluation-of-the-efg-scheme.pdf

[6] BEIS version of the Inter-Departmental Business Register

The present evaluation considers businesses that received an EFG loan in 2010/11, 2011/12 and 2012/13. The loan cohorts were selected for the evaluation such that at least three years of performance data were available after a business received an EFG loan.[7]

Baseline estimates of economic benefits were derived within a propensity score matching framework, whereby the difference-in-differences in the economic outcomes of EFG beneficiaries were compared to a matched sample of non-beneficiaries. Moreover, robustness of the estimates was tested econometrically which controls for firm-level fixed effects and time-varying shocks. Estimates of economic benefits were then used as a basis for deriving benefit-to-cost ratios (BCRs), which are discussed below.

The main analysis is complemented by a survey undertaken to understand the estimated economic impacts of the EFG scheme in greater detail. The survey was conducted by IPSOS MORI via telephone interviews with EFG beneficiaries who received a loan between 2010/2011 and 2012/2013 and a matched sample of non-beneficiaries from the general business population.

Economic impacts of the EFG scheme

EFG beneficiaries demonstrated turnover and employment growth that was 7.3% p.a. and 6.6% p.a. faster than non-beneficiaries, respectively. Turnover and employment growth impacts were larger for relatively small and young firms, perhaps because they typically face financial constraints due to a combination of a lack of credit history and collateral shortages.

Further, turnover and employment growth impacts were persistent, as EFG beneficiaries' turnover and employment growth rates were still higher than non-beneficiaries' five years after EFG beneficiaries had drawn guaranteed loans under the EFG scheme.

Survey evidence corroborates the estimates of the turnover and employment growth impacts, which is reflected in EFG beneficiaries attributing improvements in their growth prospects to financing provided by guaranteed loans under the EFG scheme.

Additionally, the survey evidence shows that EFG beneficiary firms were more likely to have introduced new or improved products and services than non-beneficiaries. Indeed, while 66.3% of EFG beneficiaries reported introducing new or improved products and services, the comparable figure was 47.5% for matched non-beneficiaries. The difference in the shares was statistically significant in both un-weighted and weighted analysis. However, when considering whether firms introduced new or improved processes, there was no material difference between EFG beneficiaries and-non-beneficiaries.

Finally, the central estimates for the impacts of EFG loans on survival probability show that EFG beneficiaries had a 0.6% lower annualised survival probability than non-beneficiaries (the survival probability of non-beneficiaries was 73.3%). The lower annualised survival probability of EFG beneficiaries may reflect that, once provided with access to finance, some of the least productive of the EFG beneficiaries face firm deaths more rapidly. Interestingly, start-up EFG beneficiaries'

[7] That is, performance of the 2010/11 loan cohort was considered over five years (2011/12-2015/16), the 2011/12 loan cohort was considered over four years (2012/13-2015/16) and the 2012/13 loan cohort was considered over three years (2013/14-2015/16)

survival probabilities were 1.2% higher than non-beneficiaries, suggesting that access to finance through the EFG scheme was crucial when starting a business.

Overall, the results show that the EFG scheme generates large economic impacts for EFG beneficiaries and that these may be concentrated among firms that *a priori* have larger financial constraints (relatively young and small firms). Further, there is an economic cost to EFG beneficiaries in participating in the EFG scheme as they have lower survival probabilities. However, the risk-reward trade-off of the scheme (discussed in the cost benefit analysis section below) is largely positive with the economic impacts on EFG beneficiaries far outweighing their lower survival probabilities. A summary of the main estimates of the economic impacts of the EFG scheme are provided in the table below.[8]

Table 1 Central estimates of the impacts of EFG loans on firm-level outcomes

	Annualised impact	Significant at 1% level?	EFG-beneficiaries sample (#)	Non-beneficiaries sample (#)
Growth of turnover	7.3%	Yes	6,965	202,235
Growth in employment	6.6%	Yes	6,885	198,450
Probability of survival	-0.6%	Yes	7,195	209,155

Note: Impacts annualised over four years for firms in the 2010/11 cohort, three years for firms in the 2011/12 cohort and two years for firms in the 2012/13 cohort. The population of EFG beneficiaries over the period 2010/11 and 2012/13 was 7,890. Sample sizes rounded to the nearest 5 firms in accordance with BEIS' data confidentiality rules

Source: IDBR and London Economics calculations

The estimates of the economic benefits of the EFG scheme derived through the econometric analysis, described above, were used as an input into the cost benefit analysis to evaluate the net economic benefits of the EFG scheme, which is described below.

Cost benefit analysis

The purpose of the cost benefit analysis of the Enterprise Finance Guarantee (EFG) scheme was to establish whether, and to what extent, the EFG scheme brings about economic gains to the UK economy.

The cost benefit analysis takes into account only costs and benefits that are 'additional'. In the context of a loan guarantee programme such as the EFG scheme, additional benefits refer to the economic benefits of loans: i) extended to borrowers that would not have been able to take out loans otherwise, ii) which do not displace the economic benefits that other businesses may have experienced in the absence of the scheme while iii) adjusting for firm survival. Further, the estimates of benefits were derived from an econometric analysis of EFG participants and a counterfactual

[8] The robustness of the results was checked using a number of methods, which included: i) testing the sensitivity of results to the propensity score match; ii) testing the sensitivity of results to the sample of analysis; and iii) controlling for factors that may bring about economic shocks not captured by the central estimates. The results, across robustness tests, show that the direction, statistical significance and order of magnitude of the main empirical estimates are preserved

group of non-participants that are otherwise similar to EFG participants. As such, the estimates of benefits can be attributed to EFG loans.

The benefits of the EFG scheme that are covered are primarily the gross value added (GVA) created and saved by firms participating in the scheme. The costs of the EFG scheme that are covered are the opportunity cost of capital employed in the scheme, the costs of loan defaults and the costs, to the British Business Bank and EFG lenders, of administering the scheme.

Costs and benefits are evaluated over the period from which EFG participants received a loan to the end of 2014/2015, which is the period for which data are available. The evaluation also projects costs and benefits to cover the lifetime of EFG loans, that is, a five-year period for each loan cohort.

Both costs and benefits are deflated to reflect real values and discounted using the HMT Green Book rate of 3.5% to provide their Net Present Values (NPV).

Key results

The total economic benefits of the EFG scheme for the 2010/2011 to 2012/2013 loan cohorts estimated up to 2014/15 were £415m.[9] The benefits of additional turnover outweigh the negative impact of the EFG scheme on firm survival.

Table 2 Total economic benefits (£m) by loan cohort and financial year

	2011/12	2012/13	2013/14	2014/15	Total
2010/11 loan cohort	29.7	54.4	76.0	93.7	**253.7**
2011/12 loan cohort		19.6	36.2	50.6	**106.4**
2012/13 loan cohort			19.4	35.8	**55.1**
Total					**415.2**

Source: IDBR, British Business Bank, IPSOS MORI survey and London Economics calculations

The total economic costs of the EFG scheme for the 2010/2011 to 2012/2013 EFG cohorts were £82m estimated up to 2014/15 and are largely due to the opportunity costs of capital associated with the value of outstanding balances of EFG loans. Exchequer costs are negative for two of the loan cohorts considered (the 2011/12 and 2012/13 loan cohorts) because the revenues from the 2% Guarantee Fee (formerly referred to as premium) payment exceeds Exchequer costs.

[9] Benefits of the EFG scheme were estimated at £254 million for the 2010/11 cohort four years after loan issue. The benefits of the EFG scheme were £106m for the 2011/12 cohort (three years after loan issue) and £55m for the 2012/13 cohort (two years after loan issue)

Table 3 Economic and Exchequer costs (£m) by loan cohort and financial year

	2010/11	2011/12	2012/13	2013/14	2014/15	Total
2010/2011 loan cohort						
Economic costs	7.1	9.6	12.6	13.4	4.7	**47.4**
Exchequer costs	-5.8	-4.9	4.4	9.5	1.7	**5.0**
2011/2012 loan cohort						
Economic costs		4.2	5.8	6.2	4.6	**20.8**
Exchequer costs		-3.4	-3.1	1.0	1.7	**-3.8**
2012/2013 loan cohort						
Economic costs			3.8	5.3	4.7	**13.8**
Exchequer costs			-3.1	-3.0	-0.3	**-6.4**
Total Economic costs						**82.0**
Total Exchequer costs						**-5.2**

Source: British Business Bank, IPSOS MORI survey and London Economics calculations

Societal BCRs are presented by loan cohort below.[10] The central estimate for the 4-year societal BCR (based on the 2010/11 loan cohort) is 5.4.

In addition, projected societal BCRs are presented (shaded in blue). Projected societal BCRs are larger than actual BCRs, particularly for later loan cohorts, for two main reasons. Firstly, the 2011/2012 and 2012/2013 loan cohorts consist of larger firms that generate greater economic benefits than the 2010/11 loan cohort. Secondly, the economic costs of loan defaults were larger for the 2010/11 loan cohort than later cohorts.

Table 4 Societal benefit-to-cost ratios by loan cohort

	1-year societal BCR	2-year societal BCR	3-year societal BCR	4-year societal BCR	5-year societal BCR
2010/2011	1.8	2.9	*3.7*	*5.4*	*7.2*
2011/2012	2.0	3.4	*5.1*	*7.5*	*10.1*
2012/2013	2.1	4.0	*5.9*	*8.5*	*11.3*

Source: British Business Bank and London Economics calculations

Notes: Benefit-to-cost ratios for each year reflect benefits and costs accrued up to that year, year 1 is the first year after loan issue, blue cells are projections

Finance additionality for the surveyed 2010/11-2012/13 EFG beneficiaries was 63%, which is lower than estimates for finance additionality in the previous evaluation of the EFG scheme (83% in 2009)

[10] Exchequer BCRs are not reported because of negative Exchequer costs. Negative Exchequer costs make it difficult to compare Exchequer BCRs across cohorts, as it is ambiguous whether the scheme has negative net economic benefits, or negative net Exchequer costs. As such, the economic benefits, economic costs, and Exchequer costs are reported separately above

and evaluations of the predecessor scheme to the EFG scheme, the Small Firms Loan Guarantee (76% in 2006 and 70% in 1999).[11]

The level of finance additionality observed indicates that 37% of firms surveyed stated that they could have accessed external finance without the guarantee from the EFG scheme and that the loan size, interest rate and other terms and conditions would have been at least as competitive as a guaranteed loan under the EFG scheme.

While the EFG scheme generates sizeable societal benefit-to-cost ratios, its further focus towards firms that are bona fide financially constrained could result in an increase in the EFG scheme's societal BCR.

[11] Differences in credit conditions may be a potential reason for differences in finance additionality across the various evaluations that have taken place. One may expect greater finance additionality when credit conditions are tighter and indeed finance additionality was higher for the 2009 cohort than the 2010/11-2012/13 cohorts. However, credit conditions were looser prior to the onset of the global financial crisis in 2008 yet finance additionality was higher in this period. As such, credit conditions alone do not fully explain the relatively finance additionality in this evaluation compared to previous ones. Another reason that finance additionality may be different across evaluations is that it was measured differently.

1 Introduction

1.1 Policy background

SMEs form an essential part of the UK economy in terms of value added and employment, as they accounted for:

- 99.7% of firms;
- 52% of value added; and
- 54% of employment in the non-financial business sector in 2015.[12] [13]

However, SMEs may face financing constraints, implying that positive net present value investment projects might not be undertaken, and the associated value added and employment impacts will therefore be foregone.

From an economic perspective, firm financing constraints arise due to the fixed costs of loan extension and asymmetric information.[14]

Fixed costs of loan extension matter more for SMEs than for larger firms, as the investment projects for which SMEs require financing tend to be smaller in size. As the appraisal and monitoring of investments by lenders involves a fixed-cost component, the larger the investment project, the smaller the per-unit cost of financing it. Smaller investment projects face higher financing costs due to the presence of fixed costs, because of which they are more likely to go un-funded than larger projects.

Information asymmetries arise between lenders and borrowers because the latter have greater information on their investment projects. A well understood consequence of informational asymmetries between lenders and borrowers is inefficient credit rationing.[15] When lenders cannot differentiate between "good" and "bad" borrowers, the price mechanism can fail to allocate capital efficiently. Curbing excess demand for loans by raising interest rates predominantly attracts "bad" borrowers, as they deem it less likely that they will actually have to pay the higher rates: they are more likely to default on their debt. As increasing interest rates worsens the pool of firms that seeks

[12] Statistics based on the EU SME definition

[13] London Economics et al. (forthcoming). 'Annual Report on European SMEs– SME Performance Review 2015/16', *Report for European Commission*

[14] Discussion of fixed costs and information asymmetries based on Fouché, M., Neugebauer, K. and A. Uthemann (2016). 'SME Financing in a Capital Markets Union', Swedish Institute for European Studies.

[15] Stiglitz, J. E., and Weiss, A. (1981). 'Credit rationing in markets with imperfect information', *American Economic Review*, 71(3), 393-410.

funding, often the only way for lenders to break even is to ration capital, that is, to invest less than is demanded by potential borrowers at the going rates.

SME investment projects particularly can go un-funded due to information asymmetries. Information asymmetries can be overcome if firms have a good track record or provide collateral against loans, as these signal creditworthiness or allow for partial loan recovery in case of default respectively. However, SMEs, as opposed to large firms, lack historical performance data (as they face lower reporting requirements and are more likely to be young) and often lack collateral.

Banks can help SMEs overcome information asymmetries through relationship lending. Banks, with their vast network of branches, are specifically suited to provide financing to their local customers with which they have relationships. Relationship lending can be defined as "the provision of financial services by a financial intermediary that (1) invests in obtaining customer-specific information, often proprietary in nature; and that (2) evaluates the profitability of these investments through multiple interactions with the same customer over time and across products."[16] This suggests that relationship lending is economically beneficial and desirable, as it ensures that banks can obtain and use the information necessary in order to make informed judgements about the viability of a loan. Long-term lending relationships considerably reduce the information asymmetry problem.[17]

However, since the onset of the global financial crisis and over the loan issuance period under consideration in the present study (2010/2011 – 2012/2013), banks may be limited in their ability to provide SMEs with access to finance. *Inter alia*:

- poor macroeconomic conditions heightened asymmetric information problems through mechanisms such as business uncertainty affecting loan repayment performance and a decline in collateral values;
- banking sector losses reduced the volume of loans that could be extended in general; and
- capital markets funding for SME loans may be restricted because banking sector investors expected and observed a greater degree of non-performing loans (NPLs).

There is a rationale for intervention through the provision of loan guarantees to banks, given the discussion above. Loan guarantees attempt to reduce the effects of asymmetric information in the provision of SME loans. They act as a substitute for SMEs' collateral: banks know that they will recover their investment given default and so are more inclined to offer loans, and at more favourable rates. Loan guarantees are also helpful in SME loan provision when bank funding is constrained.

There may be a concern that loan guarantees may encourage excessive risk-taking by banks, but this may be ameliorated through the design of the loan guarantee scheme. Firstly, by guaranteeing

[16] Boot, A.W.A. (2000). 'Relationship Banking: What Do We Know?', *Journal of Financial Intermediation,* 9(1):7–25.

[17] Petersen, M.A. and R.G. Rajan (1994). "The Benefits of Lending Relationships: Evidence from Small Business Data," *Journal of Finance* 49(1):3–37.

only a proportion of the loan, banks retain some of the risk of investment, which dampens the excess risk-taking incentive. Secondly, loan guarantees are only provided to borrowers that pass lenders standard lending criteria – the risk profile of loans covered by a loan guarantee should therefore be broadly the same as the risk profile of other loans.

1.2 The Enterprise Finance Guarantee (EFG) scheme

In practice, a response to the global financial crisis by the UK government was to rapidly expand the SME loan guarantee programme that was in place at the time – the Small Firms Loan Guarantee (SFLG) scheme. The SFLG was a loan guarantee programme introduced to help facilitate lending to SMEs by correcting for information asymmetries[18], in the sense described above.

The subsequent Enterprise Finance Guarantee (EFG) scheme has had greater scope in both size of eligible businesses and loan size.[19] It was the hope that the increase in guarantees available would help to further counteract the observed slowdown in lending to SMEs.

Although now the UK's economy and banking sector is arguably more robust, the problem of information asymmetries leading to credit rationing still persists, as established in the British Business Bank's EFG Scheme Strategic and Operational Design Review[20], and so there is rationale for the continuation of the scheme.

The EFG scheme has the following features:

- Potential borrowers apply to lenders accredited to the EFG scheme as they would with a conventional bank loan. The lender then assesses them and if they fulfil the bank's normal lending criteria but have insufficient collateral they may be eligible for a guaranteed loan.
- The government will pay up to 75% of the loan on default, subject to a cap set by an Annual Claim Limit.
- The interest rates and charges are set by the lender and in addition the borrower pays a 2% fee on the outstanding debt to government which contributes towards the cost of running the scheme.

1.3 The present economic evaluation of the EFG

This study presents the 2017 evaluation of the Enterprise Finance Guarantee (EFG) scheme. The last economic evaluation of the EFG scheme was published in 2013[21] and estimated the net economic benefit of the EFG scheme based on self-reported economic impacts provided by EFG beneficiaries that may be subject to bias. The present evaluation focuses on economic impacts reported in the

[18] Allinson, G., Robson, P. and Stone, I. (2013). Economic Evaluation of the Enterprise Financial Guarantee (EFG) Scheme, *Report for Department for Business, Innovation & Skills*

[19] British Business Bank (2016). *EFG Scheme Strategic and Operational Design Review*, April.

[20] *Ibid.*

[21] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/85761/13-600-economic-evaluation-of-the-efg-scheme.pdf

end of year accounts of EFG beneficiaries, found in the Inter-Departmental Business Register, which are provided by BEIS. Details of the IDBR sample used are provided in section 3.1.1.

Baseline estimates of economic benefits are derived within a propensity score matching framework, whereby the difference-in-differences in the economic outcomes of EFG beneficiaries were compared to a matched sample of non-beneficiaries. The robustness of the estimates is tested econometrically by controlling for time, age, regional and sector-specific characteristics that may bring about economic shocks not captured in the baseline estimates. Finally, survey evidence is used to understand the economic impacts of the EFG scheme in greater detail.

Estimates of economic benefits are then used as a basis for deriving benefit cost ratios.

The remainder of the study is split into three main chapters:

- Firstly, the EFG loan portfolio and beneficiaries are described (chapter 2)
- Secondly, estimates of economic benefits are derived econometrically with the data and methodology used being described (chapter 3)
- Thirdly, the cost benefit analysis is set out (chapter 4)

2 EFG loan portfolio and beneficiaries

This chapter provides an overview of the EFG loan portfolio[22] from 2008/2009 to 2013/2014.

The chapter also provides an analysis of the business demographics of EFG beneficiaries[23] between 2010/2011 and 2012/2013, which are the focus of present evaluation of the EFG.

Over the period 2008/09[24] and 2013/14, guaranteed loans worth £2bn were issued under the EFG scheme.

New lending under the EFG scheme was at its height when UK GDP growth was at its lowest level after the onset of the global financial crisis, suggesting that the EFG scheme served as a form of countercyclical economic policy.

Moreover, new lending was typically directed to new EFG beneficiaries rather than existing ones, and therefore a greater number of firms were benefitting from the EFG scheme over time; however, close to three-in-ten firms were repeated borrowers.

A relatively large number of EFG beneficiaries were young firms with fewer than 10 employees. For instance, 25.4% of guaranteed loans issued under the EFG scheme were issued to start-ups.

From a sectoral perspective, EFG beneficiaries were largely from wholesale and retail trade (27.0%), manufacturing (14.4%) and accommodation and food services sectors (12.7%).[25]

From a regional perspective, guaranteed loans under the EFG scheme were issued to firms located in the south west, south east and the north west of England and London more than elsewhere in the UK.[26]

The remainder of this chapter provides greater detail on the EFG loan portfolio and beneficiaries.

[22] The report covers EFG loans drawn by partnerships and companies only. Sole-proprietors could not be included due to data sharing restrictions.

[23] As above

[24] Only one quarter of data is included in 2008/2009 as the EFG scheme was introduced in January 2009. Prior to January 2009, loan guarantees were available through the Small Firms Loan guarantee (SFLG) scheme.

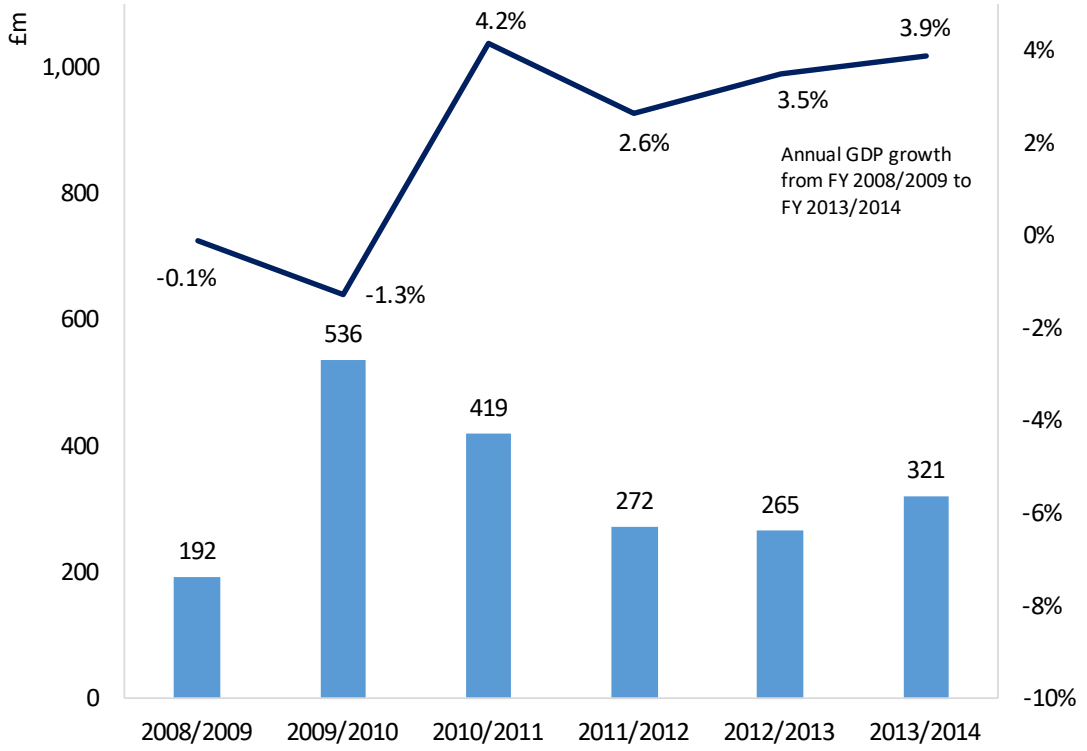
[25] A full sectoral distribution is provided in section 2.2.5

[26] A full regional distribution is provided in section 2.2.4

2.1 EFG loan portfolio

New lending under the EFG scheme was at its height when UK GDP growth was at its lowest level, indicating that the EFG scheme may have played a role in easing financing constraints that arise at times of economic stress. Figure 2 shows that between 2008/2009 and 2013/2014, over £2bn's worth of loans were guaranteed by the EFG scheme. The volume of guaranteed loans peaked at £536 million in 2009/2010 after the onset of the global financial crisis. The subsequent fall in the value of loans guaranteed by the EFG scheme occurred alongside the UK's gradual economic recovery over 2010/2011 and 2012/2013.[27]

2 Total value of EFG loans and GDP growth by year, 2008/2009 - 2013/2014



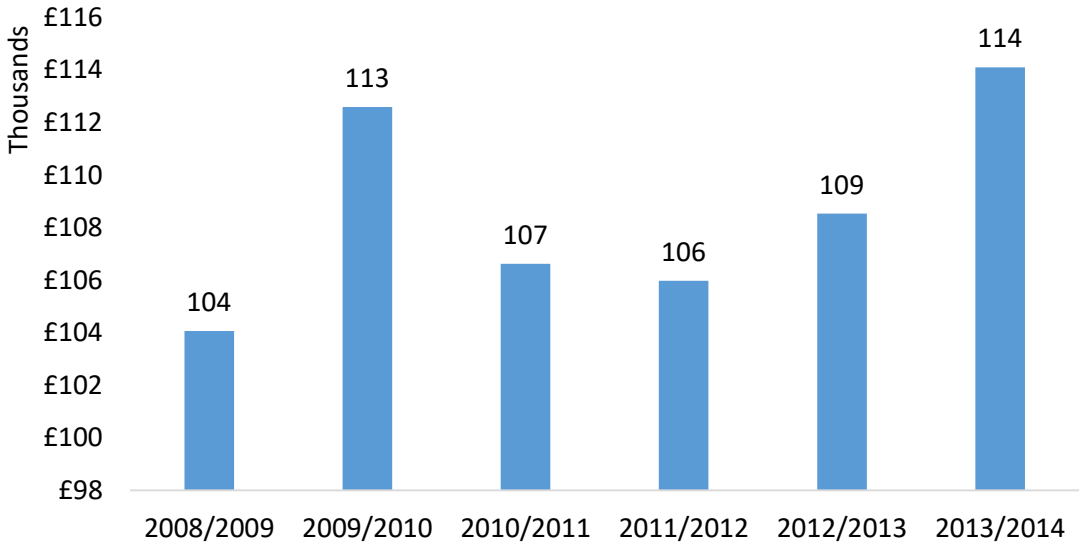
Source: British Business Bank, Office for National Statistics and London Economics calculations
Note: Only one quarter of data is included in 2008/2009 as the EFG scheme was introduced in January 2009

[27] The decline in guaranteed loan extension reversed slightly in 2012/2013 and 2013/2014 with new lending rising from £265 million in 2012/2013 to £321 million in 2013/2014, for example. This may be due to an increase in the size of the scheme in 2012, which was designed to encourage lending.*

**Inter alia* the EFG scheme guarantees 75 percent of the outstanding balance of a loan in the event of a default, subject to a cap on the number of EFG loan defaults at the lender level. The cap was originally set at 9.75 percent per lender but was revised upwards in April 2012 to 15 percent per lender. The turnover limit for EFG borrowers was also revised upwards in April 2012 increasing from £25m to £41m.

The majority of the variation in new lending over time is due to changes in the number of loans issued rather than loan sizes. Figure 3 below presents the average value of loans guaranteed under the EFG scheme over time. Across the years, the variation in the average loan size is small, and in the range £104,000 and £114,000, which implies that the variation in new lending is due to variation in the number of loans issued.

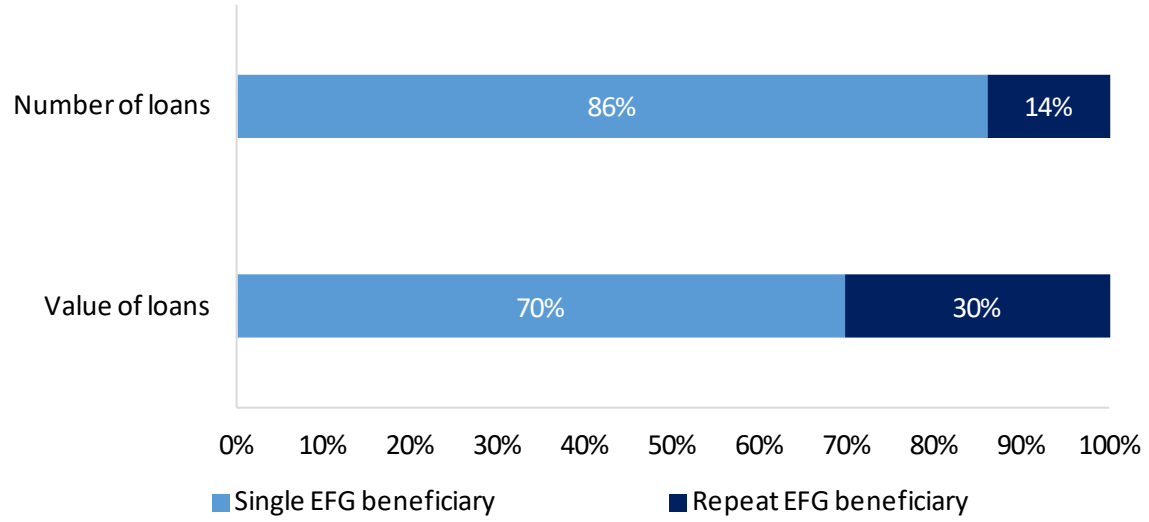
3 Average value of EFG loans, 2008/2009 - 2013/2014



Source: British Business Bank and London Economics calculations

A number of firms were issued guaranteed loans under the EFG scheme more than once. The 2013 evaluation of the EFG scheme (Allison et al., 2013) identified that 4% of EFG beneficiaries using the EFG scheme in 2009 had previously used its predecessor, the Small Firms Loan Guarantee (SFLG) scheme. Figure 4 also provides evidence of repeat EFG beneficiaries among the loan cohorts of the present evaluation of the EFG scheme, with 14% of EFG beneficiaries drawing more than one guaranteed loan under the EFG scheme.

4 Share of loans extended to repeat EFG beneficiaries



Source: British Business Bank and London Economics calculations

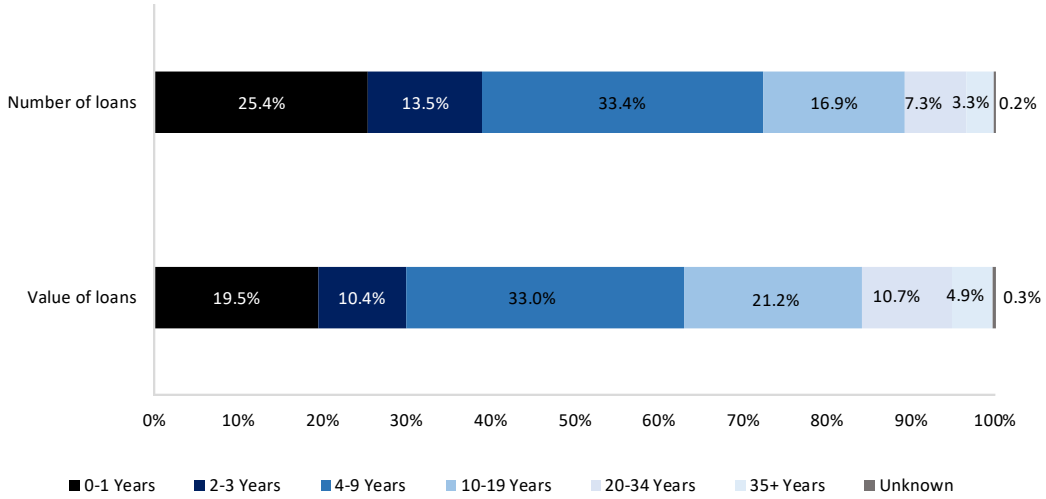
Overall, EFG loan extension was countercyclical for the cohort examined and, while a number of firms used guaranteed loans under the EFG scheme more than once, a greater number of firms were granted access to finance through EFG scheme when facing economic headwinds, given relatively stable loan sizes over the period 2009/2010 to 2013/2014.

2.2 EFG beneficiaries

2.2.1 Age distribution

A relatively large proportion of loans guaranteed under the EFG scheme were drawn by younger firms, as shown in figure 5. Indeed, 25.4% of the number of loans and 19.5% of the value of loans extended under the EFG scheme were granted to start-ups or firms up to one year old.

5 Share of EFG loans by age of firm



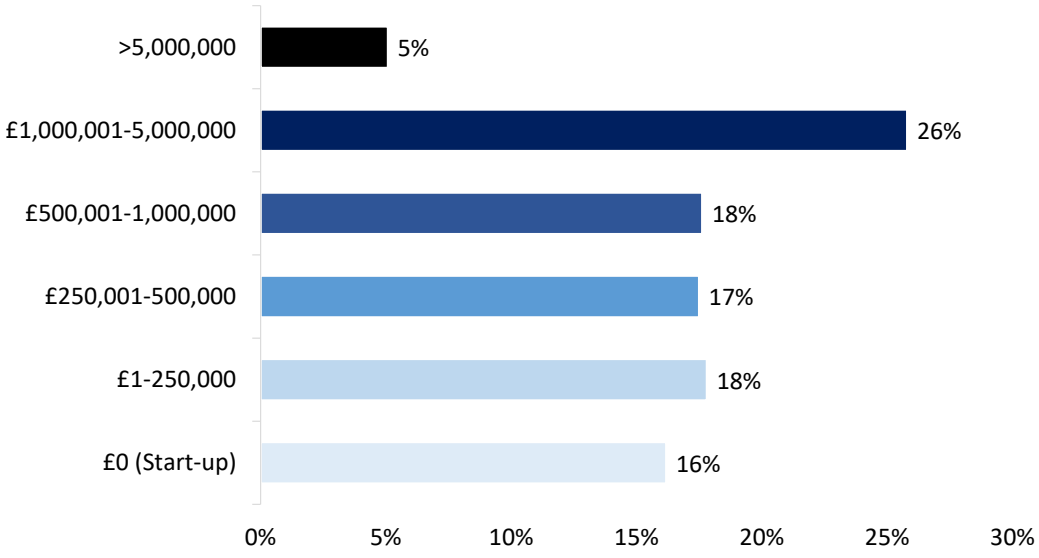
Source: IDBR, British Business Bank and London Economics calculations

Note: Based on firms drawing a loan in the period 2010/2011 – 2012/2013. Age of firm is considered from the date the loan was drawn

2.2.2 Turnover distribution

By turnover, guaranteed loans under the EFG scheme were granted to a large variety of EFG beneficiaries from start-ups to firms with turnover of over £5m. Indeed, 16% of EFG loans were issued to start-ups and a further 18% of loans to firms with turnover of up to £0.25m, as shown in figure 6. The majority of EFG beneficiaries had higher turnover than £0.25 million, with 61% of firms receiving EFG loans with a turnover of between £0.25m and £5m. Only five percent of EFG beneficiaries receiving EFG loans had a turnover of over £5m.

6 Share of EFG loans by firm turnover



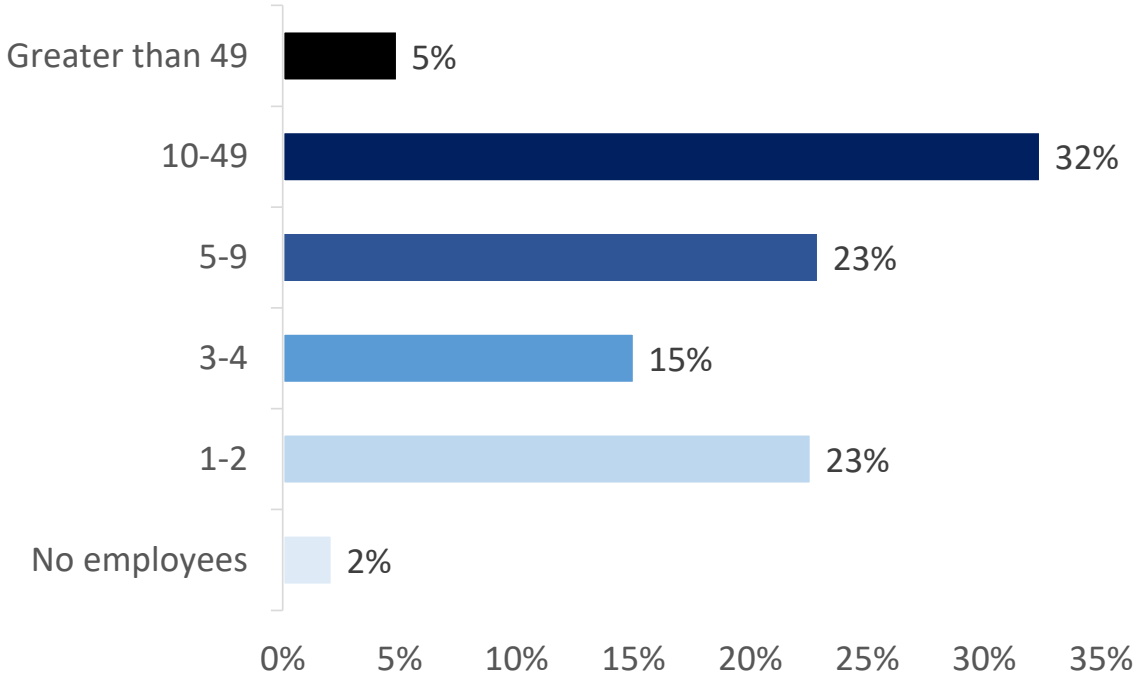
Source: IDBR, British Business Bank and London Economics calculations

Note: Based on firms drawing a loan in the period 2010/2011 – 2012/2013

2.2.3 Employment distribution

Out of the total, the majority (63%) of EFG beneficiaries were micro SMEs with fewer than ten employees, a further 32% of EFG beneficiaries were small, with between ten and 49 employees, and five percent of EFG beneficiaries were medium with over 49 employees, as shown in figure 7.

7 Share of EFG loans by number of employees



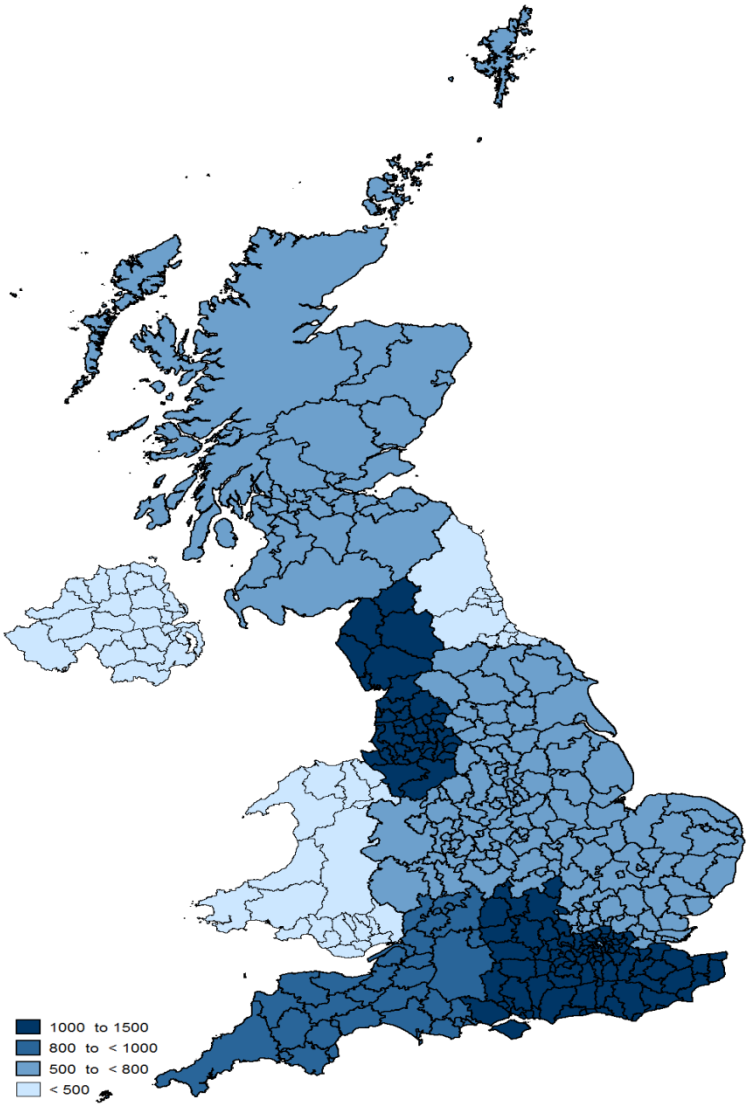
Source: IDBR, British Business Bank and London Economics calculations
Note: Based on firms drawing a loan in the period 2010/2011 – 2012/2013

2.2.4 Regional distribution

There was significant regional variation in the number of guaranteed loans issued under the EFG scheme. The number of EFG loans which were guaranteed by region varied from 84 to 1,311 loans, as shown in figure 8 below. The lowest numbers of EFG loans were granted in Northern Ireland, closely followed by the North East of England and Wales. On the other end of the spectrum, the largest number of loans were granted in the South West, South East and North West of England and London.

The British Business Bank monitors the number of EFG loans drawn per 10,000 businesses in a region[28]. The Q1 2017 EFG quarterly statistics published by the British Business bank shows Northern Ireland, and London have the lowest ratio of EFG drawn loans per 10,000 businesses. The highest ratios were in the North West, and Yorkshire and the Humber.

8 Number of EFG guaranteed loans by region



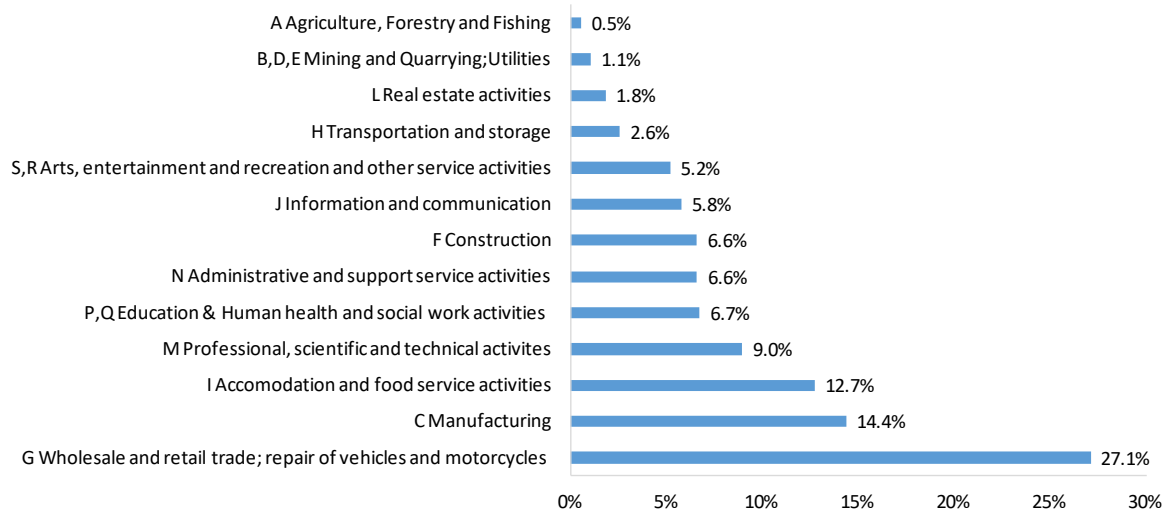
Source: IDBR, British Business Bank and London Economics calculations
Note: Based on firms drawing a loan in the period 2010/2011 – 2012/2013

[28] http://british-business-bank.co.uk/ourpartners/supporting-business-loans-enterprise-finance-guarantee/latest-enterprise-finance-guarantee-quarterly-statistics/

2.2.5 Sectoral distribution

The largest shares of loans guaranteed under the EFG scheme were issued to EFG beneficiaries in the: 'Wholesale and retail trade' sector (27.1%), 'Manufacturing' sector (14.4%) and 'Accommodation and food service activities' sector (12.7%), as shown in figure 9.

9 EFG loans by sector



Source: IDBR, British Business Bank and London Economics calculations
Note: Based on firms drawing a loan in the period 2010/2011 – 2012/2013. Sector 'B,D,E Mining and Quarrying; Utilities' refers to the 'Mining and quarrying sector', 'Electricity, gas, steam and air conditioning supply' and 'Water supply, sewerage, waste management and remediation'

EFG beneficiaries cover a wide range of age, turnover, and employment bands and are spread across regions and sectors.

A relatively large number of EFG beneficiaries were young firms with fewer than 10 employees. For instance, 25.4% of guaranteed loans issued under the EFG scheme were issued to start-ups.

From a sectoral perspective, EFG beneficiaries were largely from wholesale and retail trade (27.0%), manufacturing (14.4%) and accommodation and food services sectors (12.7%).

3 Economic impacts of the EFG scheme

This chapter provides estimates for the economic impacts of the EFG scheme. Three economic outcome measures are considered: turnover, employment and survival probability.[29]

Data were drawn from the Inter-Departmental Business Register (IDBR) provided by BEIS.[30]

EFG beneficiaries were compared to a sample of non-beneficiaries that have similar characteristics to reflect the counterfactual of what EFG beneficiaries' outcomes would have been in the absence of guaranteed loan provision under the EFG scheme. Difference-in-differences of economic outcomes between EFG beneficiaries and matched non-beneficiaries (matched using propensity score matching) were used to identify the impacts of guaranteed loans issued under the EFG scheme.[31]

EFG beneficiaries demonstrated turnover and employment growth that was 7% p.a. faster than non-beneficiaries, on average.

Turnover and employment growth impacts were larger for relatively small and young firms, and firms in service sectors,[32] as perhaps they typically face financial constraints due to combination of a lack of credit history and collateral shortages.

Turnover and employment growth impacts were persistent, as EFG beneficiaries' turnover and employment growth rates were 5% p.a. higher than non-beneficiaries', five years after EFG beneficiaries had drawn guaranteed loans under the EFG scheme.

The central estimates for the impacts of EFG loans on survival probability show that EFG beneficiaries have 0.6% lower annualised survival probability than non-beneficiaries. Interestingly, start-up EFG beneficiaries' survival probabilities are 1.2% higher than non-beneficiaries, suggesting that access to finance through the EFG scheme is crucial when starting a business.

The robustness of the results was checked using a number of methods, which included testing the sensitivity of results to the propensity score match and testing the sensitivity of results to the sample of analysis.

[29] Productivity differences between EFG beneficiaries and matched non-beneficiaries were also considered. However, due to small sample sizes available no meaningful results were generated and are therefore not reported

[30] Details of the data used are provided in section 3.1.1

[31] Details of the identification strategy are provided in section 3.1.2 and of the propensity score matching in section 3.1.3 and section 3.1.4

[32] Turnover and employment growth impacts were larger for firms in the 'Accommodation and food service activities' sector than the 'Construction' and 'Manufacturing' sectors, for example

The robustness of the baseline estimates for the economic outcomes for which data was available (turnover growth, employment growth and survival probability) was also tested by controlling for time, age, regional and sector-specific characteristics that may bring about economic shocks not captured in the baseline estimates.

Finally, a survey was conducted by IPSOS MORI via telephone interviews with 368 EFG beneficiaries who received a loan between 2010/2011 and 2012/2013 and a matched sample of 159 non-beneficiaries from the general business population with a view to understanding the economic impacts of the EFG scheme in greater detail.[33] In general, survey evidence corroborates the econometric estimates of the economic impacts of the EFG scheme. Further, insights are provided on loan uses (relating to turnover and employment growth impacts) and innovative activities (relating to productivity impacts).

The remainder of this chapter describes the data and methodology, main empirical results and robustness tests of the econometric analysis of the economic impacts of the EFG scheme, as well as provides a discussion of related survey evidence.

3.1 Data and methodology

3.1.1 Data

The Inter-Departmental Business Register (IDBR) is the comprehensive list of UK businesses that is used by Government for statistical purposes and provides the main sampling frame for surveys of businesses carried out by the Office for National Statistics and the Government departments. It is also a key data source for analyses of business activity. The IDBR covers around 2.7 million live enterprises in all sectors of the UK economy, other than some very small businesses (those without employees, and with turnover below the relevant tax threshold) and some non-profit making organisations. The IDBR also reports information on over 5.7 million non-live enterprises.

In order to analyse the performance of EFG recipients, it was necessary to match first EFG recipients to the Inter Departmental Business Register (IDBR). The EFG recipients from 2008/2009 to 2013/2014 were matched to the July-September (Q3) IDBR waves from 2009-2015 and the April-June (Q2) IDBR wave from 2016.

As far as possible, EFG recipients were matched to the wave of IDBR firms from the same year[34] as loans were drawn. This is because the matching is based on company information which is likely to vary over time. However, as there may also be delays associated with recording firms in the IDBR, cohorts were also subsequently matched to waves of IDBR firms from subsequent years.

[33] Further details of the survey are provided in Annex 1

[34] Same year refers to the first wave of the IDBR following the loan draw date

Matching was undertaken on the basis of company registration numbers (CRNs); company name/trading name and postcode/postal district; and on the basis of fuzzy matching. The overall match rate was 95% and the majority of firms (88%) were identified using CRNs.

For the analysis (described below), EFG beneficiaries were compared to a sample of non-beneficiaries that have similar characteristics to reflect the counterfactual of what EFG beneficiaries' outcomes would have been in the absence of guaranteed loan provision under the EFG scheme.

The sample of non-beneficiaries was selected from live firms which were either registered companies or partnerships, had a maximum of 250 employees and had a maximum turnover of £42.5m. The turnover threshold of £42,500 is slightly higher than the EFG eligibility threshold of £41.0m. However, as EFG firms surpassed this threshold also, it was appropriate to consider that this might be the case for non-EFG participants. Firms which were identified as non-independent (via the *wowref* identifier in the IDBR) were also removed.

It should be noted that the IDBR sample has some issues. The source of each data point used may not be the best available (for example, an older survey data point may be used instead of a more recent one). In addition, there may be uncertainty regarding the period of time each data point represents, particularly, there may be lags in the data. While BEIS are constantly working to improve the IDBR to use the most appropriate data sources available and understand data lags better (to more accurately consider features of the data such as growth trends, for example), the IDBR sample provided by BEIS for the analysis consists of the original Q3 IDBR waves for each year between 2009 and 2015 and the original Q2 IDBR wave from 2016.

Only firms in the IDBR that met the qualifying criteria for the EFG scheme were considered in the analysis.[35]

3.1.2 Identification strategy

In order to estimate the benefits of the EFG scheme econometrically a counterfactual is required for what the economic outcomes of EFG beneficiary firms would have been without the EFG scheme (which itself is unobserved).

The counterfactual is the average economic outcomes of a sample of non-beneficiaries that have similar characteristics (defined below), which is valid as a counterfactual based on the following criteria being met (Rubin, 1974):

- Participation in the EFG scheme by EFG beneficiaries should not influence the economic outcomes of non-beneficiaries, and EFG beneficiaries should receive a comparable level of support (stable unit treatment value)
- Participation in the EFG scheme should be independent of eventual economic outcomes (unconfoundedness), conditional on a set of firm characteristics

[35] Firm-level demographic characteristics and economic and financial were considered and compared with the IDBR records from the year in which the EFG treatment was received.

- Each firm in the sample should have a positive ex-ante probability of being issued a guaranteed loan under the EFG scheme (overlap)

Participation in the EFG scheme by EFG beneficiaries may not influence the economic outcomes of non-beneficiary firms, given the size of the EFG scheme, in terms of the number of EFG beneficiary firms there are, relative to the UK business population.

However, EFG beneficiaries may be operating in the same markets (product, labour or input) as non-beneficiaries firms, which could impact non-beneficiaries economic outcomes through market prices. Further, EFG beneficiary firms may influence non-beneficiaries' economic outcomes through non-market mechanisms such as R&D spill-overs.

Empirically, the sensitivity of the main empirical estimates are tested using a fixed effects estimator and controls for time-varying age, size and sector-specific shocks. The results show that the direction, statistical significance and order of magnitude of the main empirical estimates are preserved, which provides supporting evidence towards meeting the stable unit treatment value criterion.

EFG beneficiaries appear to receive a comparable level of support. Loan sizes are in a similar order of magnitude, as shown in chapter 2. In addition, the majority of EFG beneficiaries surveyed as part of this study (92.5%) stated that the guaranteed loan they received through the EFG scheme met their financing needs, which is perhaps more salient.

Participation in the EFG scheme should be independent of eventual economic outcomes, given a set of firm characteristics. In order to satisfy the 'unconfoundedness' criterion, propensity score matching is used to select non-beneficiaries that have similar characteristics to EFG beneficiaries (Rosenbaum and Rubin, 1983).

Each firm in the linked dataset should have a positive ex-ante probability of being issued a guaranteed loan under the EFG scheme, as propensity score matching is undertaken in the common support region, thereby meeting the overlap criterion.

There may be an outstanding concern that evaluating differences in the economic outcomes of EFG beneficiaries and matched non-beneficiaries may yield biased estimates because of unobserved differences between the two groups (banks may select EFG beneficiaries on such 'unobservables'). To address this issue, difference in differences of economic outcomes are considered, which controls for firm-specific and time-invariant shocks to economic outcomes (Blundell and Costa Dias, 2000). Moreover, estimates of economic impacts are derived econometrically using a fixed effects estimator, which also controls for time-varying age, size and sector-specific shocks. A bias in results may still arise if unobserved time varying shocks are occurring, for example, in credit constraints or credit conditions.

3.1.3 Propensity score model

Participation in the EFG scheme should be independent of eventual economic outcomes, given a set of firm characteristics. Propensity score (PS) models are estimated to meet this criterion, as described above.

The PS models provide an ex-ante probability, or propensity score, of EFG beneficiaries and non-beneficiaries participating in the EFG scheme. EFG beneficiaries are then matched to non-beneficiaries with similar propensity scores such that a comparison of economic outcomes between the groups provides consistent estimates of economic impacts of the EFG scheme.

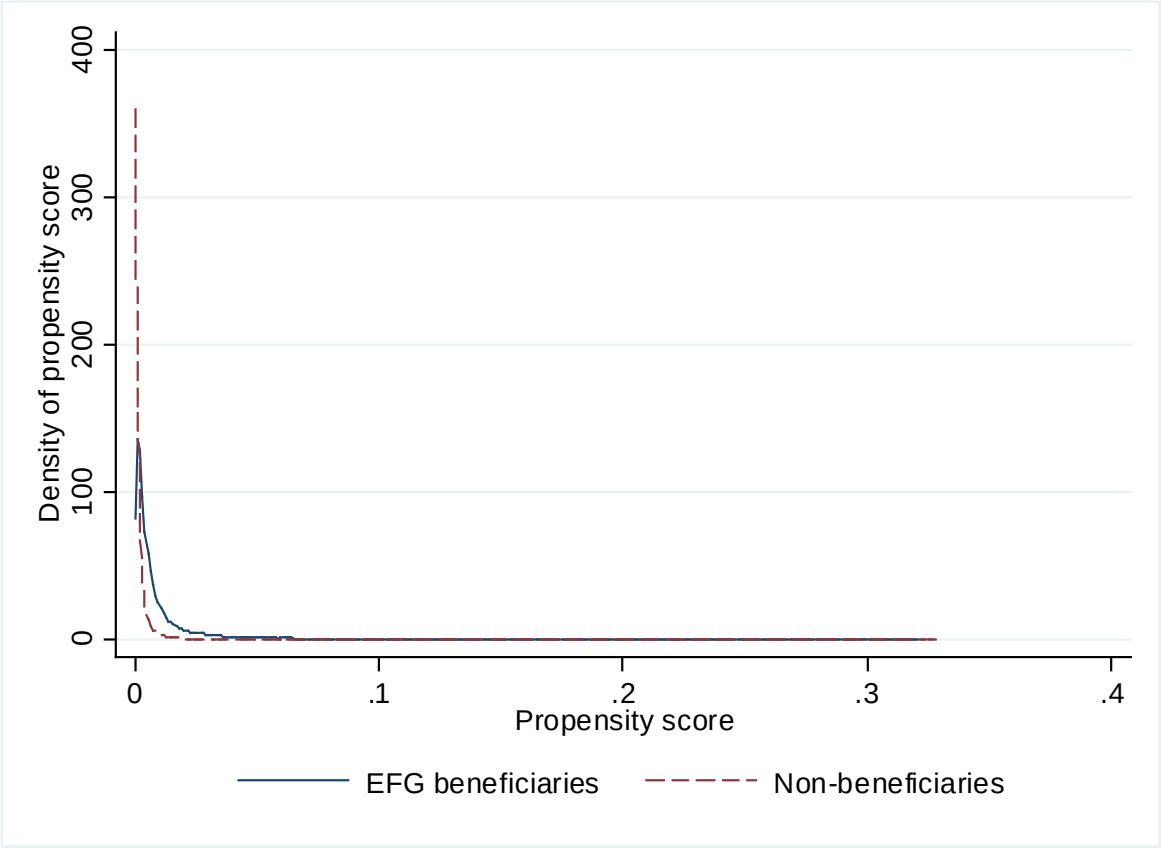
As well as estimating a PS model for main sample, separate PS models are estimated to derive economic impacts by age, size, sector and EFG cohort, to take into account differences between the different groups. The results of the main PS model are presented below.

A logit estimator is used to estimate the PS models. Variables are chosen for the PS models that predict both the ex-ante probability of participation in the EFG scheme and the ex-post outcomes variables based on economic theory and the design of the scheme. The variables included in the PS models relate to firm age, turnover, employment, and region. The PS models also included year dummies.

The results of the main PS models are provided as an annex. The predictive ability of the PS model is shown in the figure below through a comparison of the density of the propensity scores of EFG beneficiaries and non-beneficiaries. Given the overlap in the densities of propensity scores between EFG beneficiaries and non-beneficiaries, we infer that EFG beneficiaries and non-beneficiaries have sufficiently similar characteristics such that non-beneficiaries would have had a positive probability of being eligible for the EFG if they had applied. [36].

[36] That is, we infer that the "overlap criterion" for nonbeneficiaries to serve as a valid counterfactual for EFG beneficiaries is met

10 Propensity scores in the unmatched EFG beneficiary and non-beneficiary samples



Source: IDBR and London Economics calculations
Note: Based on firms drawing a loan in the period 2010/2011 – 2012/2013

3.1.4 Propensity score matching

EFG beneficiaries were matched to non-beneficiaries in the IDBR sample for the analysis of turnover, employment and survival impacts of the EFG scheme. This section provides details of the propensity score matching exercise undertaken.

EFG beneficiaries were matched to non-beneficiaries as follows:

- Nearest neighbour matching with a calliper threshold[37] with replacement was used to match each EFG beneficiary to the firms with the closest estimated propensity scores which did not receive a guaranteed loan issued under the EFG scheme.

[37] A calliper with a width of 0.2 times the standard deviation of the propensity score was used, as is commonly advised in the literature. See for example: Austin, P. C. (2011), Optimal calliper widths for propensity-score matching when estimating differences in means and differences in proportions in observational studies.

- The calliper threshold ensured EFG beneficiaries and non-EFG beneficiaries only match if the distance between the propensity score matching scores is low.
- Matching with replacement meant that a firm which did not receive a guaranteed loan issued under the EFG scheme could be matched to more than one treated firm if it was the nearest neighbour to more than one treated firm. This approach had the advantage of putting a higher weight on non-beneficiaries that matched with several EFG firms.
- The optimal match was achieved when each EFG beneficiary firm was matched to 30 non-beneficiary firms.
- As nearest neighbour matching depends on the ordering of the sample, the ordering of the dataset was randomized before the estimation.
- Finally, the matching imposed a common support by dropping treated firms for which propensity scores were outside the range of the untreated firms.[38] [39] [40] That is, EFG beneficiaries for which a comparable non-beneficiary could not be identified were dropped from the analysis.

0 shows that the PSM is successful in removing treatment selection bias in the IDBR sample. That is, the mean level difference between the treatment and control group falls for variables in the PSM and the percentage reduction is large for most variables, for some variables it's close to 100%.

Table 5 Bias reduction in the propensity score model

Variables	Status	Mean level		% Bias	% Bias reduction
		Treatment	Control		
Treatment received in 2011	Unmatched	0.36	0.26	21.00	
	Matched	0.36	0.37	- 1.50	92.90
Treatment received in 2012	Unmatched	0.27	0.24	7.20	
	Matched	0.27	0.27	0.30	95.60
Treatment received in 2013	Unmatched	0.16	0.22	- 14.60	
	Matched	0.16	0.16	0.40	97.20
Turnover (log)	Unmatched	6.26	4.97	92.60	

[38] Bias reduction in radius and kernel matching was inferior when compared to calliper and standard nearest neighbour matching results. Therefore, these methods were ruled out.

[39] The common support assumption was assessed using graphs showing the distribution of propensity scores for treated and untreated individuals. The common support was found to be fully respected under both nearest-neighbour matching and calliper matching with replacement.

[40] Efficient standard errors were estimated following Abadie and Imbens, 2006

	Matched	6.26	6.25	0.50	99.50
Number of employees (level)	Unmatched	13.92	4.47	55.20	
	Matched	13.92	13.87	0.30	99.50
Number of employees (squared)	Unmatched	674.03	125.74	23.00	
	Matched	674.03	667.69	0.30	98.80
Number of employees (cubed)	Unmatched	69,294.00	11,209.00	12.90	
	Matched	69,294.00	68,053.00	0.30	97.90
No employees	Unmatched	0.13	0.45	- 76.30	
	Matched	0.13	0.13	1.00	98.70
Firm incorporated in the last year	Unmatched	0.09	0.02	31.30	
	Matched	0.09	0.08	4.90	84.40
Firm between one and three years old	Unmatched	0.27	0.18	22.00	
	Matched	0.27	0.28	- 3.50	83.90
Firm between four and nine years old	Unmatched	0.35	0.35	1.20	
	Matched	0.35	0.35	0.70	35.80
Firm between ten and twenty five years old	Unmatched	0.22	0.31	- 21.00	
	Matched	0.22	0.22	0.50	97.80
Construction	Unmatched	0.07	0.13	- 18.70	
	Matched	0.07	0.07	1.20	93.40
Transportation and Storage	Unmatched	0.03	0.03	- 0.10	
	Matched	0.03	0.03	0.10	12.80
Information, communication, financial and insurance activities	Unmatched	0.06	0.10	- 15.00	
	Matched	0.06	0.05	1.90	87.70
Real estate	Unmatched	0.02	0.04	- 11.40	
	Matched	0.02	0.02	0.20	98.50
Professional, scientific and technical activities	Unmatched	0.09	0.17	- 24.20	
	Matched	0.09	0.08	2.40	90.00
Administrative and support service activities	Unmatched	0.07	0.07	- 2.20	
	Matched	0.07	0.07	0.80	62.30
	Unmatched	0.11	0.10	5.60	

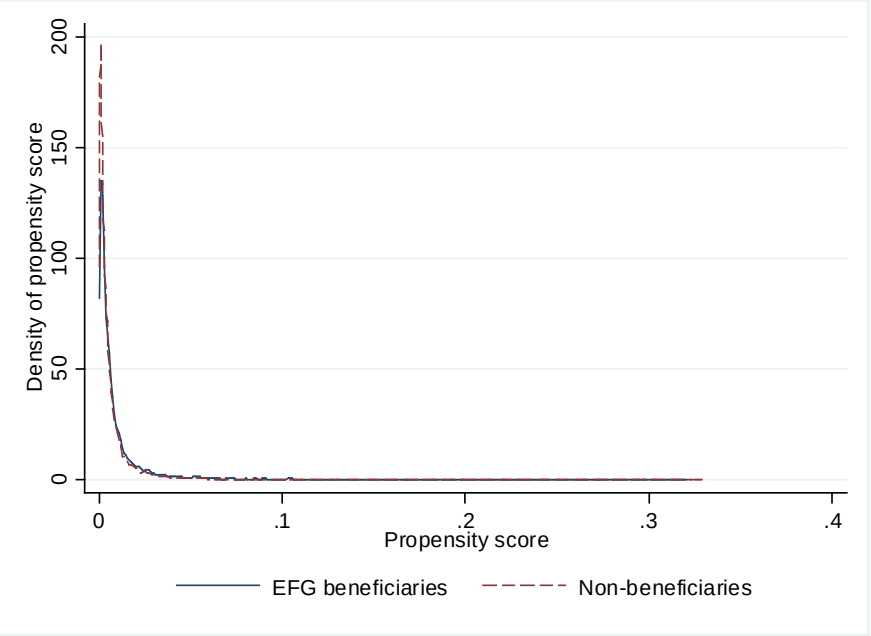
Education, human health and social work, arts, entertainment and recreation and other service activities	Matched	0.11	0.12	- 1.00	81.60
London	Unmatched	0.14	0.16	- 5.40	
	Matched	0.14	0.13	0.90	83.20
South East of England	Unmatched	0.14	0.16	- 6.50	
	Matched	0.14	0.14	0.50	92.40
South West of England	Unmatched	0.10	0.10	1.90	
	Matched	0.10	0.11	- 1.20	34.80
North East of England	Unmatched	0.03	0.03	5.20	
	Matched	0.03	0.04	- 0.30	93.90
North West of England	Unmatched	0.14	0.10	11.80	
	Matched	0.14	0.14	0.20	98.50
East of England	Unmatched	0.09	0.10	- 6.10	
	Matched	0.09	0.09	0.10	97.60
Wales	Unmatched	0.04	0.04	- 1.30	
	Matched	0.04	0.04	- 0.10	89.90
Northern Ireland	Unmatched	0.01	0.02	- 9.90	
	Matched	0.01	0.01	-	99.70
Yorkshire and the Humber	Unmatched	0.09	0.07	7.20	
	Matched	0.09	0.09	- 0.60	91.70
West Midlands	Unmatched	0.09	0.08	2.20	
	Matched	0.09	0.09	- 0.40	83.00
East Midlands	Unmatched	0.07	0.07	1.00	
	Matched	0.07	0.07	- 0.10	94.30

Source: IDBR and London Economics calculations

Note: The bias reduction presented is based on turnover as the outcome (n=6995). The models for survival and employment are comparable, but are based on slightly different samples due to differences in data gaps between outcome variables. Samples rounded to the nearest 5 firms in accordance with BEIS' data confidentiality rules

The propensity score's empirical density function between EFG beneficiaries and non-beneficiaries in figure 11 below shows a significant improvement in the PS balance when compared to figure 10 above.

11 Propensity scores in the matched EFG beneficiary and non-beneficiary samples - baseline model, 2010/2011-2012/2013



Source: IDBR and London Economics calculations

3.2 Main empirical results

The central estimates for the impacts of EFG loans on economic outcomes show that EFG beneficiaries have 7.3% higher annualised turnover and employment growth than non-beneficiaries. The identified impacts are significant at the 1% level.

The central estimates for the impacts of EFG loans on survival probability show that EFG beneficiaries have 0.6% lower annualised survival probability than non-beneficiaries, which is an effect that is significant at the 1% level.

The above results are shown in the table below.

12 Central estimates of the impacts EFG loan on outcomes

	Avg. annual impact	Significant at 1% level	EFG Beneficiaries	Non Beneficiaries
Growth of turnover	7.3%	Yes	6,965	202,235
Growth in employment	6.6%	Yes	6,885	198,450
Probability of survival	-0.6%	Yes	7,195	209,155

Note: Based on EFG beneficiaries drawing a loan in the period 2010/2011 – 2012/2013 and matched non-beneficiaries. Impacts annualised over five years for firms in the 2010/11 cohort, four years for firms in the 2011/12 cohort and three years for firms in the 2012/13 cohort. Samples rounded to the nearest 5 firms in accordance with BEIS' data confidentiality rules

Source: IDBR and London Economics calculations

3.2.1 Impacts by age, size and sector

Younger EFG beneficiaries, firms in the age bands 1-3 and 4-9, are responsible for a larger growth in turnover and employment than other EFG beneficiaries. For example, EFG beneficiaries that were 1-3 years old had turnover and employment growth that was 9.1% faster than matched non-beneficiaries, while turnover growth for EFG beneficiaries 25-35 years of age was 2.8% faster than matched non-beneficiaries.

Estimates of the impacts of guaranteed loans issued under the EFG scheme on survival probabilities reduce with firm age, and are negative for firms over four years old. Start-up EFG beneficiaries' survival probabilities are 1.5% higher than non-beneficiaries[41], suggesting that access to finance through the EFG scheme is crucial when starting a business.

13 Estimates of EFG loan on outcomes by age band

Age band	Employment		Turnover		Survival	
	Avg. annual impact	Significant at the 1% level	Avg. annual impact	Significant at the 1% level	Avg. annual impact	Significant at the 1% level
Age 0	9.5%	Yes	4.4%	No**	1.5%	No
Age 1-3	9.1%	Yes	9.3%	Yes	0.0%	No
Age 4-9	5.8%	Yes	8.0%	Yes	-1.3%	Yes
Age 10-25	2.4%	Yes	4.0%	Yes	-2.2%	Yes
Age 25-35	2.8%	No*	4.4%	Yes	-2.0%	yes

Note: Based On EFG Beneficiaries Drawing A Loan In The Period 2010/2011 – 2012/2013 And Matched Non-Beneficiaries. Impacts Annualised Over Five Years For Firms In The 2010/11 Cohort, Four Years For Firms In The 2011/12 Cohort And Three Years For Firms In The 2012/13 Cohort. The Number Of Beneficiaries And Non-Beneficiaries In Each Age Group Are: 555 EFG Beneficiaries And 10,905 Non-Beneficiaries For 'Age 0', 1,855 EFG Beneficiaries And 57,645 Non-Beneficiaries For 'Age 1-3', 2,420 EFG Beneficiaries And 65,990 Non-Beneficiaries For 'Age 4-9', 1,500 EFG Beneficiaries And 42,225 Non-Beneficiaries For 'Age 10-25', And 275 EFG Beneficiaries And 7,875 Non-Beneficiaries For 'Age 25+'.Samples Rounded To The Nearest 5 Firms In Accordance With BEIS' Data Confidentiality Rules.*Significant At The 5% Level, **Significant At The 10% Level

Source: IDBR and London Economics calculations

In addition, by turnover, smaller EFG beneficiaries generated larger growth in turnover and employment than larger EFG beneficiaries, compared to their respective matched non-beneficiaries. These results are consistent with the notion that younger and smaller firms are more financially constrained and benefit from interventions that support their access to finance.

Estimates of the impacts of guaranteed loans issued under the EFG scheme on survival probabilities are only significant for firms with turnover between £0.5m-£5m, suggesting that relatively larger businesses are driving the negative impact of the EFG on survival.

[41] Albeit not statistically significant

14 Estimates of EFG loan on outcomes by turnover band

Turnover band	Employment		Turnover		Survival	
	Avg. annual impact	Significant at the 1% level	Avg. annual impact	Significant at the 1% level	Avg. annual impact	Significant at the 1% level
£0.01m-0.25m	10.0%	No	11.2%	Yes	-0.5%	No
£0.25m-0.5m	6.0%	Yes	6.0%	Yes	-0.2%	No
£0.5m-1m	6.6%	Yes	6.0%	Yes	-0.8%	Yes
£1m-5m	4.1%	Yes	4.7%	Yes	-0.9%	Yes
>5m	1.3%	No	-1.0%	No	-0.2%	No

Note: Based on EFG beneficiaries drawing a loan in the period 2010/2011 – 2012/2013 and matched non-beneficiaries. Impacts annualised over five years for firms in the 2010/11 cohort, four years for firms in the 2011/12 cohort and three years for firms in the 2012/13 cohort. The number of beneficiaries and non-beneficiaries in each turnover band are: 2,015 EFG beneficiaries and 68,140 non-beneficiaries for '£0.01m-0.25m', 1,395 EFG beneficiaries and 37,315 non-beneficiaries for '£0.25m-0.5m', 1,270 EFG beneficiaries and 34,535 non-beneficiaries for '£0.5m-1m', 1,805 EFG beneficiaries and 46,035 non-beneficiaries for '£1m-5m', and 360 EFG beneficiaries and 8,280 non-beneficiaries for '>5m'. Samples rounded to the nearest 5 firms in accordance with BEIS' data confidentiality rules. *Significant at the 5% level, **Significant at the 10% level.

Source: IDBR and London Economics calculations

By sector, EFG beneficiaries in the 'Accommodation and food service activities' sector benefitted more from EFG loans than firms in the 'Manufacturing' sector, for example. Differences across the services and manufacturing sector may be due to differences in collateral availability and therefore access to finance.

Similarly, estimates of the impacts of guaranteed loans issued under the EFG scheme on survival probabilities were either positive or not significant in the 'Accommodation and food service activities', 'Professional, scientific and technical activities' and 'Wholesale and retail trade; repair of vehicles and motorcycles' sectors. Estimated survival impacts for 'Manufacturing' and 'Construction' were negative and significant.

15 Estimates of EFG loan on outcomes by sector

Sector	Employment		Turnover		Survival	
	Avg. annual impact	Significant at the 1% level	Avg. annual impact	Significant at the 1% level	Avg. annual impact	Significant at the 1% level
C Manufacturing	2.5%	Yes	3.1%	Yes	-1.8%	Yes
G Wholesale and retail trade; repair of vehicles and motorcycles	6.2%	Yes	6.5%	Yes	-0.8%	No*
F Construction	4.3%	Yes	7.2%	Yes	-4.8%	Yes
I Accommodation and food service activities	10.0%	Yes	10.0%	Yes	2.4%	yes
M Professional, scientific and technical activities	6.6%	Yes	9.7%	Yes	-0.4%	No

Note: Based on EFG beneficiaries drawing a loan in the period 2010/2011 – 2012/2013 and matched non-beneficiaries. Impacts annualised over five years for firms in the 2010/11 cohort, four years for firms in the 2011/12 cohort and three years for firms in the 2012/13 cohort. The number of beneficiaries and non-beneficiaries in each turnover band are: 1,055 EFG beneficiaries and 26,895 non-beneficiaries for 'C Manufacturing', 1,850 EFG beneficiaries and 51,925 non-beneficiaries for 'G Wholesale and retail trade; repair of vehicles and motorcycles ', 495 EFG beneficiaries and 14,200 non-beneficiaries for 'F Construction', 770 EFG beneficiaries and 18,325 non-beneficiaries for 'I Accommodation and food service activities', and 645 EFG beneficiaries and 22,850 non-beneficiaries for 'M Professional, scientific and technical activities'. Samples rounded to the nearest 5 firms in accordance with BEIS' data confidentiality rules. *Significant at the 5% level, **Significant at the 10% level

Source: IDBR and London Economics calculations

3.2.2 Duration of impacts

The duration of impacts are of policy interest because if they are short-lived, they may not be cost-beneficial. Typically, evaluation work takes place soon after an intervention and there is not a possibility of studying longer-term impacts. Fortunately, the present study allows for the duration of impacts to be considered up to five years after intervention (in the case of the 2010 EFG loan cohort).

Turnover and employment growth impacts were persistent, as EFG beneficiaries' turnover and employment growth rates were 4.5% p.a. higher than non-beneficiaries', five years after EFG beneficiaries had drawn guaranteed loans under the EFG scheme.

The negative impact on survival probabilities become significant from year four after treatment.

16 Estimates of EFG loan on outcomes by sector

	Employment		Turnover		Survival	
	Avg. annual impact	Significant at the 1% level	Avg. annual impact	Significant at the 1% level	Avg. annual impact	Significant at the 1% level
One year after treatment	14.4%	Yes	8.5%	Yes	-0.9%	No*
Two years after treatment	9.8%	Yes	8.3%	Yes	-0.5%	No**
Three years after treatment	7.0%	Yes	6.9%	Yes	-0.5%	No*
Four years after treatment	5.6%	Yes	5.6%	Yes	-0.5%	Yes
Five years after treatment	4.5%	Yes	4.8%	Yes	-0.8%	Yes

Note: Based on EFG beneficiaries drawing a loan in the period 2010/2011 – 2012/2013 and matched non-beneficiaries. Impacts annualised over five years for firms in the 2010/11 cohort, four years for firms in the 2011/12 cohort and three years for firms in the 2012/13 cohort. The number of beneficiaries and non-beneficiaries in each turnover band are: 6,990 EFG beneficiaries and 202,925 non-beneficiaries for 'One year after treatment', 6,940 EFG beneficiaries and 199,865 non-beneficiaries for 'Two years after treatment', 6,915 EFG beneficiaries and 199,385 non-beneficiaries for 'Three years after treatment', 5,775 EFG beneficiaries and 167,365 non-beneficiaries for 'Four years after treatment', and 3,920 EFG beneficiaries and 119,655 non-beneficiaries for 'Five years after treatment'. Samples rounded to the nearest 5 firms in accordance with BEIS' data confidentiality rules. *Significant at the 5% level, **Significant at the 10% level

Source: IDBR and London Economics calculations

3.3 Robustness tests

The robustness of the results was checked using a number of methods.

Firstly, the robustness of the central estimates to the influence of outliers was tested by a) removing firms with the top 5% of turnover from the sample and b) removing firms with employment growth outside the normal range from the sample.

Secondly, the robustness of the central estimates to differences in the growth of EFG beneficiaries and non-beneficiaries prior to treatment was assessed by controlling for turnover growth in the year prior to receipt of an EFG loan in the propensity score model.

The results across robustness tests show that the direction and order of magnitude of the main empirical estimates are preserved.

Table 6 Robustness of EFG loan impacts

	Avg. annual impact	Significant at the 1% level	EFG Beneficiaries	Non-Beneficiaries
Employment				
Central estimate	6.6%	Yes	6,885	198,450
Removing firms with top 5% of Turnover from the sample	7.5%	Yes	5,430	160,175
Removing firms with employment growth outside the normal range from the sample	4.5%	Yes	6,405	185,190
Controlling for growth in turnover prior to treatment in the propensity score model	5.3%	Yes	5,595	154,520
Turnover				
Central estimate	7.3%	Yes	6,965	202,235
Removing firms with top 5% of Turnover from the sample	8.3%	Yes	5,510	162,950
Removing firms with turnover growth outside the normal range from the sample	5.5%	Yes	6,765	195,390
Controlling for growth in turnover prior to treatment in the propensity score model	6.9%	Yes	5,650	156,435
Survival				
Central estimate	-0.6%	Yes	7,195	209,155
Removing firms with top 5% of Turnover from the sample	-0.4%	No**	5,675	169,030
Controlling for growth in turnover prior to treatment from the sample	-1.2%	Yes	5,780	159,480

Note: Based on EFG beneficiaries drawing a loan in the period 2010/2011 – 2012/2013 and matched non-beneficiaries. Impacts annualised over five years for firms in the 2010/11 cohort, four years for firms in the 2011/12 cohort and three years for firms in the 2012/13 cohort. Samples rounded to the nearest 5 firms in accordance with BEIS' data confidentiality rules

Source: IDBR and London Economics calculations

There may be an outstanding concern that evaluating differences in the economic outcomes of EFG beneficiaries and matched non-beneficiaries may yield biased estimates because of unobserved differences between the two groups (banks may select EFG beneficiaries on such 'unobservables'). To address this issue, estimates of turnover impacts are derived econometrically using a fixed effects estimator, which also controls for time-varying age, size and sector-specific shocks. Results are presented in Annex 5.

3.4 External validity

Sample selection bias, where the set of firms which are sampled are not representative of the population being studied, is a common problem in economic evaluation. The advantage of deriving estimates from the IDBR is that nearly all EFG firms extended loans between 2010/11 and 2012/13 are included in the analysis and that there are a large number of suitable non-beneficiary matches.

3.5 Survey evidence

Using survey evidence, this section sets out to understand the estimated economic impacts of the EFG scheme in greater detail.

The survey was conducted by IPSOS MORI via telephone interviews with EFG beneficiaries who received a loan between 2010/2011 and 2012/2013 and a matched sample of non-beneficiaries from the general business population.

For EFG beneficiaries, the survey focused on the year in which they had received the EFG loan. In cases where beneficiary firms had received EFG loans in multiple years, it focused on the year in which either the largest EFG loan was drawn, or if loans were of equal size, the first year in which an EFG loan was drawn.

For non-beneficiaries, the survey focused on the year in which they had received the largest amount of external finance between 2010 and 2013. For firms which had not received any external finance over this period, the survey focused on a randomly selected year between 2010 and 2013.

The table below provides a summary of the number of survey responses by year.

Table 7 Number of survey responses by year of analysis

Year of analysis	Non-beneficiary	EFG beneficiary	Total
2010	42	87	129
2011	48	124	172
2012	33	118	151
2013	36	39	75
Total	159	368	527

Source: IPSOS MORI survey

The key findings are as follows. EFG beneficiaries most frequently reported 'growing existing business lines' as a benefit of the financing provided by guaranteed loans under the EFG scheme, which is reflected in EFG beneficiaries also attributing improvements in their growth prospects to financing provided by guaranteed loans under the EFG scheme. The findings corroborate the estimates of the turnover and employment growth impacts.

EFG beneficiaries reported financing R&D or exporting activities with guaranteed loans under the EFG scheme less frequently. EFG beneficiaries were no more likely to introduce new processes than matched non-beneficiaries although they were more likely to introduce new products. Overall, the

survey evidence presents a mixed picture on whether EFG beneficiaries demonstrated greater/fewer behaviours associated with productive firms than non-beneficiaries.

Some EFG beneficiaries (approximately one in six) were facing challenging financial circumstances. Many EFG beneficiaries reported 'increasing… working capital' and 'having a safety cushion' as a benefit of the financing provided by guaranteed loans under the EFG scheme. Among EFG beneficiaries for which the main reason for seeking external finance was to provide working capital, covering falling sales, increased costs and bad debts as their reasons for applying for a guaranteed loan under the EFG scheme.

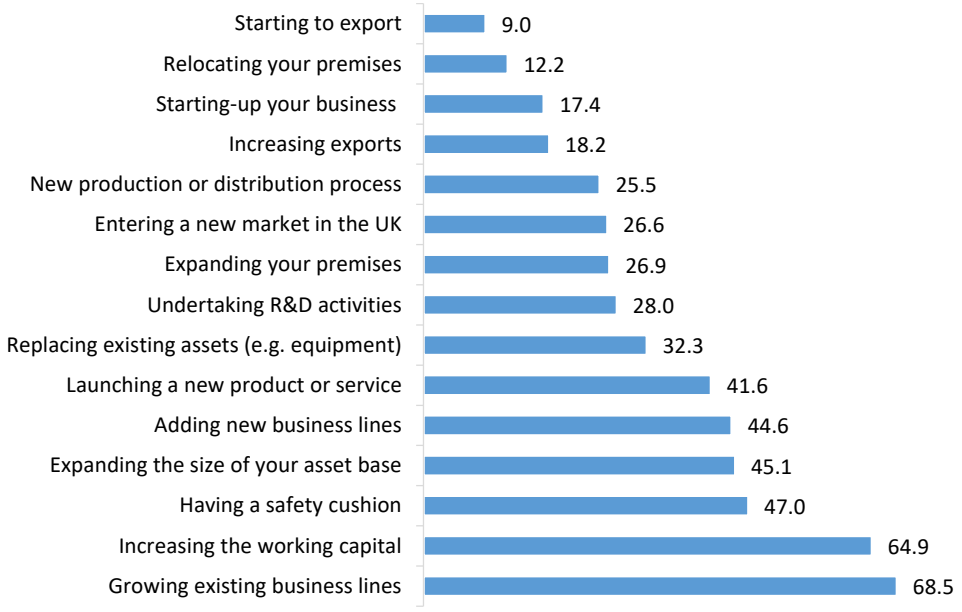
Additionally, approximately two-in-three EFG beneficiaries reported guaranteed loans under the EFG scheme improving their survival prospects. This may appear to contradict the econometric finding that EFG beneficiaries were less likely to survive then their non-beneficiary counterparts. However, beneficiary firms may not be aware of their true counterfactual outcome, and so the self-report estimates do not account for a true estimate of additionality. Moreover, the survey results are biased by the fact that they are constrained to firms which would have survived.

The remainder of this section discusses survey evidence on turnover and employment growth, productivity and survival in greater detail.

3.5.1 Impacts on turnover and employment growth

Overall, EFG beneficiaries perceived that guaranteed loans issued under the EFG scheme had a positive impact on their economic performance. The most common benefit of guaranteed loans issued under the EFG scheme reported was 'growing business lines' (a benefit experienced by 68.5% of EFG beneficiaries).

17 Types of benefits reported (in %)

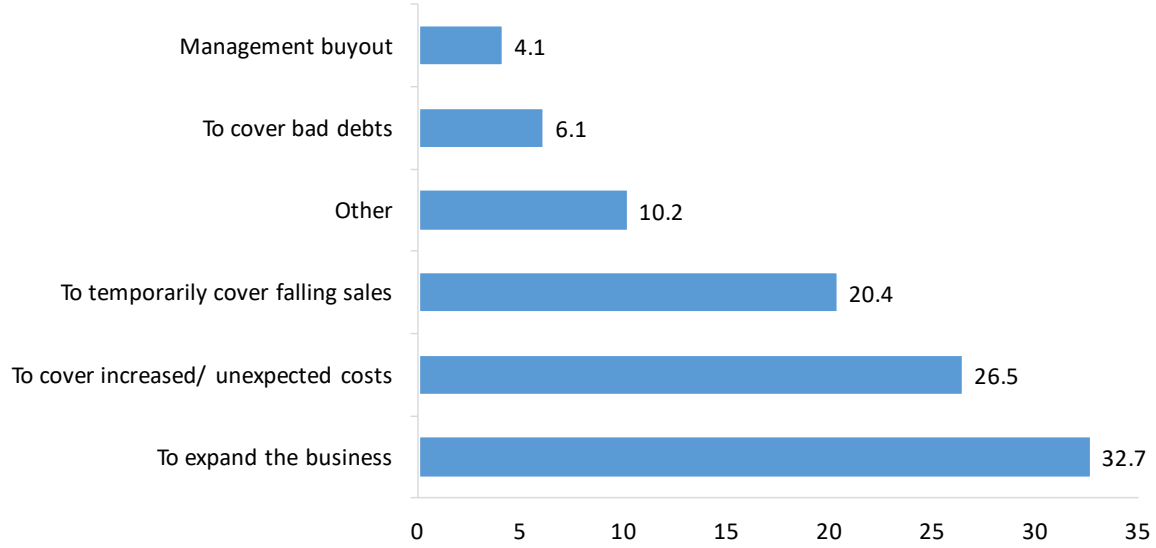


Note: Based on a sample of EFG beneficiaries drawing a loan in the period 2010/2011 – 2012/2013 and matched non-beneficiaries.
Source: IPSOS MORI survey and London Economics calculations

Interestingly, figure 17 above showed that 64.9% of EFG beneficiaries reported 'increasing working capital' as a benefit of guaranteed loans issued under the EFG scheme.

A relatively large proportion of EFG beneficiaries that used EFG loans to fund working capital, used it to cover temporary revenue shortfalls, higher/unexpected costs and bad debts as shown in figure 18. Many firms cited reasons for seeking working capital that suggest their businesses may have been struggling. For instance, 26.5%, 20.4% and 6.1% of EFG beneficiaries stated 'covering increased or unexpected costs', 'funding to temporarily cover falling sales', and 'to cover bad debts' as their main reasons for seeking working capital. However, close to one in three of the firms that cited 'working capital' as their main reason for seeking finance were looking to 'expand their business'.

18 Reasons why working capital was sought (in %)



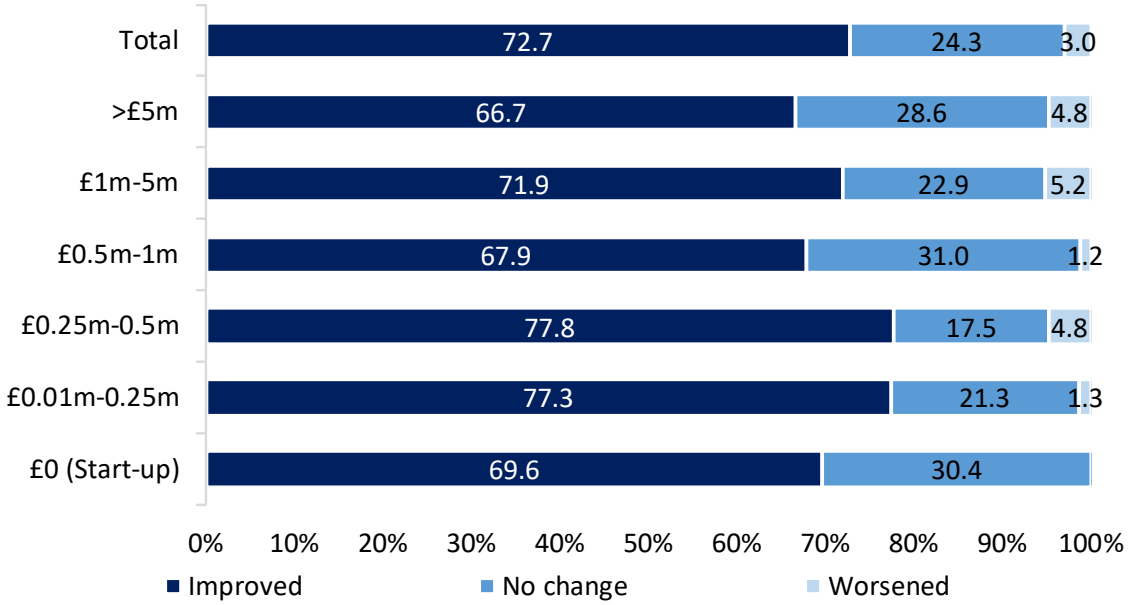
Source: IPSOS MORI survey and London Economics calculations

Note: Based on a sample of EFG beneficiaries drawing a loan in the period 2010/2011 – 2012/2013 and matched non-beneficiaries. Analysis covers 62 EFG beneficiaries whose main reason for seeking external finance was to provide working capital, where 13 respondents provided either 'Don't know' or 'Refused' as their response

Further, guaranteed loans issued under the EFG scheme had a positive impact on the self-reported growth prospects of firms. Figure 19 shows that 72.7% of EFG beneficiaries reported that receiving a guaranteed loan issued under the EFG scheme improved their growth prospects. Only 3.0% of EFG beneficiaries reported that the EFG loan had worsened their prospects. EFG beneficiaries with turnover of between £0.01 and £0.5m were the most likely to report that their growth prospects had improved as a result of the EFG loan.

The findings above corroborate the econometric estimates of the turnover and employment growth impacts.

19 **Impact of EFG loan on growth prospects (in %) by size of turnover (£m)**



Source: IPSOS MORI survey and London Economics calculations

Note: Based on a sample of EFG beneficiaries drawing a loan in the period 2010/2011 – 2012/2013 and matched non-beneficiaries. Analysis covers 368 EFG beneficiaries, where six respondents either responded 'Don't know' or 'Refused'

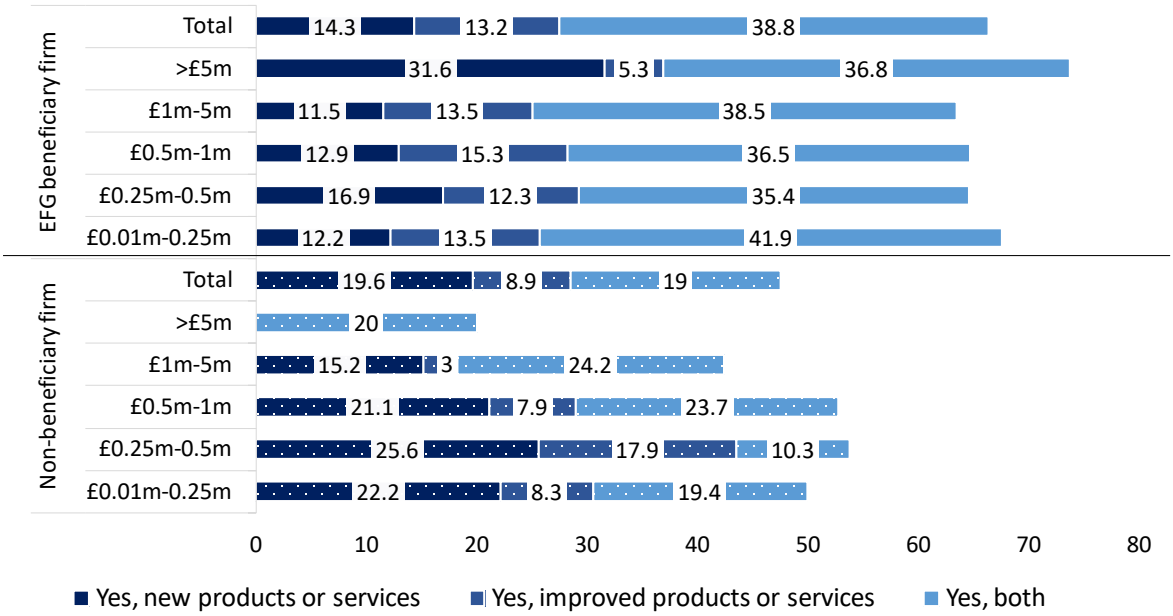
3.5.2 Impacts on drivers of productivity

New or improved products and services

EFG beneficiary firms were more likely to have introduced new or improved products and services than non-beneficiaries. Indeed, while 66.3% of EFG beneficiaries reported introducing new or improved products and services, the comparable figure was just 47.5% for matched non-beneficiaries. The difference in the shares is statistically significant in both un-weighted and weighted analysis.

Figure 20 shows that this result holds across all turnover categories. The largest differences in the likelihood of introducing new or improved products and services between EFG beneficiaries and non-beneficiaries was for firms with turnover of over £1m. This result implies that the largest impact of the EFG scheme on innovation may have been experienced by larger firms.

20 New or improved products and services (in %) by type of firm and by size of turnover (£m)



Source: IPSOS MORI survey and London Economics calculations

Note: Based on a sample of EFG beneficiaries drawing a loan in the period 2010/2011 – 2012/2013 and matched non-beneficiaries. Analysis covers 368 EFG beneficiaries and 159 non-beneficiaries, where five beneficiaries and one non-beneficiary respondent provided either 'Don't know' or 'Refused' as their response. The share of financially constrained firms is not presented for firms with a turnover of zero as there are not sufficient non-beneficiaries in this category to present results

New or improved processes

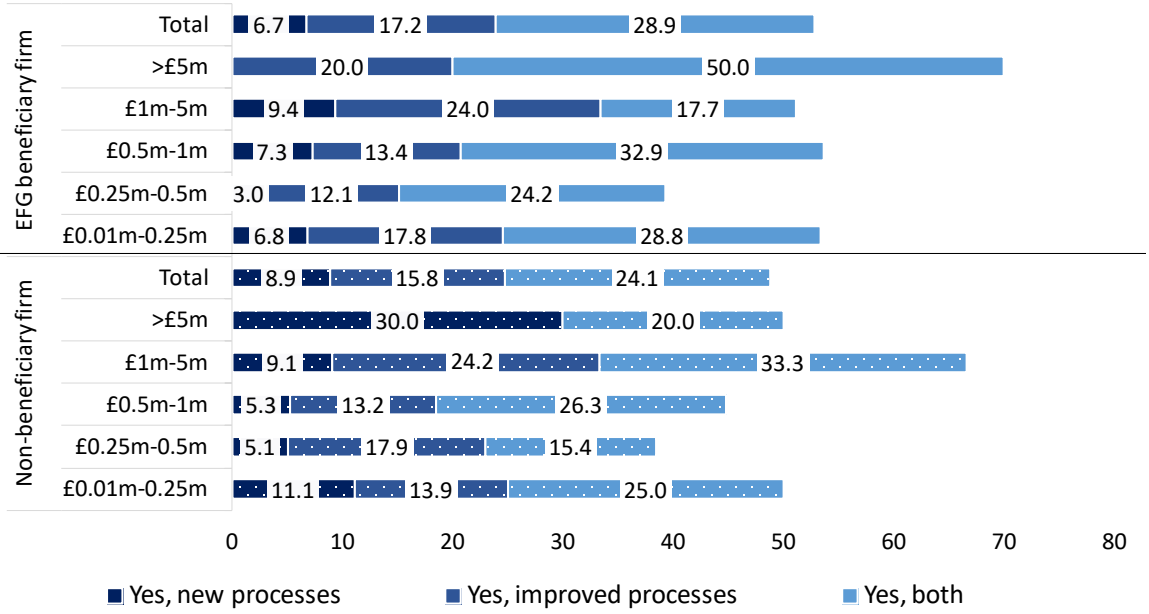
EFG beneficiaries were no more likely to have introduced new or improved processes non-beneficiaries.

Just over half (52.8%) of EFG beneficiaries reported introducing new or improved processes compared to 48.8% for non-beneficiaries.

Figure 21 shows that EFG beneficiaries with turnover of over £5m were the most likely to report new or improved processes at 70.0% of EFG beneficiaries reporting new or improved processes.

Comparatively, for non-beneficiaries, the most likely group to introduce new or improved processes were those with turnover of between £1 and £5m at 66.6% of non-beneficiaries reporting new or improved processes.

21 New or improved processes (in %) by type of firm and by size of turnover (£m)



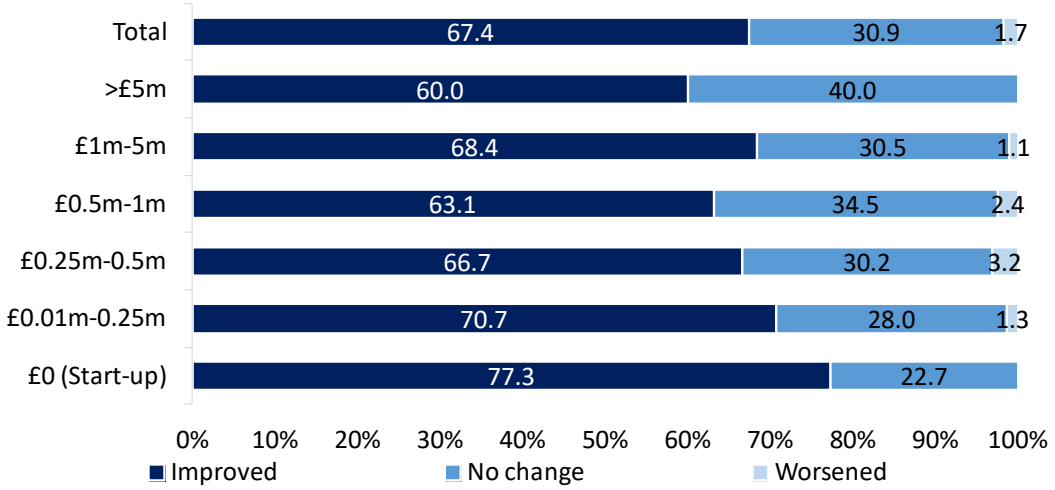
Source: IPSOS MORI survey and London Economics calculations

Note: Based on a sample of EFG beneficiaries drawing a loan in the period 2010/2011 – 2012/2013 and matched non-beneficiaries. Analysis covers 368 EFG beneficiaries and 159 non-beneficiaries, five beneficiaries and one non-beneficiary respondents provided 'Don't know' or 'Refused' as their response. The share of financially constrained firms is not presented for firms with a turnover of zero as there are not sufficient non-beneficiaries in this category to present results

3.5.3 Impacts on survival

The majority (67.4%) of EFG beneficiaries reported that guaranteed loans issued under the EFG scheme improved their chances of survival, as shown in figure 22 below. A small share, at 1.7% of EFG beneficiaries, reported that EFG loan had worsened survival prospects.

22 Impact on survival prospects of receiving EFG loan (in %) by size of turnover (£m)



Source: IPSOS MORI survey and London Economics calculations

Note: Based on a sample of EFG beneficiaries drawing a loan in the period 2010/2011 – 2012/2013 and matched non-beneficiaries. Analysis covers 368 EFG beneficiaries, nine respondents either responded 'Don't know' or 'Refused'

The above result can be rationalised with the negative impact of the EFG loan on survival outlined in the previous section because beneficiary firms may not be aware of their true counterfactual outcome, and so the self-report estimates are not accounting for additionality. The survey responses may also be biased, given they are based on firms which survived.[42]

3.5.4 Summary of key findings

EFG beneficiaries demonstrated turnover and employment growth that was 7.3% p.a. and 6.6% p.a. faster than non-beneficiaries in the econometric analysis, respectively. Further, turnover and employment growth impacts were persistent, as EFG beneficiaries' turnover and employment growth rates were still higher than non-beneficiaries' five years after EFG beneficiaries had drawn guaranteed loans under the EFG scheme.

The econometric analysis of the turnover and employment growth impacts are consistent with survey evidence showing that EFG beneficiaries attributing improvements in their growth prospects to financing provided by guaranteed loans under the EFG scheme and reporting benefits as a result of the scheme.

The central estimates for the impacts of EFG loans on survival probability from the econometric analysis show that EFG beneficiaries had a 0.6% lower annualised survival probability than non-beneficiaries (the survival probability of non-beneficiaries was 73.3%). The lower annualised survival probability of EFG beneficiaries may reflect that, once provided with access to finance, some of the least productive of the EFG beneficiaries face firm deaths more rapidly. Interestingly, start-up EFG beneficiaries' survival probabilities were 1.2% higher than non-beneficiaries, suggesting that access to finance through the EFG scheme was crucial when starting a business.

In the survey, approximately two-in-three EFG beneficiaries reported guaranteed loans under the EFG scheme improving their survival prospects. Survey responses may appear to be at odds with the econometric finding that EFG beneficiaries were less likely to survive then their non-beneficiary counterparts. However, beneficiary firms may not be aware of their true counterfactual outcome, and so the self-report estimates do not account for a true estimate of additionality.

The survey evidence presents a mixed picture on whether EFG beneficiaries demonstrated greater/fewer behaviours associated with productive firms than non-beneficiaries. EFG beneficiaries reported financing R&D or exporting activities with guaranteed loans under the EFG scheme less frequently. EFG beneficiaries were no more likely to introduce new processes than matched non-beneficiaries although they were more likely to introduce new products.

[42] Firm level surveys are generally not able to include firms which are no longer operational

4 Cost benefit analysis

This chapter provides a cost benefit analysis of the EFG scheme, describing the data and methodology, and results cost benefit analysis.

4.1 Methodology

The purpose of the cost benefit analysis of the Enterprise Finance Guarantee (EFG) scheme is to establish whether, and to what extent, the EFG scheme brings about economic gains to the UK economy.

The cost benefit analysis takes into account only costs and benefits that are 'additional'. In the context of a loan guarantee programme such as the EFG scheme, additional benefits refer to the economic benefits of loans: i) extended to borrowers that would not have been able to take out loans otherwise (the loans are 'finance additional'), ii) which do not displace the economic benefits that other businesses may have experienced in the absence of the scheme and iii) adjusting for firm survival. Further, the estimates of benefits of the previous chapter were derived from an econometric analysis of EFG participants and a counterfactual group of non-participants that are otherwise similar to EFG participants. As such, the estimates of benefits can be attributed to EFG loans.

Finance additionality for the surveyed 2010/11-2012/13 EFG beneficiaries was 63%, which is lower than estimates for finance additionality in the previous evaluation of the EFG scheme (83% in 2009) and evaluations of the predecessor scheme to the EFG scheme, the Small Firms Loan Guarantee (76% in 2006 and 70% in 1999).[43]

The benefits of the EFG scheme that are covered are primarily the gross value added (GVA) created and saved by firms participating in the scheme. The costs of the EFG scheme that are covered are the opportunity cost of capital employed in the scheme, the costs of loan defaults, the administrative burden of the scheme on lenders and the costs, to the British Business Bank, of administering the scheme.

The cost benefit analysis considers EFG participants in 2010/2011, 2011/2012 and 2012/2013. Costs and benefits are evaluated over the period from which EFG participants received a loan to the end of 2014/2015, which is the period for which data are available. Costs and benefits are also projected forward five years after receiving an EFG loan for each loan cohort.

[43] Differences in credit conditions may be a potential reason for differences in finance additionality across the various evaluations that have taken place. One may expect greater finance additionality when credit conditions are tighter and indeed finance additionality was higher for the 2009 cohort than the 2010/11-2012/13 cohorts. However, credit conditions were looser prior to the onset of the global financial crisis in 2008 yet finance additionality was higher in this period. As such, credit conditions alone do not fully explain the relatively finance additionality in this evaluation compared to previous ones. Another reason that finance additionality may be different across evaluations is that it was measured differently.

Both costs and benefits are deflated to reflect real values and discounted using the HMT Green Book rate of 3.5% to provide their Net Present Values (NPV).

The remainder of this section describes the evaluation of cost and benefits in greater detail.

4.1.1 Costs

There are five categories of costs associated with the EFG scheme:

- the opportunity cost of capital employed in the scheme;
- the net[44] costs of loan defaults;
- the costs of administering the scheme borne by the Government
- the Guarantee Fee (formerly premium) (which offsets other Exchequer costs); and
- administrative burden borne by lenders.

Opportunity cost of capital

Funds used for an EFG loan (including the EFG loan itself provided by banks, and the loan guarantee provided by the government) could have been used for other purposes. Hence, there is an opportunity cost of capital used for EFG loans to take into account in the cost benefit analysis.

The opportunity cost of capital faced by banks is calculated at the expected rate of return foregone as a result of granting EFG loans.[45] The expected rate of return is measured as the average loan rates for all SMEs which has been approximately 3.5%, as shown in 23 below.[46]

The opportunity cost of capital faced by the Exchequer is calculated at 3.5% of EFG claims made. There is no Exchequer opportunity cost of holding budget to make EFG claims, as the Government will honour all EFG claims made (within the claims limit).

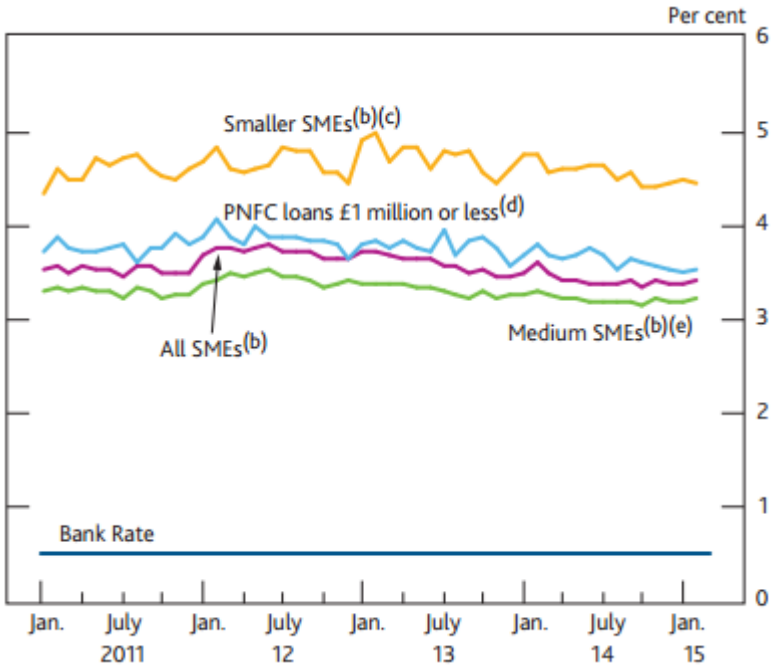
The opportunity cost of capital (faced by the private sector and Exchequer) are economic costs. Exchequer opportunity costs are also included as an Exchequer cost.

[44] Net of recoveries

[45] The opportunity costs of capital will be based on the opportunity costs of loan defaults and the opportunity costs of the outstanding amounts lent.

[46] Bank of England (2015). 'Trends in Lending'

23 Indicative interest rates on lending to SMEs



Notes: (a) These indicative rates do not reflect the impact of cashback deals or fees. Data for Bank Rate are to end-March and for all other series to end-February. Non-seasonally adjusted. (b) Median by value of SME facilities (new loans, new and renewed overdrafts) priced at margins over base rates, by four major UK lenders (Barclays, HSBC, Lloyds Banking Group and Royal Bank of Scotland). Data cover lending in both sterling and foreign currency, expressed in sterling. (c) Smaller SMEs are businesses with annual debit account turnover on the main business account less than £1 million. (d) Weighted average of new lending to PNFCs of all sizes by UK MFIs for advances less than or equal to £1 million, an indicator of pricing for small business loans. Data cover lending in sterling. The Bank's effective interest rates series are currently compiled using data from 22 UK MFIs. (e) Medium SMEs are businesses with annual debit account turnover on the main business account between £1 million and £25 million
Sources: BIS, Bank of England and Bank of England calculations

Net costs of loan defaults

The net costs of EFG loan defaults are taken into account in the cost benefit analysis, as these costs would not have arisen in the absence of the EFG scheme.

The *net* cost of a loan default is the outstanding balance of the loan in the event of default minus the value of assets recovered[47] (e.g., loan collateral relinquished by the borrower).

The EFG scheme guarantees 75 percent of the outstanding balance of a loan in the event of a default, subject to a cap on the number of EFG loan defaults at the lender level. The cap was originally set at 9.75 percent per lender but was revised upwards in April 2012 to 15 percent per lender.

[47] The value of assets recovered was only available for government. Lenders were assumed to recover the same share of defaults as the government. This will still understate the size of recoveries for lenders because the government would have only received the value of recoveries if the value of loan defaults was below the cap.

The net costs of loan defaults to the Exchequer is therefore the net costs covered by the EFG scheme, which enter the calculation of the Exchequer costs. The evaluation has factored in that not all guaranteed defaults will be claimed against by lenders (this is based on EFG management information).

The net cost of loan defaults to society is the total cost of additional loan defaults covered by the Exchequer and lenders, which enter the economic costs calculation.

Administrative costs (British Business Bank)

Administrative costs[48] associated with managing the EFG scheme are taken into account in the cost benefit analysis. Administrative costs include staff costs (including wages, pensions, employer National Insurance Contributions and other staff costs including training, travel and subsistence), IT, professional, legal costs and also the costs of operating the portal required for delivering the scheme. The administrative costs enter the calculation of the Exchequer costs and economic costs calculations.

Guarantee Fee (formerly referred to as premium)

The costs of the EFG scheme (discussed above) are partially offset by the income generated by the scheme, as BBB, on behalf of Government, levies a Guarantee Feeof two percent per annum. The Guarantee Fee is paid quarterly on the outstanding balance of the EFG loan for every period of trading.

Income from the Guarantee Fee offsets the other costs to the Exchequer and enters the calculation of the economic costs and Exchequer costs. There is no benefit to society of the Guarantee Fee as the benefit to the Exchequer is cancelled out by the cost borne by businesses, and therefore the income from the Guarantee Fee will not enter the societal costs and benefits calculation.

Administrative burden

The administrative burden of the EFG scheme on lenders is estimated by assuming that each EFG application has a half-hour wage cost associated with it. Lenders must report information about EFG loans via a web portal. It has been assumed that the number of EFG loans drawn represents 90% of applications that incur an administrative burden, as there may be instances where applications are withdrawn or offers are not taken up but still result in some administrative burden for lenders[49].

The administrative burden costs enter the calculation of the economic costs and Exchequer costs.

[48] Total administrative costs were allocated to the firms extended loans between 2010/11 and 2012/13 using the ratio of guarantee fees paid by these EFG beneficiaries and all EFG beneficiaries.

[49] The administrative burden cost is so small that this assumption does not significantly affect the societal BCR.

4.1.2 Benefits

Value added

The economic benefits of the EFG scheme are primarily based on the GVA created or saved as a result of the turnover impacts derived in the previous chapter.

Scaling factors for finance additionality and product market displacement are based on survey estimates for these factors. A scaling factor for firm survival is derived based on data from the Inter-Departmental Business Register.

Firm survival

Firm survival is also taken into account in the cost benefit analysis.

The benefits of firm survival are based on the value of additional GVA arising from firms surviving when they might have otherwise failed. As a firm level approach cannot be used to measure this value, it is assumed that each firm which has survived as a result of the EFG scheme has the average value for GVA impacts that can be attributed to the scheme.

4.2 Key results

Benefits of the EFG scheme are estimated at £254 million for the 2010/11 cohort which accrue four years after loan issue. Benefits of the EFG scheme are £106m for the 2011/12 cohort (three years after loan issue) and £55m for the 2012/13 cohort (two years after loan issue). The benefits of additional turnover outweigh the negative impact of the EFG scheme on firm survival.

Table 8 Total economic benefits (£m) by loan cohort

	2010/11	2011/12	2012/13	2013/14	2014/15	Total
Total Economic Benefits		**29.7**	**54.4**	**76.0**	**93.7**	**253.7**
Benefit from turnover (GVA created)		32.1	58.7	81.7	100.5	272.9
Benefits from survival (GVA saved)		-2.4	-4.3	-5.7	-6.8	-19.2

Source: British Business Bank, IPSOS MORI survey and London Economics calculations

Table 9 Total economic benefits (£m) by loan cohort

	2010/11	2011/12	2012/13	2013/14	2014/15	Total
Total Economic Benefits			**19.6**	**36.2**	**50.6**	**106.4**
Benefit from turnover (GVA created)			21.2	39.0	54.4	114.7
Benefits from survival (GVA saved)			-1.6	-2.8	-3.8	-8.3

Source: British Business Bank, IPSOS MORI survey and London Economics calculations

Table 10 Total economic benefits (£m) by loan cohort

	2010/11	2011/12	2012/13	2013/14	2014/15	Total
Total Economic Benefits				**19.4**	**35.8**	**55.1**
Benefit from turnover (GVA created)				21.0	38.6	59.5
Benefits from survival (GVA saved)				-1.6	-2.8	-4.4

Source: British Business Bank, IPSOS MORI survey and London Economics calculations

The total economic costs of the EFG scheme for the 2010/2011 to 2012/2013 EFG cohorts were £82 million and are largely due to the opportunity costs of capital associated with the value of outstanding balances of EFG loans as shown in the detailed cost information provided in 0.

Exchequer costs are negative for two of the loan cohorts considered (the 2011/12 and 2012/13 loan cohorts) because the revenues from the 2% Guarantee Fee payment exceeds Exchequer costs as also set out in 0.

Table 11 Economic and Exchequer costs (£m) by loan cohort

	2010/11	2011/12	2012/13	2013/14	2014/15	Total
2010/2011						
Economic costs	7.1	9.6	12.6	13.4	4.7	47.4
Exchequer costs	-5.8	-4.9	4.4	9.5	1.7	5.0
2011/2012						
Economic costs		4.2	5.8	6.2	4.6	20.8
Exchequer costs		-3.4	-3.1	1.0	1.7	-3.8
2012/2013						
Economic costs			3.8	5.3	4.7	13.8
Exchequer costs			-3.1	-3.0	-0.3	-6.4
Total economic costs						**82.0**
Total Exchequer costs						**-5.2**

Source: British Business Bank, IPSOS MORI survey and London Economics calculation

The central estimate for the societal BCR is 5.4 for the 2010/11 cohort (a period of four years after receiving an EFG loan), the 2011/12 cohort has a societal BCR of 5.1 (three years after receiving an EFG loan), and the 2012/13 cohort has a BCR of 4.0 (two years after receiving an EFG loan).

Table 12 Societal benefit-to-cost ratios by loan cohort

	1-year societal BCR	2-year societal BCR	3-year societal BCR	4-year societal BCR
2010/2011	1.8	2.9	3.7	5.4
2011/2012	2.0	3.4	5.1	
2012/2013	2.1	4.0		

Source: British Business Bank, IPSOS MORI survey and London Economics calculations

The societal BCRs are also presented excluding (negative) survival benefits in the table below, the rationale for which is as follows. Negative survival benefits of the EFG scheme may reflect that, once provided with access to finance, some of the least productive of the EFG beneficiaries face firm deaths more rapidly. Negative survival benefits may therefore be associated with a reallocation of capital to more productive firms that generates economic benefits. Given that it is unclear whether negative survival benefits generate economic benefits (due to the reallocation of capital) or economic costs (due to the firm deaths *per se*) on a net basis, it may be useful to evaluate societal BCRs excluding (negative) survival benefits. Excluding survival benefits, the central estimate for the 4-year societal BCR (based on the 2010/11 loan cohort) is 5.8.

Table 13 Societal benefit-to-cost ratios (excluding survival benefits) by loan cohort

	1-year societal BCR	2-year societal BCR	3-year societal BCR	4-year societal BCR
2010/2011	1.9	3.1	4.0	5.8
2011/2012	2.1	3.7	5.5	
2012/2013	2.3	4.3		

Source: British Business Bank, IPSOS MORI survey and London Economics calculations
Note: Year 1 is the first year after loan issue, benefit-to-cost ratios are cumulative

4.3 Projecting costs and benefits forward

This section presents five-year societal BCRs on the basis of actual and projected values for economic costs and benefits.

Five-year societal BCRs are computed as EFG loans typically have a duration of five years. Moreover, the results of the previous chapter showed that turnover and employment growth impacts were persistent out to five years and should be accounted for – EFG beneficiaries' turnover and employment growth rates being 4.5% p.a. higher than non-beneficiaries' five years after EFG beneficiaries had drawn guaranteed loans under the EFG scheme.

Economic costs and benefits are projected for one year for the 2010/11 loan cohort (as actual values are available for four years), for two years for the 2011/12 loan cohort and for three years for the 2012/13 loan cohort.

Projections for economic benefits assume an annual turnover growth of 7.3% in the first four years after a loan is drawn, as per the central estimate for the impact of an EFG loan on turnover (see section 0). Turnover growth is then assumed to be 4.8% in the fifth year, which reflects the findings of the durations of impacts analysis (see section 3.2.2).

Projections for economic costs are carried out as follows. Projections for non-administrative costs (for example, for EFG claims) are made on the basis of the profile of actual economic costs for the 2010/11 loan cohort. Administrative costs to the BBB are assumed to be constant, and reflect 2014/15 values. There are no additional administrative costs to lenders to project, as the EFG web portal information is inputted when the loans are originated.

Details of the projected economic costs and benefits can be found in Annex 6.

The five-year societal BCR of the scheme was projected at 7.2 for the 2010/2011 cohort, 10.1 for the 2011/2012 cohort and 11.3 for the 2012/2013. Differences in the projected five-year societal BCRs between cohorts predominately arise because of differences in the turnover of an average EFG firm and the size of EFG claims.

Table 14 Projected societal benefit-to-cost ratios by loan cohort

	1-year societal BCR	2-year societal BCR	3-year societal BCR	4-year societal BCR	5-year societal BCR
2010/2011	1.8	2.9	*3.7*	*5.4*	***7.2***
2011/2012	2.0	3.4	*5.1*	***7.5***	***10.1***
2012/2013	2.1	4.0	***5.9***	***8.5***	***11.3***

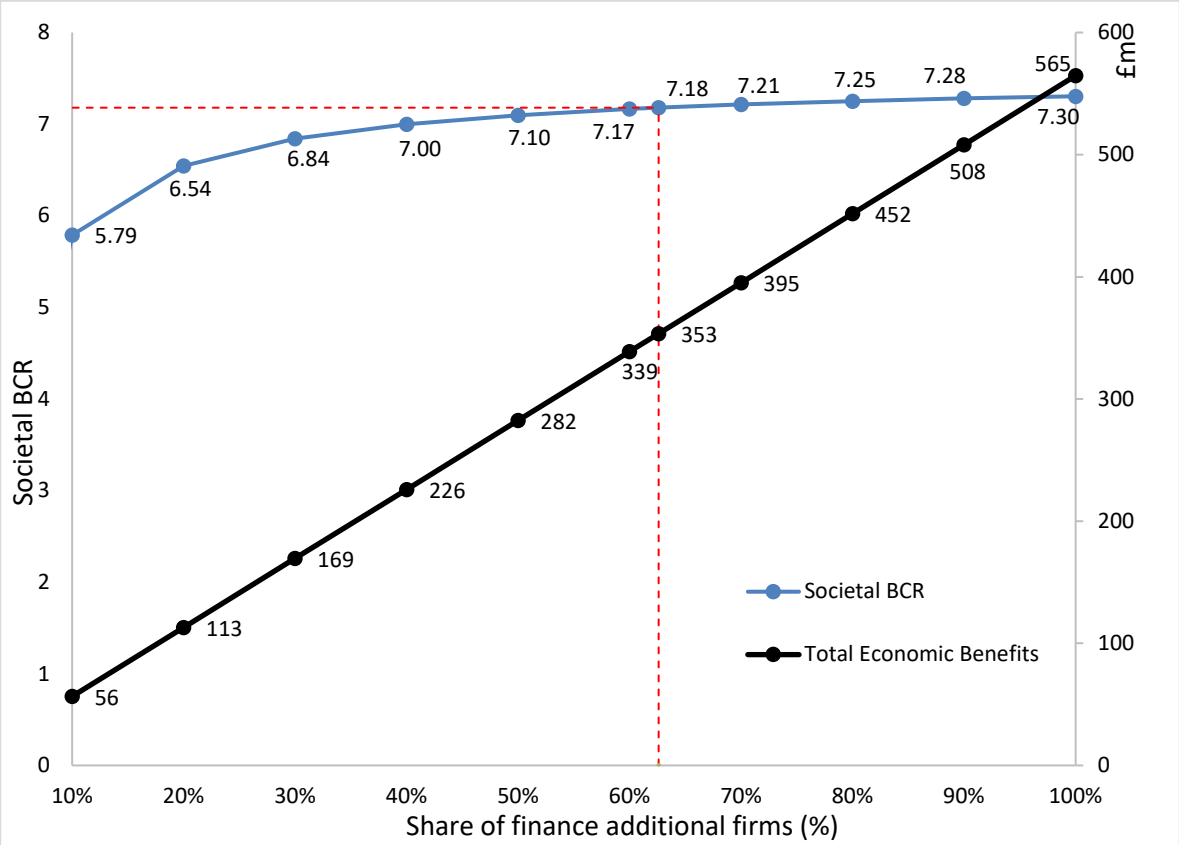
Source: British Business Bank, IPSOS MORI survey and London Economics calculations
Note: Year 1 is the first year after loan issue, benefit-to-cost ratios are cumulative

4.4 Sensitivity of BCRs to the level of finance additionality

A key input into the BCR calculations derived above is the level of finance additionality. Finance additionality is measured on the basis of a relatively small-scale survey carried out as part of this evaluation and may be subject to a degree of measurement error. For this reason, it is useful to test the sensitivity of the BCRs to the level of finance additionality – given the uncertainty around this measure. The figure below shows the sensitivity of the 5-year societal BCR and magnitude of economic benefits to the level of finance additionality for the 2010/11 cohort. The 5-year societal BCR is relatively insensitive to changes in finance additionality around its measured level of 63%. However, economic benefits vary depending on the level of finance additionality – a 10% change in finance additionality results in over a £50m change in the magnitude of economic benefits.[50]

[50] The sensitivity of BCRs and economic benefits to the level of finance additionality follows a similar pattern for the 2011/12 and 2012/13 loan cohorts (not reported)

24 Sensitivity of 5-year societal BCR and economic benefits to the level of finance additionality, 2010/11 loan cohort



As economic benefits vary by finance additionality it is important to note that measured finance additionality was lower in this evaluation than previous ones. Finance additionality for the surveyed 2010/11-2012/13 EFG beneficiaries was 63%, which is lower than estimates for finance additionality in the previous evaluation of the EFG scheme (83% in 2009) and evaluations of the predecessor scheme to the EFG scheme, the Small Firms Loan Guarantee (76% in 2006 and 70% in 1999).

Differences in credit conditions may be a potential reason for differences in finance additionality across the various evaluations that have taken place. One may expect greater finance additionality when credit conditions are tighter and indeed finance additionality was higher for the 2009 cohort than the 2010/11-2012/13 cohorts. However, credit conditions were looser prior to the onset of the global financial crisis in 2008 yet finance additionality was higher in this period. As such, credit conditions alone do not fully explain the lower level of finance additionality in this evaluation compared to previous ones. Another reason that finance additionality may be different across evaluations is that it was measured differently.

The benefit-to-cost ratio is relatively insensitive to the level of finance additionality; the ratio ranges from 5.79 at a 10% level of finance additional to 7.30 at a 100% level of finance additionality. While the true level of finance additionality is unclear, even without assuming the 63% measured finance additionality, the EFG scheme generates sizeable societal benefit-to-cost ratios.

Nevertheless, a greater focus towards firms that are bona fide financially constrained could result in an increase in the EFG scheme's societal BCR.

The EFG scheme is net beneficial taking into account the costs of the scheme. The total economic benefits of the EFG scheme for the 2010/2011 to 2012/2013 loan cohorts estimated up to 2014/15 were £415m.[51] The benefits of additional turnover outweigh the negative impact of the EFG scheme on firm survival.

The total economic costs of the EFG scheme for the 2010/2011 to 2012/2013 EFG cohorts were £82m estimated up to 2014/15 and are largely due to the opportunity costs of capital associated with the value of outstanding balances of EFG loans. Exchequer costs are negative for two of the loan cohorts considered (the 2011/12 and 2012/13 loan cohorts) because the revenues from the 2% guarantee fee payment exceeds Exchequer costs.

The five-year societal BCR of the scheme was projected at 7.2 for the 2010/2011 cohort, 10.1 for the 2011/2012 cohort and 11.3 for the 2012/2013.

[51] Benefits of the EFG scheme were estimated at £254 million for the 2010/11 cohort four years after loan issue. The benefits of the EFG scheme were £106m for the 2011/12 cohort (three years after loan issue) and £55m for the 2012/13 cohort (two years after loan issue)

5 Conclusions

The aim of the present evaluation of the EFG scheme was to provide the British Business Bank (BBB) with an evidence base on the EFG scheme to make future resource allocations.

The evaluation results showed that the EFG scheme has yielded positive benefit-to-cost ratios for the UK economy.

The present evaluation focused on economic impacts reported in the end of year accounts of EFG beneficiaries, found in the Inter-Departmental Business Register[52], which are collected by the Office for National Statistics. Unless otherwise indicated, the results in this section are based on the aforementioned dataset.

EFG beneficiaries generated larger gains in economic outcomes than matched non-beneficiaries, which represented the counterfactual of what EFG beneficiaries' outcomes would have been in the absence of guarantees loan provision under the EFG scheme. EFG beneficiaries demonstrated turnover and employment growth that was 7.3% p.a. and 6.6% p.a. faster than non-beneficiaries, respectively.

Moreover, the economic impacts of guaranteed loans issued under the EFG scheme were persistent. Turnover and employment growth impacts were persistent, as EFG beneficiaries' turnover and employment growth rates were still higher than non-beneficiaries' five years after EFG beneficiaries had drawn guaranteed loans issued under the EFG scheme.

The EFG scheme appears to have had a greater impact among firms experiencing greater financing constraints. One expects small and young firms to face greater financing constraints, perhaps because they typically have shorter credit histories and lack collateral. And indeed, guaranteed loans issued under the EFG scheme had greater impacts for relatively small and young firms.

The central estimates for the impacts of EFG loans on survival probability show that EFG beneficiaries have a 0.6% lower annualised survival probability than non-beneficiaries. The lower annualised survival probability of EFG beneficiaries may reflect that, once provided with access to finance, some of the least productive of the EFG beneficiaries face firm deaths more rapidly. However, start-up EFG beneficiaries' survival probabilities are 1.2% higher than non-beneficiaries.

A survey was also conducted by IPSOS MORI via telephone interviews with 368 EFG beneficiaries that received a loan between 2010/2011 and 2012/2013 and a matched sample of 159 non-beneficiaries from the general business population with a view to understanding the economic impacts of the EFG scheme in greater detail.[53] The survey findings corroborate the estimates of the

[52] BEIS version of the Inter-Departmental Business Register. It is important to note that this is not the same version of the Inter-Departmental Business Register that is provided to ONS approved researchers though the Office for National Statistics Virtual Microdata Laboratory.

[53] Further details of the survey are provided in Annex 1

turnover and employment growth impacts, with EFG beneficiaries attributing improvements in their growth prospects to financing provided by guaranteed loans under the EFG scheme.

Finance additionality for the surveyed 2010/11-2012/13 EFG beneficiaries was 63%, which is lower than estimates for finance additionality in the previous evaluation of the EFG scheme (83% in 2009) and evaluations of the predecessor scheme to the EFG scheme, the Small Firms Loan Guarantee (76% in 2006 and 70% in 1999).

Overall, there is a potential trade-off between the economic impacts of the EFG scheme derived from firm-level growth and reduced survival probability. However, the EFG scheme is net beneficial, given the potential trade-off and taking into account the costs of the scheme. Further, while the EFG scheme generates sizeable societal benefit-to-cost ratios, greater targeting towards firms that are bona fide financially constrained could result in an increase in the EFG scheme's societal BCR.

A) Index of Tables, Figures and Boxes

Tables

Figures

ANNEXES

Annex 1 Survey methodology

A1.1 Fieldwork

The survey was conducted by IPSOS MORI via telephone interviews with EFG beneficiaries who received a loan between 2010/2011 and 2012/2013 and a matched sample of non-beneficiaries from the general business population.

The non-beneficiary sample was constructed using the propensity score model outlined in section 0. The non-beneficiary businesses were sourced from the Inter Departmental Business Register (IDBR) and the Bureau Van Dyke Orbis server. Non-beneficiaries were screened on the basis of having applied for external finance, where only firms that applied for or obtained external finance since 2010 were included in the sample.

The main fieldwork was conducted between January and March 2017 and the average interview duration during fieldwork was around 25 minutes for beneficiaries and 15 minutes for non-beneficiaries. The questionnaire was fully piloted prior to the start of the main fieldwork.

Table 15 below presents the outcomes of the survey.

Table 15 Survey outcomes

	Beneficiaries		Non-beneficiaries	
	No	**%**	**No**	**%**
Completed interview	368	13	159	5
Abandoned interview	26	1	21	1
Refused	292	10	587	20
Bad number	396	14	405	14
Soft appointment	184	7	115	4
Not available in field work period	222	8	415	14
No answer/answer machine	1189	42	842	29
Screen out - Company no longer trading	4	*	0	0
Screen out - No one aware of EFG	118	4	0	0
Screen out - No finance applied for/obtained	0	0	350	12
Screen out - Financially constrained*	0	0	5	0
Eligibility (completed/completed + screen out)	75%		31%	
Total (called at least once)	2799	100	2899	100

Source: IPSOS MORI survey
Note: *Screening criteria removed following pilot

For EFG beneficiaries, the survey focused on the year in which they had received the EFG loan. In cases where beneficiary firms had received EFG loans in multiple years, it focused on the year in which either the largest EFG loan was drawn, or if loans were of equal size, the first year in which an EFG loan was drawn.

For non-beneficiaries, the survey focused on the year in which they had received the largest amount of external finance between 2010 and 2013. For firms which had not received any external finance over this period, the survey focused on a randomly selected year between 2010 and 2013.

Table 16 Number of survey responses by year of analysis

Year of analysis	Non-beneficiary	EFG beneficiary	Total
2010	42	87	129
2011	48	124	172
2012	33	118	151
2013	36	39	75
Total	159	368	527

Source: IPSOS MORI survey and London Economics calculations

A1.2 Unweighted and weighted analysis

The report presents unweighted survey results. For the purpose of significance testing, results were tested both an unweighted sample and a sample weighted using turnover, age and sector groups.

In survey design, weighting is a commonly used tool to correct for a sample selection bias, where the set of firms which are sampled are not representative of the population being studied. With weighting, there is always a trade-off involved between biasing the results towards a small number of observations and correcting for selection bias.

Due to the trade-offs, the present report presents unweighted survey results to favour the transparency of the results.

A1.3 Significance tests

Table 17 below presents the F-statistics and probability values for any significance tests referred to in the main body of the report.

Table 17 Statistical tests for differences in means

Variable	Weighted analysis			Unweighted analysis		
	F stat	P value	Significant at 5% level	F stat	P value	Significant at 5% level
Binary variable for introducing a new or improved product	9.2	0.0	Yes	16.2	0.0	Yes
Binary variable for introducing a new or improved process	2.3	0.1	No	0.7	0.4	No

Source: IPSOS MORI survey and London Economics calculations

Annex 2 Benefit-to-cost ratios

The benefit-to-cost ratios (BCRs) which are estimated for the EFG scheme are as follows:

- the societal cost-benefit ratio
- ratio of net economic benefit to each Exchequer £1

The societal BCR provides the social return of the EFG scheme based on investment made by society, including costs incurred by both the Government and the private sector. It is given by the ratio of the net present value of total Economic Benefits to the net present value of Economic Costs.

Calculation of the societal cost-benefit ratio

$$\text{Societal BCR} = \frac{\text{NPV Total Economic Benefits}}{\text{NPV Total Economic Costs}}$$

A value for money assessment from the Exchequer perspective takes into account the net costs to the Exchequer. It is given by the ratio of the net present value of net Economic Benefits to the net present value of net Exchequer Costs.

Calculation of the ratio of net economic benefit to each Exchequer £1

$$\text{Exchequer BCR} = \frac{\text{NPV (Economic Benefits – Economic Costs)}}{\text{NPV (Exchequer Costs – Exchequer Revenue)}}$$

A2.1 Detailed cost information

Economic costs mainly consist of the opportunity cost of loans drawn and the cost of loan defaults, as shown in table 20, table 21, and table 22 below.

Table 20 Total economic costs (£m), 2010/11 loan cohort

	2010/11	2011/12	2012/13	2013/14	2014/15	Total
Economic costs	**7.1**	**9.6**	**12.6**	**13.4**	**4.7**	**47.4**
Exchequer EFG claims for additional loans	-	1.1	5.4	7.4	2.2	16.0
Administrative costs (BBB)	0.4	0.4	0.2	0.1	0.1	1.2
Opportunity cost (exchequer)	-	0.1	0.3	0.4	0.1	0.9
Exchequer recoveries for additional loans	-	0.0	0.0	-0.1	-0.2	-0.3
Administrative burden (lenders)	0.0	-	-	-	-	0.0
Bank defaults (that are not guaranteed)	-	0.4	1.8	2.5	0.7	5.3
Opportunity cost (lenders)	6.7	7.7	5.0	3.1	1.8	24.3
Bank recoveries	-	-0.0	-0.0	-0.0	-0.1	-0.1

Source: British Business Bank, IPSOS MORI survey and London Economics calculations

Table 21 Total economic costs (£m), 2011/12 loan cohort

	2010/11	2011/12	2012/13	2013/14	2014/15	Total
Total Economic Costs		**4.2**	**5.8**	**6.2**	**4.6**	**20.8**
Exchequer EFG claims for additional loans		0.0	0.6	2.2	2.0	4.8
Administrative costs (BBB)		0.2	0.2	0.1	0.1	0.6
Opportunity cost (exchequer)		-	0.0	0.1	0.1	0.3
Exchequer recoveries for additional loans		-	-	0.0	0.0	-0.0
Administrative burden (lenders)		0.0	-	-	-	0.0
Bank defaults (that are not guaranteed)		0.0	0.2	0.7	0.7	1.6
Opportunity cost (lenders)		4.0	4.7	3.0	1.8	13.5
Bank recoveries		-	-	0.0	0.0	0.0

Source: British Business Bank, IPSOS MORI survey and London Economics calculations

Table 22 Total economic costs (£m), 2012/13 loan cohort

	2010/11	2011/12	2012/13	2013/14	2014/15	Total
Total Economic Costs			**3.8**	**5.3**	**4.7**	**13.8**
Exchequer EFG claims for additional loans			-	0.5	1.3	1.8
Administrative costs (BBB)			0.2	0.2	0.2	0.5
Opportunity cost (exchequer)			-	0.0	0.1	0.1
Exchequer recoveries for additional loans			-	-	-0.0	-0.0
Administrative burden (lenders)			0.0	-	-	0.0

	2010/11	2011/12	2012/13	2013/14	2014/15	Total
Bank defaults (that are not guaranteed)			-	0.2	0.4	0.6
Opportunity cost (lenders)			3.6	4.4	2.8	10.8
Bank recoveries			-	-	0.0	0.0

Source: British Business Bank, IPSOS MORI survey and London Economics calculations

Exchequer costs are mainly arising from loan defaults, as shown by table 23, table 24, and table 25 below.

Table 23 Total exchequer costs (£m), 2010/11 loan cohort

	2010/11	2011/12	2012/13	2013/14	2014/15	Total
Exchequer costs	**-5.8**	**-4.9**	**4.4**	**9.5**	**1.7**	**5.0**
Exchequer EFG claims	-	1.7	8.6	11.8	3.5	25.6
Of which exchequer EFG claims for additional loans	-	1.1	5.4	7.4	2.2	16.0
Administrative costs (BBB)	0.4	0.4	0.2	0.1	0.1	1.2
Opportunity cost (exchequer)	-	0.1	0.3	0.4	0.1	0.9
Guarantee Fees	-6.1	-7.0	-4.6	-2.8	-1.7	-22.2
Exchequer recoveries	-	-0.0	-0.1	-0.1	-0.3	-0.5
Of which exchequer recoveries for additional loans	-	-0.0	-0.0	-0.1	-0.2	-0.3

Source: British Business Bank, IPSOS MORI survey and London Economics calculations

Table 24 Total exchequer costs (£m), 2011/12 loan cohort

	2010/11	2011/12	2012/13	2013/14	2014/15	Total
Exchequer costs		**-3.4**	**-3.1**	**1.0**	**1.7**	**-3.8**
Exchequer EFG claims		0.0	1.0	3.5	3.2	7.7
Of which exchequer EFG claims for additional loans		0.0	0.6	2.2	2.0	4.8
Administrative costs (BBB)		0.2	0.2	0.1	0.1	0.6
Opportunity cost (exchequer)		-	0.0	0.1	0.1	0.3
Guarantee Fees		-3.6	-4.3	-2.8	-1.6	-12.4
Exchequer recoveries		-	-	-0.0	-0.0	-0.1
Of which exchequer recoveries for additional loans		-	-	-0.0	-0.0	-0.0

Source: British Business Bank, IPSOS MORI survey and London Economics calculations

Table 25 Total exchequer costs (£m), 2012/2013 loan cohort

	2010/11	2011/12	2012/13	2013/14	2014/15	Total
Exchequer costs			-3.1	-3.0	-0.3	-6.4
Exchequer EFG claims			-	0.8	2.0	2.9
Of which exchequer EFG claims for additional loans			-	0.5	1.3	1.8
Administrative costs (BBB)			0.2	0.2	0.2	0.5
Opportunity cost (exchequer)			-	0.0	0.1	0.1
Guarantee Fees			-3.3	-4.0	-2.6	-9.9
Exchequer recoveries			-	-	-0.0	-0.0
Of which exchequer recoveries for additional loans			-	-	-0.0	-0.0

Source: British Business Bank, IPSOS MORI survey and London Economics calculation

Annex 3 Survey-based measures of deadweight and displacement

A3.1 Finance additionality

Estimates of economic benefits of the EFG scheme are adjusted for the percentage of EFG participants that either self-reported as financially constrained (and therefore for which loan funding was additional) or reported that they would not have received EFG finance in the absence of the scheme.

An EFG participant is financially constrained if it is unable to access the size of the loan it needs or if the price (or other T&C's) at which the size of the loan it needs is too high. As the receipt of the EFG loan may have reduced the number of EFG beneficiaries who met the criteria for a financially constrained firm, an EFG participant is also considered financially constrained if it probably or definitely would not have received finance in the absence of the EFG scheme.

Based on the above definition, 62.6% of firms were credit constrained, and therefore 62.6% of EFG loans were finance additional.

Table 26 Adjustments for finance additionality – based on survey responses

Question	Response	Finance additional
When you were applying for or considering applying for external finance, please confirm whether any the following issues were applicable to your business[54]:	Have been put off applying for a specific source of external finance due to fear of rejection	Financially constrained if Y (and therefore EFG loan is additional)
	Despite applying, did not receive any offers of external financing at all	Financially constrained if Y (and therefore EFG loan is additional)
	Refused to proceed with offers of external financing because of unfavourable costs and/or terms of financing	Financially constrained if Y (and therefore EFG loan is additional)
	Did not receive all the external financing requested	Financially constrained if Y (and therefore EFG loan is additional)
In your opinion, would other external finance or a loan without the guarantee from the EFG scheme have been available to you?	Yes, definitely	-
	Yes, probably	-
	Probably not	Financially constrained if Y (and therefore EFG loan is additional)
	Definitely not	Financially constrained if Y (and therefore EFG loan is additional)

Source: London Economics

[54] Firms were asked to report whether any of these statements applied to any external finance that they may have considered or taken up since receiving the EFG loan for EFG beneficiaries or the sample year for non-beneficiaries.

A3.2 Product market displacement

Estimates of economic benefits of the EFG scheme are adjusted for product market displacement, which for each firm surveyed is assessed based on the location of competitors, the competitiveness of the market, and the extent to which sales would readily be captured by other firms. Partial displacement is calculated by taking the product of the displacement created by each of these factors:

The adjustment estimated by each factor is presented in table 27 below, according to the survey responses provided.

Based on the above definition, 48.7% of firm activity was product market displacing.

The above approximation is likely to overstate product market displacement as it ignores quality gains or other gains from the increased competition that might be generated from the EFG loan. This measure of displacement is also purely at a national level, and overlooks local dynamics.

Table 27 Adjustments for product market displacement – based on survey responses

Question	Response	Displacement
Are any of your current customers based…?	Only in UK	100% displacement
	Outside the UK	0% displacement
	Both	x% displacement Where x is the share of sales located outside the UK
If your business were to cease trading tomorrow, do you think any of your competitors would take up your current sales over the next year?	Yes, all of the sales	100% displacement
	Yes, some of them	50% displacement
	No, none of the sales	0% displacement
If your business were to cease trading tomorrow, do you think any of your competitors would take up your current sales over the next year?	Very intense competition	100% displacement
	Intense competition	75% displacement
	Moderate competition	50% displacement
	Weak competition	25% displacement
	No competition at all	0% displacement

Source: London Economics

Annex 4 Propensity score model results

The results of the main PS model are provided in the tables below. It should be noted that the use of the logit model it is purely instrumental to the estimation of the propensity score, and as such estimated coefficients are not be interpreted.

Table 28 Propensity score model

Independent variable	Estimate	Standard Error	Significant at 1% level
Treatment dummy (2011)	1.06	0.04	Yes
Treatment dummy (2012)	0.89	0.04	Yes
Treatment dummy (2013)	0.54	0.05	Yes
Turnover (log)	0.42	0.01	Yes
Number of employees (level)	0.06	0.00	Yes
Number of employees (squared)	- 0.00	0.00	Yes
Number of employees (cubed)	0.00	0.00	Yes
No employees	- 0.88	0.04	Yes
Firm incorporated in the last year	4.18	0.07	Yes
Firm between one and three years old	2.30	0.05	Yes
Firm between four and nine years old	1.62	0.05	Yes
Firm between ten and twenty five years old	0.74	0.05	Yes
Construction	- 0.90	0.05	Yes
Transportation and Storage	- 0.48	0.08	Yes
Information, communication, financial and insurance activities	- 0.60	0.05	Yes
Real estate	- 0.67	0.09	Yes
Professional, scientific and technical activities	- 0.75	0.04	Yes
Administrative and support service activities	- 0.56	0.05	Yes
Education, human health and social work, arts, entertainment and recreation and other service activities	- 0.42	0.04	Yes
London	- 0.09	0.06	No
South East of England	0.03	0.06	No
South West of England	0.28	0.06	Yes
North East of England	0.31	0.08	Yes
North West of England	0.40	0.06	Yes
East of England	- 0.03	0.06	No

Wales	0.13	0.08	No
Northern Ireland	- 0.71	0.14	Yes
Yorkshire and the Humber	0.28	0.06	Yes
West Midlands	0.17	0.06	Yes
East Midlands	0.13	0.07	No*
Constant	- 10.93	0.10	Yes
Number of EFG beneficiaries	6,965		
Number of non-beneficiaries	202,235		

Source: IDBR and London Economics calculations

Notes: Based on EFG beneficiaries drawing loans over the period 2010/11-2012/13 and matched non-beneficiaries. The control group includes firms which received loans in 2010, were over 25 years of age, located in Scotland, and in the following sectors 'B Mining and Quarrying', 'A Agriculture, Forestry and Fishing', 'C Manufacturing', 'D Electricity, gas, steam and air conditioning supply' 'E Water supply, sewerage, waste management and remediation', 'G Wholesale and retail trade; repair of vehicles and motorcycles 'and 'I Accommodation and food service activities'. The model presented is based on turnover outcomes. The models for survival and employment are comparable, but are based on slightly different samples due to differences in data gaps between outcome variables. Samples rounded to the nearest 5 firms in accordance with BEIS' data confidentiality rules

Annex 5 Robustness tests

The three tables below provide fixed effects estimates of the impacts of the EFG on turnover and employment.

The estimating equation is of the form below, which is 'Model 1' in each of the tables below. Subsequently, 'Model 2'controls for the log of contemporaneous employment, 'Model 3' controls for the region, sector and the loan cohort of the firm and 'Model 4' includes both the controls in the previous two models.

$y_{it} = \beta_0 + \delta T_i + \gamma l_t + \theta(T_i * l_t) + \varepsilon_{it}$ .....(A1)

y_{it} are outcomes of interest (employment and turnover)

T_i is the treatment (that is, the EFG loan)

l_t is a set of time-specific dummies that indicate the time period (that is, year 1 after loan extension under a loan portfolio guarantee, year 2 after loan extension, etc.)

$T_i * l_t$ is their interaction

ε_{it} is an error term

δ, γ and θ are individual / vectors of coefficients

β_0 is a constant

The impact of the EFG on an outcome is measured as the sum of γ and θ. The estimates of the impact of the EFG on turnover (on the basis of which the benefits in the cost benefit analysis are estimated) are in a similar range to the central estimates presented in the main report.

Table 29 Robustness of EFG loan impacts, fixed effects estimates of turnover impacts

	Model 1		Model 2		Model 3		Model4	
	Estimate	Significant at 1% level	Estimate	Significant at 1% level	Estimate	Significant at 1% level	Estimate	Significant at 1% level
EFG loan	0.15	Yes	0.11	Yes	0.15	Yes	0.12	Yes
Interaction between EFG loan and one year after treatment dummy	-0.07	Yes	-0.05	No*	-0.07	Yes	-0.05	Yes
Interaction between EFG loan and two years after treatment dummy	-0.02	No	-0.01	No	-0.02	No	-0.02	No
Interaction between EFG	0.00	No	0.00	No	0.00	No	0.00	No

	Model 1		Model 2		Model 3		Model4	
	Estimate	Significant at 1% level	Estimate	Significant at 1% level	Estimate	Significant at 1% level	Estimate	Significant at 1% level
loan and three years after treatment dummy								
Interaction between EFG loan and four years after treatment dummy	0.01	No	0.00	No	0.00	No	0.00	No
Contemporaneous log of employees			0.41	Yes			0.41	Yes
Constant	6.27	Yes	5.49	Yes	6.27	Yes	5.49	Yes
Fixed effects	Yes		Yes		Yes		Yes	
Time dummies	Yes		Yes		Yes		Yes	
Regional, sector & cohort dummies	No		No		Yes		Yes	
Sample size	64,400		63,525		64,400		63,525	

Source: IDBR and London Economics calculations

Note: Based on EFG beneficiaries drawing loans over the period 2010/11-2012/13 and matched non-beneficiaries. *Significant at the 5% level, **Significant at the 10% level. Interaction between EFG and five years after treatment could not be estimated due to collinearity with interaction between EFG and four years after treatment. Samples rounded to the nearest 5 firms in accordance with BEIS' data confidentiality rules

Table 30 Robustness of EFG loan impacts, fixed effects estimates of employment impacts

	Model 1		Model 2		Model 3		Model 4	
	Estimate	Significant at 1% level	Estimate	Significant at 1% level	Estimate	Significant at 1% level	Estimate	Significant at 1% level
EFG loan	0.10	Yes	0.06	Yes	0.09	Yes	0.06	Yes
Interaction between EFG loan and one year after treatment	- 0.04	No*	- 0.02	No*	- 0.04	No*	- 0.02	No
Interaction between EFG loan and two	- 0.02	No	- 0.01	No	- 0.02	No	- 0.02	No

	Model 1		Model 2		Model 3		Model 4	
	Estimate	Significant at 1% level	Estimate	Significant at 1% level	Estimate	Significant at 1% level	Estimate	Significant at 1% level
years after treatment								
Interaction between EFG loan and three years after treatment	- 0.00	No	- 0.01	No	- 0.01	No	- 0.01	No
Interaction between EFG loan and four years after treatment	0.01	No	0.01	No	0.01	No	- 0.01	No
Contemporaneous log of turnover			0.26	Yes			0.00	No
Constant	1.96	Yes	0.34	Yes	1.96	Yes	0.34	Yes
Fixed effects	Yes		Yes		Yes		Yes	
Time dummies	Yes		Yes		Yes		Yes	
Regional, sector & cohort dummies	No		No		Yes		Yes	
Sample size	63,595		63,525		63,595		63,525	

Source: IDBR and London Economics calculations

Note: Based on EFG beneficiaries drawing loans over the period 2010/11-2012/13 and matched non-beneficiaries. *Significant at the 5% level, **Significant at the 10% level. Interaction between EFG and five years after treatment could not be estimated due to collinearity with interaction between EFG and four years after treatment. Samples rounded to the nearest 5 firms in accordance with BEIS' data confidentiality rules

Annex 7 Projections of economic costs and benefits

Table 31 Projected total economic costs (£m) - 2010/2011 loan cohort

	2010/11	2011/12	2012/13	2013/14	2014/15	Projected 2015/2016	Projected 2016/2017	Projected 2017/2018	Projected total over five years
Economic costs	**7.1**	**9.6**	**12.6**	**13.4**	**4.7**	**1.9**	**-**	**-**	**49.2**
Exchequer EFG claims for additional loans	-	1.1	5.4	7.4	2.2	0.7	-	-	16.7
Administrative costs (BBB)	0.4	0.4	0.2	0.1	0.1	0.1	-	-	1.3
Opportunity cost (exchequer)	-	0.1	0.3	0.4	0.1	0.0	-	-	0.9
Exchequer recoveries for additional loans	-	-0.0	-0.0	-0.1	-0.2	-0.2	-	-	-0.5
Administrative burden (lenders)	0.0	-	-	-	-	-	-	-	0.0
Bank defaults (that are not guaranteed)	-	0.4	1.8	2.5	0.7	0.2	-	-	5.6
Opportunity cost (lenders)	6.7	7.7	5.0	3.1	1.8	1.1	-	-	25.5
Bank recoveries	-	-0.0	-0.0	-0.0	-0.1	-0.1	-	-	-0.2

Source: British Business Bank, IPSOS MORI survey and London Economics calculations

Table 32 Projected total economic costs (£m) - 2011/2012 loan cohort

	2010/11	2011/12	2012/13	2013/14	2014/15	Projected 2015/2016	Projected 2016/2017	Projected 2017/2018	Projected total over five years
Total Economic Costs		**4.2**	**5.8**	**6.2**	**4.6**	**1.9**	**0.9**		**23.6**
Exchequer EFG claims for additional loans		0.0	0.6	2.2	2.0	0.6	0.2		5.6
Administrative costs (BBB)		0.2	0.2	0.1	0.1	0.1	0.1		0.8
Opportunity cost (exchequer)		-	0.0	0.1	0.1	0.0	0.0		0.3
Exchequer recoveries for additional loans		-	-	-0.0	-0.0	-0.1	-0.1		-0.2
Administrative burden (lenders)		0.0	-	-	-	-	-		0.0
Bank defaults (that are not guaranteed)		0.0	0.2	0.7	0.7	0.2	0.1		1.9
Opportunity cost (lenders)		4.0	4.7	3.0	1.8	1.1	0.7		15.4
Bank recoveries		-	-	-0.0	-0.0	-0.0	-0.0		-0.1

Source: British Business Bank, IPSOS MORI survey and London Economics calculations

Table 33 Projected total economic costs (£m) - 2012/2013 loan cohort

	2010/11	2011/12	2012/13	2013/14	2014/15	Projected 2015/2016	Projected 2016/2017	Projected 2017/2018	Projected total over five years
Total Economic Costs			**3.8**	**5.3**	**4.7**	**4.4**	**1.9**	**1.0**	**21.1**
Exchequer EFG claims for additional loans			-	0.5	1.3	1.8	0.5	0.2	4.2
Administrative costs (BBB)			0.2	0.2	0.2	0.1	0.1	0.1	0.9
Opportunity cost (exchequer)			-	0.0	0.1	0.1	0.0	0.0	0.2
Exchequer recoveries for additional loans			-	-	-0.0	-0.0	-0.0	-0.0	-0.0
Administrative burden (lenders)			0.0	-	-	-	-	-	0.0
Bank defaults (that are not guaranteed)			-	0.2	0.4	0.6	0.2	0.1	1.4
Opportunity cost (lenders)			3.6	4.4	2.8	1.8	1.1	0.7	14.3
Bank recoveries			-	-	-0.0	-0.0	-0.0	-0.0	-0.0

Source: British Business Bank, IPSOS MORI survey and London Economics calculations

Table 34 Projected total economic benefits (£m) - 2010/2011 loan cohort

	2010/11	2011/12	2012/13	2013/14	2014/15	Projected 2015/2016	Projected 2016/2017	Projected 2017/2018	Projected total over five years
Total Economic Benefits		**29.7**	**54.4**	**76**	**93.7**	**99.8**			**353.5**
Benefit from turnover (GVA created)		32.1	58.7	81.7	100.5	105.8			378.7
Benefits from survival (GVA saved)		-2.4	-4.3	-5.7	-6.8	-6.0			-25.2

Source: British Business Bank, IPSOS MORI survey and London Economics calculations

Table 35 Projected total economic benefits (£m) - 2011/2012 loan cohort

	2010/11	2011/12	2012/13	2013/14	2014/15	Projected 2015/2016	Projected 2016/2017	Projected 2017/2018	Projected total over five years
Total Economic Benefits			**19.6**	**36.2**	**50.6**	**64**	**67.1**		**237.6**
Benefit from turnover (GVA created)			21.2	39.0	54.4	67.5	70.1		252.2
Benefits from survival (GVA saved)			-1.6	-2.8	-3.8	-3.4	-3.0		-14.6

Source: British Business Bank, IPSOS MORI survey and London Economics calculations

Table 36 Projected total economic benefits (£m) - 2012/2013 loan cohort

	2010/11	2011/12	2012/13	2013/14	2014/15	Projected 2015/2016	Projected 2016/2017	Projected 2017/2018	Projected total over five years
Total Economic Benefits				**19.4**	**35.8**	**51.7**	**64.1**	**67.3**	**238.2**
Benefit from turnover (GVA created)				21	38.6	54.2	66.4	69.2	249.3
Benefits from survival (GVA saved)				-1.6	-2.8	-2.5	-2.2	-2.0	-11.1

Source: British Business Bank, IPSOS MORI survey and London Economics calculation

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