The impact of public loan guarantees on banks' risk taking and firms' growth: evidence from France

Alexandre Gazaniol, Mathilde Lê*

This version : 11/09/2020

Abstract

This paper investigates the economic impact and cost-efficiency of the main national loan guarantee program in France, using a very rich dataset gathering information both at the entrepreneur- and at the firm-level. First, we document that French commercial banks are more likely to use public loan guarantees for ambitious entrepreneurs with relatively low collateral and/or no parallel income, as well as fast-growing mature companies with relatively low solvency or liquidity ratios. Taking this selection bias into account, we show that loan guarantees have a positive impact on survival, sales, value-added and employment. The underlying mechanism is a better access to external finance, with the guarantee immediately translating into an increase of financial debt. However, we find no evidence of a "certification effect" easing recipients' financial conditions on the longer run. Importantly, we find that loan guarantees affect how firms exit the market, with recipients being more likely to file a bankruptcy but less likely to go through a dissolution. This might partly explain the conflicting results of the literature regarding the impact of guarantees on survival and default. Finally, we compute the public gross cost per additional job, which ranges between 2 800 and 3 500 euros depending on the guarantee target. These results are consistent with other empirical evidence and suggest that loan guarantees are a cost-efficient policy that allows to correct market failures on the credit market.

Keywords: loan guarantees, access to finance, financial frictions, entrepreneurship.

Introduction

The Covid-19 pandemic has urged Governments worldwide to enact exceptional stimulus measures in order to prevent business bankruptcies and layoffs in the private sector. In this context, government-backed loan guarantee programs have been one of the most popular policies and have reached an unprecedented scale in some countries (see OECD, 2020). As an illustration, the French loan guarantee program which was enacted during the pandemic ("Prêts garantis par l'Etat", PGE) has a maximum capacity of 300 G€, which represents about 30 % of the outstanding loans to non-financial companies in France. Although there is a broad consensus that these programs were needed to address the liquidity needs of firms, their generosity has also raised concerns about potential undesired effects, such as moral hazard and adverse selection (Gopinath, 2020; BIS, 2020; World Bank, 2020). Ultimately, this context reinforces the need of assessing the economic impact of loan guarantee programs and of fully understanding the mechanisms at stake, since empirical evidence is still scarce on these matters (see Schich *et al.*, 2017).

In this context, our paper assesses the economic impact and the efficiency of the main national loan guarantee program in France, which is operated by the French development bank, Bpifrance. More specifically, we focus on two of the main guarantee funds operated by Bpifrance, namely the "creation" fund (which targets investments made by new businesses) and the "expansion" fund (which targets investments made by mature SMEs). To this end, we use difference-in-difference estimators and propensity-score matching techniques on a very rich dataset, which allows us (i) to compute the impact of guarantees on a wide range of financial outcomes (access to finance) and economic outcomes (survival, sales, employment, investment) (ii) to cover all size classes, even the smallest companies with zero or a few employees (iii) to control for many firms and entrepreneurs' characteristics, including some features which could not be generally observed by statisticians– such as the ambition to grow or non-financial support (iv) to account for different macroeconomic conditions, since the sample covers the period 2007 - 2017. Using our impact estimates, we also use proprietary data of Bpifrance to compute the needed gross public endowment for each additional job or each additional euro of investment, which allows us to assess the cost-efficiency of the program.

Our results are the following. First, we confirm that French commercial banks use loan guarantees for investment projects which appear relatively risky ex-ante, which is precisely an objective of the scheme: entrepreneurs with relatively low collateral and/or no parallel income, mature companies with relatively low solvency or liquidity ratios. Taking this selection bias into account, we show that loan guarantees have a positive impact on survival, turnover, employment and investment. We show that the underlying mechanism is an improved access to finance, since the recipients of guarantees show no difference of trajectory with control firms that simultaneously raise debt without a guarantee. Reversely, we find no evidence of a "certification effect": recipients of guarantees show no greater growth of financial debt in the years following the grant of the guarantee. Finally, we estimate that the gross public endowment needed to create one additional job is relatively low and ranges between 2,800 and 3,500 euros, depending on the typology of guaranteed projects. All this evidence suggests that public guarantees are an efficient way of alleviating financial frictions for SMEs throughout the cycle.

The contribution of our paper to the literature is twofold. First, we take advantage of the richness of our data to investigate about the characteristics at the entrepreneur-level which determine the use of loan guarantees when financing a new business. To our knowledge, no empirical paper has

investigated this issue using such a large and detailed dataset. We show that French commercial banks are more likely to use guarantees for young and/or previously unemployed entrepreneurs. A possible explanation for this result is that these two characteristics are associated with other unobservable ones, such as the lack of personal resources: in that regard, we also find that entrepreneurs using guarantees are more likely to benefit from other financial support (such as subsidized corporate or personal loans and subsidies for business creation) and that they are less likely to have parallel revenues. Our results also show that entrepreneurs using guarantees are relatively ambitious: they more frequently express the objective of developing the created business (in terms of employment or investment) instead of only securing their own job. These different results are consistent with the hypothesis that commercial banks perceive greater risks on these investment projects and therefore use loan guarantees to reduce their risk exposure. Another interesting result is that entrepreneurs using guarantees are more likely to benefit from the support of structures dedicated to fostering business creation or innovation activities (such as chambers of commerce or networks of entrepreneurs). These structures, by helping entrepreneurs to mature their project, might play a certification effect for banks, allowing them to reduce information asymmetries on creation projects (reminding that loan guarantees are only partial and therefore that banks remain exposed in case of default)[1].

The second contribution of our paper is to provide a potential explanation for the conflicting results of the literature regarding the impacts of guarantees on firms' survival. Our empirical analysis suggests that these conflicting results might come from the fact that loan guarantees affect the form of exits: when focusing on bankruptcy filings, we find that guarantees increase the probability of bankruptcy (replicating the results of Lelarge *et al.*, 2010, which analyze the same guarantee scheme on a less recent period); however, when focusing on all business terminations (including those without a legal procedure), we find opposite results, i.e. a positive impact of guarantees on survival. We argue that this difference is related to the fact that loan guarantees partly determine the termination mode of one business. If loan guarantees improve access to bank loans, recipients of guarantees are, by construction, more likely to have creditors than non-recipients and therefore more likely to go through a legal bankruptcy filing in case of default. The fact that reversely, the share of dissolutions is lower among recipients of guarantees (compared to non-recipients with a similar risk profile ex-ante) might reflect the fact that without the guarantee, firms are more likely to terminate their business because of an insufficient access to finance. Therefore, we argue that focusing on bankruptcies or defaults introduces a bias in the survival analysis and potentially leads to neglect the positive impact of guarantees on access to finance. In that regard, it is worth noting that most empirical studies concluding that guarantees have a negative impact on survival focus on the probability of defaults or bankruptcy rather than the probability of dissolution (see appendix I).

Our paper relates closely to several fields of the literature. First, we build on a vast body of papers investigating the financing patterns of small and medium businesses, both theoretically and empirically. Especially, our paper closely relates to several studies looking at the financing conditions

---

[1] This hypothesis of a certification effect is all the more plausible that in France, several networks of entrepreneurs provide not only advice and information but also financial support with personal loans ("prêts d'honneur"). These loans are meant to increase the entrepreneur's equity and to have a leverage on bank loans. Since networks grant these personal loans following a specific screening process (usually implying other entrepreneurs and bankers), obtaining a "prêt d'honneur" provides commercial banks valuable information about the quality of the project.

of new entrepreneurs according to their initial characteristics and expectations (Landier and Thesmar, 2009; Bustamente and D'Acunto, 2019; Derrien *et al.*, 2020). As detailed above, our empirical analysis completes this literature by showing evidence of a self-selection process regarding the use of loan guarantees for the financing of new entrepreneurs. Second, our paper adds a new brick to the fast-growing literature about the economic impact of loan guarantees and their effectiveness (for the French case, see for example Lelarge *et al.*, 2010; Bertoni *et al.*, 2018; Barrot *et al.*, 2019). Our empirical analysis supports the assumption that loan guarantees allow to correct market failures on the credit market, since we show that they increase financial debt, sales and employment at the firm-level. Our analysis introduces new insights about the effect of loan guarantees on how firms exit the market: it suggests that focusing on bankruptcies and/or defaults provides only a partial view of the effects of guarantees, neglecting their positive impact on access to finance. Finally, while evidence on the cost-efficiency of loan guarantees is still scarce (Barrot *et al.*, 2019; Brown and Earle, 2017), we provide new estimates for the gross public cost per job, which are consistent with those of Barrot *et al.* (2019) and suggest that loan guarantees are a cost-effective policy.

Our paper is structured as follows. Section 1 provides a literature review. Section 2 presents the institutional background and the characteristics of loan guarantees operated by Bpifrance. In section 3, we present our methodology. Section 4 presents the data and results are displayed in section 5.

Section 1: theoretical and empirical background

Public credit guarantee schemes (CGS) are very popular within OECD countries and Western Europe (see Beck *et al.*, 2010; OECD, 2013; Chatzouz *et al.*, 2017). These schemes consist in insuring lenders against credit losses in case of default of their borrowers. Their rationale relies on the existence of informational asymmetries between borrowers and lenders, which can lead to moral hazard and adverse selection issues and ultimately to credit rationing (Stiglitz and Weiss, 1981). These information asymmetries are expected to have a greater effect on the financing of young and small companies, which suffer from high transaction costs and the lack of collateral (Beck and Demirguc-Kunt, 2006).

CGS can alleviate these financial constraints through several mechanisms (see the review of Chatzouz *et al.*, 2017). First, by reducing credit losses in case of default of the borrower, CGS can encourage banks to provide better financing conditions for target firms (either by increasing lending or by lowering interest rates) [2], depending on the price and the coverage ratio of the guarantee. Second, in case the guarantor screens loan applications and has an informational advantage over lenders, CGS can directly resolve the issue of information asymmetries described above[3]. Third, CGS can lower prudential capital requirements for commercial banks (depending on the accounting rules applying to public guarantees), which have been proven to have detrimental effects on bank lending according to some recent studies (see for example Fraisse *et al.*, 2019).

Besides their ability to alleviate firms' financial constraints, the popularity of public CGS over other forms of public support (such as direct lending by government agencies) relies on the fact that most

---

[2] Gale (1990) argues that loan guarantees are more effective than interest subsidies because they raise banks' returns and therefore their willingness to lend, whereas interest subsidies only reduce interest payments for borrowers and do not really affect the source of credit rationing.

[3] For example, government agencies might have some greater experience than private lenders in financing some typologies of investment projects, such as innovative projects (which often rely on public subsidies in their early stage). Mutual guarantee associations are another illustration (see Columba, 2008).

public CGS let private lenders select investment projects who will benefit from the guarantee (Beck, 2010): for this reason, they are considered more "market friendly" than direct lending by government agencies and less likely to distort the allocation of resources within the economy (Arping *et al.*, 2010).

However, the impact of CGS on welfare is ambiguous from a theorical point of view. When poorly designed, these schemes can provide bad incentives to entrepreneurs and financial intermediaries and channel resources to unproductive companies (see De Meza, 2002; Arping *et al.*, 2010; Honohan, 2010). A key concern is that the provision of collateral acts as a signal for projects' quality (Bester, 1985) and plays a disciplining role on credit markets, as financial intermediaries require collateral to ensure that entrepreneurs provide their best efforts (Holmström and Tirole, 1997)[4]. Since loan guarantees relax this collateral constraint, by allowing the substitution between private and public guarantees, they risk both to lower the quality of the pool of funded projects and to reduce entrepreneurs' efforts if they prove excessively generous (Arping *et al.*, 2010). On the supply side, guarantees might also encourage excessive risk-taking if they leave financial intermediaries with no "skin in the game" (which is why most governments provide partial rather than total guarantees). Another concern is the crowding-out of non-guaranteed loans, if banks have a limited funding capacity and serve borrowers sequentially according to the maximal bank return (Gale, 1990).

Therefore, the economic impact of public CGS is mostly an empirical issue. Although great progress has been made on this matter, the OECD and the World Bank (among others) have stressed the need both to more systematically evaluate CGS and to complete existing studies on several dimensions (see Schich *et al.*, 2017; World Bank and Initiative First, 2015). Indeed, the empirical literature about the economic impacts of CGS provides ambiguous conclusions (see appendix I for a review). Studies looking at the "financial additionality" of CGS (i.e. their impact on access to finance) mostly find that loan guarantees increase debt and/or lower the cost of debt (see for example Lelarge *et al.*, 2010; Seens and Song, 2015; Zecchini and Venture, 2009; D'Ignazio et Menon, 2012; De Blasio *et al.*, 2017; Mullins and Toro, 2018; Bachas *et al.*, 2020). However, conclusions about the "economic additionality" of CGS (i.e. their effects on sales, employment or investment) are more mixed: some papers find a positive economic impact of guarantees on economic outcomes (Asdrubali and Signore, 2015; Brown and Earle, 2017; Barrot *et al.*, 2019), while others find no significant impact (De Blasio *et al.*, 2017; D'Ignazio and Menon, 2012) or even a negative impact (D'Acunto *et al.*, 2017).

Similarly, it is worth stressing that evidence regarding the impact of CGS on firms' survival is ambiguous at best. Not only do existing studies find opposite conclusions, but the mechanisms behind these opposite conclusions remain unknown. For example, guarantees might increase the share of bankruptcies among recipients (as found by Lelarge *et al.*, 2010), but it is not clear whether this result is related (i) to the fact that CGS encourage banks to take more risks (which is often an explicit objective of CGS – see Chatzouz *et al.*, 2017) (ii) to the fact that loan guarantees mechanically increase the likelihood of experiencing a bankruptcy since they increase debt[5] (iii) to the fact that CGS are poorly designed and suffer from moral hazard issues (which obviously does not have the same implications for policy). Reversely, guarantees might increase firms' survival (as found by Barrot *et al.*, 2019; Bertoni

---

[4] Some studies have shown empirically that exogenous changes in the ability to provide collateral improves firms' access to finance (see for example Aretz *et al.*, 2020) or that the use of collateral depends on lending technologies and their ability to reduce information asymmetries (see Berger *et al.*, 2011).

[5] Since the new loan introduces new recurring expenses and increases the debt / equity ratio (mechanically deteriorating the firm's solvency ratio).

et al., 2018; Gonzalez-Uribe and Wang, 2020) either by directly improving firms' access to finance in the short run (additional debt and/or lower interest rates) or by signalling the quality of the firm towards creditors through a "certification effect" (easing its access to finance in the longer run) [6].

These opposite conclusions might come from methodological aspects[7], from the fact that there is great diversity of guarantee schemes (see Beck, 2010), potentially leading to heterogeneous effects or from the fact that firms respond differently to guarantees according to their characteristics and/or to their economic and institutional environment. In this regard, several papers have found heterogeneous effects of loan guarantees according to firms' size or firms' age (Bertoni *et al*., 2019; Asdrubali and SIgnore, 2015; Brault *et al*., 2019), to firms' financial situation (Ciani *et al*., 2020; Barrot *et al*., 2020), to macroeconomic conditions and business cycles (Brown and Earle, 2017; Bertoni *at al*., 2019), to banking relationships (Uesugi *et al*., 2010), to loan maturity (Ciani *et al*., 2020) or to workers' characteristics (Barrot *et al*., 2020)[8]. They tend to show that guarantees have greater positive effects for firms which are the most likely to suffer from financial constraints (small, young and risky ones), while the effect of industry or macroeconomic conditions is less clear-cut. Although the literature insists on the fact that the design of CGS probably determines their efficiency (Beck *et al*., 2010), very few papers have investigated this issue empirically. A notable exception is the study of Boschi *et al.* (2014), which suggests that guarantees with too low coverage ratios have no significant effects on firms' financial conditions. Focusing on SBA loans, D'Acunto *et al*. (2017) suggest that removing the screening process of the guarantor increases moral hazard issues. However, little is known about the marginal impact of changing price or other parameters.

Section 2: institutional setting

Our study focuses on loan guarantees granted by Bpifrance. Bpifrance is a French public institution, owned both by the French state (50 %) and the Caisse des Dépôts et Consignations (50 %), which aims at promoting the financing and development of companies operating in France, especially small and medium enterprises (SMEs), its general interest missions being defined by French law. Bpifrance can support companies through a wide range of financial instruments, *i.e.* direct loans, loan guarantees, subsidies for R&D and innovation, equity stakes both into companies and into private equity funds, export credit and advisory services. It was created through the successive mergers of several public entities, in order to create a single point of contact for French companies seeking financial support. Bpifrance has agencies in each French administrative region and most financing decisions are taken at the local level. In 2019, it supported about 71,000 companies through all business lines, which raised about 26 G€ in funding (direct loans, guaranteed loans, equity and subsidies)[9].

Bpifrance provides loan guarantees to French commercial banks in order to ease SME's access to external finance for their most risky investment projects. This guarantee program was created with an institution called SOFARIS in the 1980's and now covers all companies' development stages (business

---

[6] Marti and Quas (2017) provide evidence of this certification effects for a public program of participative loans.

[7] Related to econometric techniques or the representativeness of the sample for example.

[8] Making a pan-european assessment of the impact of guarantees provided by the European Investment Fund, Brault *et al*. (2019) show that the magnitude of this impact depends on firms' size, age and industry and that once these characteristics are controlled for, differences across countries regarding the impact of guarantees are significantly reduced.

[9] Detailed figures about the activity of Bpifrance are available here (in French): https://www.bpifrance.fr/A-la-une/Dossiers/Impact-de-Bpifrance/Les-principaux-messages-de-2018

creation, business transfer, expansion projects, international development). The funding of this program relies on endowments from the French State (which are voted each year by the French parliament), from French administrative regions and from the European Union. These donors define the priorities of the guarantee program, based on the experience and feedback of Bpifrance.

The loan guarantee program has a very large scope: all French commercial banks can use these guarantees[10] and all companies meeting the European definition of SMEs[11] are eligible, except some specific industries such as agriculture, financial and insurance industries or real estate. The guarantee only covers new corporate loans (therefore excluding renegotiations) or new personal loans to be injected into businesses' equity. The guarantee is partial and its coverage ratio ranges between 40 % and 70 %, depending on the nature of the project (see below). The triggering event of the guarantee is a legal bankruptcy procedure; however, claims are not possible for bankruptcies occurring only a few months after the disbursement of the loan ("waiting period") in order to prevent opportunistic behaviours. Moreover, the guarantee covers only the final loss: once banks have triggered the guarantee, they have to undergo their usual recovery process and Bpifrance only covers the residual loss. Banks must limit the value of the assets they use as collateral (especially, no mortgage on the main residence of entrepreneurs is allowed) but Bpifrance requests that its guarantees do not fully substitute to usual collateral securities. The guarantee has a price, which is set as a percentage of remaining amount of the loan to be reimbursed and was similar across investment projects over the sample period[12]. Finally, applications are formally made by banks (not firms) and the guarantee has two distribution modes: historically, all commercial banks had to file an application, which is reviewed by Bpifrance's analysts; however, since the 2000s, Bpifrance allows French commercial banks to use its credit guarantees without a formal review of each application, when the underlying projects meet some strict criteria (loan amount under a certain size threshold, especially).

It is worth noting that several features described above (partial guarantee, waiting period, coverage of the final loss only, request of additional collateral) are meant to align all parties' interests and should therefore prevent moral hazard issues and opportunistic behaviours.

In 2019, guarantees provided by Bpifrance supported about 50,000 distinct companies, which received about 6.8 GE of business loans. The guarantees amounted to about 2.9 GE and therefore globally covered about 43 % of the underlying loans. According to statistics from the French central bank, loans guaranteed by Bpifrance represented about 2 % of the total production of new business loans in France in 2019 (about 330 G€). This share reaches 5 % when focusing on new loans up to 1 M€.

Bpifrance has several guarantee funds, each being dedicated to a specific typology of business projects. The four main guarantee funds are the following:

- The "creation" fund aims at improving the access to external finance for young companies (*i.e.* companies aged of less than 3 years). These guarantees cover loans for new businesses

---

[10] The only historic condition is to become a shareholder of Bpifrance, which is the case for all major commercial banks in France. On December the 31st of 2019, French commercial banks owned about 9 % of the capital of Bpifrance Financement, which is the subsidiary of Bpifrance delivering loans, subsidies and credit guarantees.

[11] Less than 250 employees on the one hand, turnover below 50 M€ or total assets below 43 M€ on the other hand. These size criteria being measured at the group level when a company belongs to a business group with several legal entities.

[12] In 2019, Bpifrance implemented a new pricing grid, consisting in charging higher fees for riskier projects. The grid now accounts for the distribution mode of guarantees (see below) and for projects' typology.

(created "ex nihilo") or purchases of an existing company (when the buyer is less than 3 years old)[13]. The coverage ratio goes up to 70 % for creation "ex-nihilo" and up to 60 % for other projects;

- The "expansion" fund covers new loans funding investment projects (mostly tangible assets) of more mature SMEs (at least three years old);
- The "transmission" fund covers loans for business transfers when the buyer is more than 3-year-old;
- The "cash reinforcement" fund aims at strengthening the financial structure of the company and funding its working capital (precising that only loans with a minimum maturity of two years are eligible).

The advantage of this setup is that it easily allows us to produce distinct analysis according to the nature of funded projects, since our data specifies the identity of the fund for each guaranteed loan.

Section 3: methodology

Our objective is to measure the economic impact of guarantees looking at several outcomes: survival, sales, value-added, employment, financial debt, investment. In this paper, we focus on the "creation" and the "expansion" funds described above, which represented, for year 2018, about half of the new production in terms of guaranteed amounts and about 75 % of the total number of recipients. For each fund, we use different datasets and build a specific counterfactual sample.

In order to compute the impact of loan guarantees, we implement a difference-in-difference approach by estimating the following equation on our panel:

$$Y_{i,t} = FIRM_i + \sum_{\tau=1}^{T} \alpha_\tau YEAR_\tau + \sum_{\tau=1}^{T} \beta_\tau TREAT_{i,\tau} + \mu_{i,t} \qquad (1)$$

Where $Y_{i,t}$ is the outcome for firm *i* in year *t*, $FIRM_i$ corresponds to firm fixed effects, $YEAR_\tau$ corresponds to year fixed effects and $TREAT_{i,t}$ is a dummy for treated firms in the years following the granting of the guarantee. Given that the model includes firm and year fixed effects, coefficient β_τ measures the evolution of the gap between treated firms and control firms after the granting of the guarantee. We dissociate short term from long term effects by including one dummy for each year following the granting of the guarantee (from year T to T+3). Standard errors are clustered at the firm level in order to control for serial correlation of the error term.

In order to account for selection bias, we combine our difference-in-difference approach with propensity-score matching techniques. This allows us to compare recipients of guarantees with control firms that displayed similar observable characteristics before the granting of the guarantee. First, we compute equation (2) using a logit model:

$$TREAT_i = C + \gamma X_i + \varepsilon_i \qquad (2)$$

Where $TREAT_i$ is a dummy for firms benefitting from the guarantee, X is a vector of covariates at the firm level and ε_i is the error term. These propensity scores are estimated separately for each guarantee fund and for each cohort. Once the estimated scores $\widehat{TREAT_i}$ are retrieved, we use matching techniques in order to balance the distribution of covariates across the treated group and the non-

---

[13] New companies that correspond to affiliates of existing business groups are not eligible.

treated group. In our baseline specification, we combine propensity-score matching with exact matching on year, industry and region. We perform several sensitivity tests regarding the number of neighbours, the caliper threshold, the choice of replacement and the matching technique (also testing the results with inverse propensity score weighting methods – see below). We finally estimate equation (1) on the matched sample.

Regarding the "creation fund", we cannot, by construction, use panel data and observe entrepreneurs' past growth, since most new businesses obtain the guaranteed loan on the year of foundation. Therefore, after retrieving the matched sample, we compute a simple ATT using OLS:

$$Y_{i,t+T} = C + \beta\, TREAT_{i,t} + \varepsilon_{i,t} \qquad (2)$$

Where $Y_{i,t+T}$ is the outcome and $TREAT_{i,t}$ is a dummy for treated firms. The coefficient β therefore corresponds to the impact of guarantees. Our dataset allows us to compute the impact of the "creation" fund on two outcomes: survival and employment.

Propensity score matching techniques rely on the conditional independence assumption: conditionally to all observable characteristics in vector *X*, treated firms and control firms would have followed the same trend without any treatment (Rosenbaum and Rubin, 1983). A related assumption is that two firms sharing the same observable characteristics and seeking for external finance might differ regarding their access to loan guarantees. This assumption appears plausible since the application for guarantees is made by banks and not by firms: banks might react differently to a given loan application and make different risk analysis (especially in the case of important information asymmetries, which is the case for the funding of new businesses). This might result in differences regarding the recourse to guarantees. In support of this assumption, several empirical studies show that firms' financial conditions depend on previous bank relationships (see Beatriz *et al.*, 2018), lenders' capital ratios (Hubbard *et al.*, 2002), geographic distance with lenders (Knyazeva and Knyazeva, 2012; Hollander and Verriest, 2016) or banks' organization structure (Canales and Nanda, 2011). Unfortunately, our data does not allow us to test this assumption empirically.

We acknowledge that our methodology has several limitations. First, we are not able to estimate the impact of loan guarantees on the number of created companies, since our methodology consists in comparing treated companies with companies created without the support of a guarantee. This potentially leads to under-estimating the impact of loan guarantees for new businesses. Second, our methodology does not allow us to account for unobservable variables correlated with the treatment (for example the rise of an investment opportunity), although the richness of our data allows us to control for many characteristics of firms and entrepreneurs. Third, as mentioned above, our methodology does not allow us to identify why control firms in the matched sample did not obtain a guaranteed loan. These control firms could gather companies which did not apply for a loan (potentially because of self-censorship), companies which applied for a loan but did not obtain it and companies which applied for a loan and obtained it without the support of a public guarantee. This uncertainty limits our ability to identify precisely the mechanisms driving our results. However, we investigate whether our impact estimates stem from the fact that loan guarantees unlock access to external finance. To do so, we run equations (1) and (2) on a sample matching treated companies with control firms obtaining a bank loan without a guarantee (which we are able to track in the data): if the impact of guarantees completely disappears when using this sample, it suggests that the impact of guarantees is fully related to the fact that the guarantee improves access to external finance.

Section 4: data and descriptive statistics

Dataset for the recipients of loan guarantees

Our first database identifies all beneficiaries of loans guaranteed by Bpifrance over the period 2006 – 2019. For each beneficiary, we have information about the administrative identification number of the company ("SIREN" number), its name, the amount of the guarantee, the amount of the loan and the name of the guarantee fund covering the loan (allowing us to isolate "creation" and "expansion" guarantees).

Dataset for the analysis of the "Creation" fund

In order to analyze the impact of "creation" guarantees, we merge our data with the SINE survey ("Système d'Information sur les Nouvelles Entreprises") conducted by the French office of Statistics. This survey covers a representative sample of French entrepreneurs who created their company or took over an existing business during the first semester of a given year N. These entrepreneurs are interviewed in N, in N+3 and in N+5, so that the survey allows to track the survival rate and the number of employees of all the sampled companies over a period of 5 years. The survey provides very rich information about these companies: profile of the entrepreneur (age, education, motive for creating the business, situation before creating the business, former experience in the company's main activity …), profile of the company (industry, legal structure, number of employees, location), details about the business's funding (amount of funding needed, sources of funding, use of public support).

We use the SINE surveys conducted in 2010 (covering the period 2010 – 2015) and in 2014 (covering the period 2014 – 2019). We exclude entrepreneurs taking over an existing business and new companies which correspond to affiliates of existing business groups. Regarding treated firms, we focus on those obtaining a guaranteed loan during the year of foundation, since including firms obtaining a guaranteed loan after the year of foundation would raise some methodological issues when assessing the impacts[14]. Our final sample for year 2010 gathers 38,224 companies. Within this sample, 2,152 companies were supported by a loan guarantee. Details about the final sample are displayed in appendix II. We check that within recipients of guarantees, the final sample (firms within the SINE survey) is representative of the full population in terms of industry, administrative region and loan amount.

Dataset for the analysis of the "Expansion" fund

We analyse the impact of "expansion" guarantees by merging Bpifrance's data with several datasets also provided by the French office of statistics. First, the "FICUS" and "FARE" files provide detailed income statements and balance sheets of the vast majority of French companies over the period 2006 – 2017 (excluding the agriculture and the financial sectors). This data has a very good coverage of firms supported by the "expansion" fund (96 % being tracked in "FARE" on the year the guaranteed loan is granted). We also use the "Financial links" survey, which allows us to identify firms belonging to a business group. Thanks to this survey, we know the location of the group headquarters (allowing us to identify foreign-owned companies) and we are able to compute the size of business group by summing the employees of all companies belonging to the same business group. Finally, we use data from the "Bulletin officiel des annonces civiles et commerciales" (BODACC), which lists all commercial companies filing a dissolution or bankruptcy procedure, with the ID number of the company and the

---

[14] This filter excludes about 10 % of the initial sample of recipients.

filing date. Merging all these databases is straightforward since each one provides the unique identification number of French companies ("SIREN" number).

Using this data, we construct several cohorts: each cohort corresponds to a potential year of treatment (denoted T) and gathers both companies treated in T and companies non-treated in T but eligible to the "expansion" guarantee[15]. Our dataset gathers cohorts with T ∈ {2007, 2008, 2012, 2013}. Unfortunately, we must exclude cohorts with T ∈ {2009, 2010, 2011} because the data for year 2008 does not provide information about firms' balance sheets[16]: therefore, we lack the data to build a solid counterfactual sample for firms supported in 2009, 2010 and 2011.

For each cohort, we restrict the sample to companies with balance sheet data for each year between T-3 and T-1 and for which the observed output (sales, employment, debt …) is observed each year between T and T+3[17]. For the survival analysis, we only restrict the sample to companies with balance sheet data for years T-3 to T-1 (otherwise, our sample would only include companies which survived after the granting of the guarantee) but exclude those taking the form of a sole proprietorship, since these companies are not necessarily covered by the BODACC data. This exclusion should have a limited effect on the results, since only about 20 % of firms benefiting from the "expansion" fund are sole proprietorships.

Details about the final sample for impact analysis are displayed in appendix II. Looking at the most recent cohort (2013), our final sample for the impact analysis 2013 includes between 2,800 and 4,500 companies, depending on which outcome we focus on (survival, sales, employment …).

Section 5: results

The initial characteristics of guarantees' recipients

We first look at the characteristics of companies supported by the "creation fund". In this analysis, we account for the fact that in France, many public schemes exist and provide financial and non-financial support for new businesses, besides loan guarantees (see appendix III for a brief review of these schemes). Fortunately, our data allows us to identify the recipients of most of these schemes. Therefore, we split our sample of entrepreneurs into four categories, according to the sources used to fund their project:

1. Entrepreneurs which obtained a guaranteed loan (and eventually other public support). This represents about 6 % of our sample for year 2010;
2. Entrepreneurs which obtained a bank loan without the guarantee of Bpifrance but received other subsidized loans (knowing that these loans are conditional on obtaining a private loan). This represents about 18 % of our sample;

---

[15] We restrict the sample to firms eligible to "expansion" guarantees by excluding firms older than 3 years in T-1, firms not meeting the size criteria of SMEs as defined by the EU (the workforce criteria being measured at the group level thanks to the LiFi survey), firms in non-eligible industries (essentially agriculture, real estate and financial activities – NACE divisions 01, 02, 03, 64, 65, 66 and 68). We also remove industries with a very small number of companies (limiting the number of potential control firms – NACE divisions 05, 06, 07, 09, 12 and 19) as well as non-profit organizations (firms in NACE division 94 or taking the legal form of an association) and companies for which the analysis of balance sheet data is not relevant (holding companies).

[16] This year, the French office of statistics changed its process for constructing the database.

[17] We drop observations for which the French office of statistics makes imputations on balance sheet data (when lacking the accounting documentation).

3. Entrepreneurs which obtained a bank loan without any guarantee nor subsidized loans. This represents about 23 % of our sample;
4. Entrepreneurs which did not use / obtain a bank loan (about 54 % of our sample).

In order to assess whether loan guarantees have an effect on banks' behaviour, we make two comparisons (see statistics in appendix IV):

- First, we compare entrepreneurs which leveraged on public support (loan guarantee, subsidized loans) to obtain a private bank loan (categories 1 and 2) with those which obtained a bank loan without any public support (category 3). It appears that the share of young entrepreneurs, job seekers, welfare recipients, entrepreneurs with no parallel income and first-time entrepreneurs is higher among entrepreneurs which rely on public support to obtain a bank loan. This confirms that public support targets projects which exhibit a relatively high risk level ex-ante and/or entrepreneurs who probably experience greater difficulties to pledge collateral;

- Second, within the group of entrepreneurs relying on public support to obtain a bank loan (categories 1 and 2), we compare recipients of loan guarantees (category 1) with entrepreneurs relying on other subsidized loans (category 2). This comparison reveals that loan guarantees target relatively ambitious projects: recipients of guarantees are more likely to express the objective of hiring and/or investing. We also see that loan guarantees target relatively large bank loans: this is partly related to the design of subsidized loans, which explicitly target small loans (eligibility criteria include a cap on the total amount of the investment project).

We now look at the characteristics of companies supported by the "expansion fund". Table 1 displays some descriptive statistics about treated and control firms, focusing on their characteristics in T-1 (one year before the potential granting of the guarantee). The comparison with non-treated firms suggests that French commercial banks are more likely to use loan guarantees to fund companies with a relatively high risk-profile: recipients exhibit relatively low equity ratios, low interest rate coverage ratios, low liquidity ratios and high debt cost. Consistently, they also exhibit lower survival rates and greater bankruptcy rates. However, these companies also display relatively high growth rates (in terms of turnover or investment) in the period preceding the granting of the guarantee. All these findings are valid whether we focus the comparison with all control companies (including those which potentially did not apply for a bank loan) or with control companies which exhibit an increase of their financial debt in T.

Table 1: Expansion guarantees: characteristics of treated and non-treated firms over the period 2013-2016

Firms' characteristics in T-1	Treated companies			All non-treated firms			Non-treated firms increasing their financial debt in T*		
	First quartile	Median	Third quartile	First quartile	Median	Third quartile	First quartile	Median	Third quartile
Age and size of the company									
Age (years)	5	9	17	6	12	21	7	13	23
Sales (K€)	192	472	1 286	86	206	587	237	608	1 652
Number of employees	1	4	9	0	1	4	1	4	10
Past growth of the company									
Growth of sales between T-3 and T-1 (in %)	-2,7%	4,4%	15,7%	-7,3%	0,2%	7,3%	-4,5%	1,8%	10,1%
Growth of tangible assets between T-3 and T-1 (in %)	0,0%	5,3%	20,4%	0,0%	0,1%	8,7%	0,0%	2,9%	12,2%
Profitability and productivity									
EBITDA / Sales	0,03	0,07	0,14	0,02	0,08	0,19	0,02	0,06	0,14
Value-added / payroll	1,14	1,31	1,68	1,10	1,34	2,01	1,10	1,27	1,65
Financial structure									
Equity / total assets	15%	29%	46%	14%	39%	62%	19%	39%	58%
Current assets / current debts	28%	69%	116%	33%	91%	179%	46%	99%	171%
Net financial debt / EBITDA	-23%	69%	227%	-135%	-13%	116%	-140%	-14%	109%
Interest expenses / financial debt**	3,1%	5,0%	8,4%	2,8%	4,6%	7,7%	2,3%	4,1%	7,8%
Working capital requirement / sales	-8%	2%	12%	-10%	0%	10%	-6%	3%	14%

*Increase of at least 10 K€. **Only computed on the sample of firms with positive interest expenses and no previous support by a loan guarantee.*

Source: FARE, authors' calculation.

These descriptive statistics globally confirm that commercial banks use loan guarantees to serve relatively risky projects, which is an explicit objective of the scheme.

We now estimate the probability of benefitting from a loan guarantee in year T as a function of observable characteristics with a logit model. This allows both to identify the most significant predictors for obtaining a guaranteed loan and to construct propensity scores which we will use to match treated firms with initially similar control firms. The set of covariates depends on data availability (see appendix V for the definition of variables):

- Regarding the "creation fund", we first include many individual characteristics: age, gender, nationality, marital status, diploma, entrepreneurs among relatives, work situation before creating the firm, work experience in the same job, experience in creating firms, paid sideline job, motives for creating the company (entrepreneurial spirit, autonomy, additional revenues). Among these characteristics, several have been proven to influence entrepreneurs' optimism and financing patterns (see Landier and Thesmar, 2009). Covariates also include projects' characteristics: industry, region, legal form of the company, main goal in creating the firm (whether his/her goal is to develop the firm or whether it is to create his/her own job). Finally, we also include information both about public financial support and about the non-financial support received either from chambers of commerce, associations, incubators, specialists (lawyers, accountants…) or suppliers and clients. All covariates are measured in the year of foundation (T). We choose not to control for initial size (number of employees) since this might lead to endogeneity issues (the guarantee is likely to have an impact on initial size, as found by Lelarge *et al.*, 2010).

- Regarding the "expansion fund", we first control for size (turnover, total assets), age, several financial ratios (equity ratio, interest coverage ratio, liquidity ratio, profitability, cost of

financial debt) and past growth and investment effort (average annual growth rate of turnover, of workforce and of tangible assets). Since some of these regressors might display negative values and since they might have non-linear effects on the probability of obtaining a guaranteed loan, we do not perform a logarithm transformation but rather break down the distribution of these regressors into deciles[18]. The model also includes industry, region and year fixed effects. We also account for export status and business group membership with specific dummies. We include several dummies accounting for other potential financial support from Bpifrance during the eight years preceding the granting of the guarantee. Finally, we also include several dummies that account for past increases in the size of the balance sheet and in the size of financial debt and control for past loans or capital increases. All covariates are lagged and mostly cover the period between T-3 and T-1.

Detailed results of the logit models are displayed in appendix VI:

- Regarding the "creation fund", the likelihood of receiving a guaranteed loan increases when the entrepreneur was previously unemployed (rather than running a business, being self-employed or being inactive before creation), has no other sources of income, received support for creating its business or for innovation activities, also benefits from subsidized loans and has the objective of hiring and/or investing. Reversely, the likelihood of receiving a guaranteed loan is lower for sole proprietorships and relatively old entrepreneurs;

- Regarding the "expansion fund", results confirm that the likelihood of receiving a guaranteed loan is higher for companies with relatively deteriorated financial ratios and companies previously supported by Bpifrance (especially those already supported through a loan guarantee). The probability of enjoying a loan guarantee also increases with past growth of turnover.

The economic impact of loan guarantees

We now turn to our impact analysis. First, we compute propensity scores separately for each guarantee fund and for each cohort, using the logit model described in the previous section. Second, we match treated companies with control firms sharing the same initial characteristics. In our baseline specification, we mobilize nearest-neighbour matching techniques with one neighbour, no replacement and a caliper of width equal to 0.5 of the standard error of propensity scores (we test alternative specifications as robustness checks, see below). Tables in appendix VII shows that the characteristics of treated and control firms are well balanced in the matched sample, for all covariates considered in the computation of the scores.

Results show that the "creation" guarantee has a positive effect on both variables of interest, survival and employment (see table 2 for results regarding cohort 2010 and appendix VIII for results regarding cohort 2014). For cohort 2010, loan guarantees increase the survival rate by 5 percentage points at a three-year horizon. The average impact on firms' employment is also significant: the growth rate of the workforce between T-1 and T+3 is 19 percentage points higher for treated firms, which correspond to an absolute average increase of about 0.5 employee per firm. It is worth noting that the magnitude

---

[18] We also performed the model with other specifications including log transformation of regressors. Main conclusions remain unchanged.

of the impact on employment is comparable with the results of Lelarge *et al*. (2010), which focus on the same scheme using a different methodology.

Regarding the "expansion" fund, results show that guarantees have a positive effect on survival, turnover, employment, wages and investment (see table 3 for results regarding cohort 2013 and appendix IX for results regarding other cohorts). Looking at results following our difference-in-difference approach, in average, each recipient increases its sales by +159 K€ between T-1 and T+3, its value-added by +48 K€, its workforce by +1.3 employee, its financial debt by +80 K€ and its tangible assets by +90 K€. These figures might seem low, but recipients of loan guarantees are mostly very small companies, so that the impact on sales, value-added, employment and wages represents approximately a 10 percentage point increase within three years. Looking at the impact on survival, the 3-year dissolution rate is reduced by about 3.5 percentage points. We find no significant impact on the average wage, suggesting that the skill composition of the workforce remains unchanged. We find a negative impact on profitability, although this result is sensitive to the choice of the indicator for profitability. Let us note that the grant of an investment loan (be it guaranteed or not) mechanically introduces new expenses for the company (loan interest, amortization of the acquired tangible assets, additional wages if the investment comes with new employees).

Table 2: Creation guarantees: impact of loan guarantees on firms' survival and employment for cohort 2010

	Number of observations			Impact estimates according to methodology - total sample				
	Total sample	Treated firms	Treated firms after caliper	ATT - NN1	ATT - NN2	ATT - NN3	ATT - Inverse probability weighting matching	ATT with all neighbours sharing the same score
Impact on survival rate in T+3 (percentage points)	38 224	2 152	2 152	0,05*** (0,013)	0,06*** (0,013)	0,05*** (0,013)	0,05*** (0,004)	0,04*** (0,011)
Impact on total employment in T+3	24 487	1 551	1 551	0,5*** (0,149)	0,4*** (0,158)	0,4*** (0,183)	0,4*** (0,061)	0,4*** (0,1411)

Source: SINE survey, authors' calculation. Figures correspond to impact estimates and standard deviations (in parenthesis).

Table 3: Expansion guarantees: impact of loan guarantees on firms' survival and growth for cohort 2013

	Number of observations			Impact estimation according to methodology					
	Total sample	Treated firms	Treated firms after caliper	ATT - NN1	ATT - NN2	ATT - NN3	ATT - Inverse probability weighting matching	ATT with all neighbours sharing the same score	ATT - difference in difference estimator (NN 3)
Impact on survival rate in T+3 (percentage points)	683 711	4 496	4 496	0,035*** (0,006)	0,036*** (0,006)	0,034*** (0,006)	0,034*** (0,001)	0,034*** (0,004)	
Variation of sales between T-1 and T+3 (K€)	734 675	4 479	4 479	127,68*** (35,25)	152,3*** (33,88)	163,21*** (34,53)	154,77*** (3,79)	166,27*** (26,35)	159,11*** (30,98)
Variation of value added between T-1 and T+3 (K€)	734 675	4 479	4 479	44,01*** (11,65)	46,52*** (12)	46,5*** (11,75)	50,58*** (1,3)	54,68*** (9,41)	48,06*** (10,83)
Variation of number of employees between T-1 and T+3	481 351	3 019	3 019	1,13*** (0,26)	1,23*** (0,27)	1,23*** (0,26)	1,23*** (0,03)	1,31*** (0,22)	1,29*** (0,24)
Variation of wages between T-1 and T+3 (K€)	734 675	4 479	4 479	30,85*** (5,3288)	27,26*** (5,96)	31*** (5,56)	29,58*** (0,062)	31,93*** (5,51)	31,89*** (5,34)
Variation of financial debt between T-1 and T+3 (K€)	734 675	4 479	4 479	100,51*** (15,44)	93,55*** (10,9)	79,08*** (13,53)	85,21*** (1,31)	86,47*** (8,78)	79,64*** (11,1)
Variation of tangible assets between T-1 and T+3 (K€)	734 675	4 479	4 479	64,86*** (14,12)	84,36*** (15,09)	81,77*** (14,96)	79,68*** (1,42)	84,07*** (9,38)	90,12*** (12,8)
Variation of mean wage between T-1 and T+3 (K€)	375 900	2 775	2 775	-0,95 (0,68)	-0,75 (0,65)	-0,68 (0,67)	-0,95*** (0,096)	-0,81 (0,52)	-0,36 (0,53)
Variation of profitability* between T-1 and T+3 (percentage points)	562 953	3 846	3 846	-0,026*** (0,007)	-0,025*** (0,007)	-0,021*** (0,007)	-0,022*** (0,001)	-0,021*** (0,005)	-0,027*** (0,007)

Source: FARE, authors' calculation. Figures correspond to impact estimates and standard deviations (in parenthesis).

We perform several sensitivity tests on our results (see above and appendices VIII and IX). First, we test several matching techniques (change in the number of neighbours, matching with or without replacement, inverse propensity score weighting method) and find that conclusions globally remain unchanged. Second, we check whether our results are driven by firms which already had benefitted of Bpifrance's financial support before or after the granting of the guarantee: in that case, we might overestimate the impact of guarantees. To do so, we estimate equation (1) on the sample excluding firms which benefit from any support of Bpifrance between T-1 and T-3 or from T+1 to T+3. Results are still significant, although their magnitude appears smaller than in the baseline model.

We now investigate about the mechanisms driving our impact estimates. First, we run the same model but only keep firms which also obtained a bank loan in T within the control group. This allows us to assess whether our impact estimates are driven by the fact that loan guarantees improve access to finance. Results suggest that this is the case, since we no longer see a significant difference between treated and control firms using this subsample. This comparison between treated firms and similar control firms which also obtained a bank loan in T (without a guarantee) also allows us to invalidate the "moral hazard" hypothesis: in case of moral hazard, we should see a greater rate of dissolutions within the group of treated firms, which is not the case here. Second, we investigate the existence of a certification effect by looking at the impact of loan guarantees on the growth rate of financial debt between T and T+3 (therefore putting aside the year when the guarantee was granted)[19]: indeed, in case of a certification effect, we should see a long-run effect of loan guarantees on the access to external finance. Our results show no difference between treated and control firms, which invalidates the hypothesis of a certification effect (either of loan guarantees or the underlying bank loan). Therefore, it seems that the initial impact of loan guarantees on the access to finance is fully driving our results.

The impact of guarantees on firm survival: sensitivity analysis

Our results regarding the positive impact of guarantees on survival are opposite to the conclusions of Lelarge *et al.* (2010), who find that recipients of guarantees are more likely to file a bankruptcy (also focusing on the "creation" fund over a less recent period). In order to shed some light about this difference, we take advantage of the fact that our data also allows us to track bankruptcies and try to replicate the results of Lelarge *et al.* (2010) by using the same indicator. Results are displayed in table 4. They suggest that conclusions regarding the impact of guarantees on survival are indeed very sensitive to the choice of the indicator for survival: recipients exhibit a greater likelihood of filing a bankruptcy, but a lower likelihood of terminating their business through a dissolution.

Table 4: impact of guarantees of the "creation" fund on the rate of dissolutions and on the rate of bankruptcies

	Impact on total employment in T+3	Impact on total employment in T+5	Impact on the rate of bankrupcies in T+3	Impact on the rate of bankrupcies in T+5	Impact on the rate of dissolutions in T+3	Impact on the rate of dissolutions in T+3
Lelarge *et al.* (2010)	0,6	0,42	+ 12 ppt	+ 29 ppt	NA	NA
Impact with our baseline methodology (ATT NN1) - cohort 2010	0,5	0,7	+ 8 ppt	+ 10 ppt	- 5 ppt	- 7 ppt

Source: SINE survey and BODACC data. The impact on the rate of bankruptcies is estimated with a subsample excluding sole proprietorships, whose dissolution events are not tracked by our data.

---

[19] We can only run this test for the "expansion" fund, since we do not have data for the evolution of financial debt for new businesses.

An explanation for this result might be that loan guarantees improve access to external finance and therefore increase financial debt at the firm level (and potentially the number of creditors, although we cannot shed light on this particular aspect with our data). This mechanically increases the probability that recipients of guarantees go through a bankruptcy procedure when defaulting on their debt or terminating their business (reminding that in France, creditors have the ability to trigger bankruptcy procedures when experiencing a default from their borrowers. The fact that reversely, the share of dissolutions is lower among recipients of guarantees (compared to non-recipients with a similar risk profile ex-ante) might reflect the fact without the guarantee, firms are more likely to terminate their business because of an insufficient access to finance. Therefore, it is possible that focusing on bankruptcies or defaults introduces a bias in the survival analysis and potentially leads to neglect the positive impact of guarantees on access to finance. In that regard, it is worth noting that most empirical studies concluding that guarantees have a negative impact on survival focus on the probability of defaults rather than the probability of dissolution (see appendix I).

Cost / benefit analysis

Guarantee programs of Bpifrance require a public endowment in order to cover both administrative costs and future potential claims from banks. This endowment represents both a budgetary cost and an opportunity cost since it reduces available endowments for other purposes and since its financing could distort the behaviour of some economic actors.

In order to conduct our cost-benefit analysis, we first compute the aggregate economic impact of loan guarantees, focusing on employment and investment and accounting for two mechanisms:

- The impact of loan guarantees on firms' survival[20]. For each cohort, we multiply the number of recipients with (i) the estimated average impact of loan guarantees on the survival rate and (ii) the median initial characteristics of recipients that were not able to survive during this period;

- The impact of loan guarantees on investment and employment, conditionally to firm survival. For each cohort, we multiply the number of surviving firms with the average impact of loan guarantees on employment and investment (as computed above).

These aggregate economic impacts are first computed separately for each guarantee fund and for each cohort (cohorts 2010 and 2014 for "creation" fund; cohorts 2007, 2008, 2012 and 2013 for "expansion" fund). Then for each guarantee fund, we pool the figures for all cohorts in order to provide average estimates that account for different macroeconomic conditions.

The second step is to estimate the amount of public endowment which was required to produce these generations of guaranteed loans. For each guaranteed loan, we are able to compute this amount by using the "multipliers" of each guarantee fund. These multipliers, designed by fund managers, define

---

[20] Fort cost-benefit analysis, we privilege our estimates using inverse propensity score weighting methods because they allow to account for the full sample (not only matched firms) and limit the impact of outliers on the results. Moreover, by construction, they have the advantage of not being sensitive to the arbitrary choice of several parameters (unlike nearest neighbour matching techniques). As displayed above, all matching techniques provide close estimates so our choice of inverse propensity score weighting methods does not significantly affect our results.

the maximal amount of public guarantees that can be covered by each euro of public endowment, given the expected default rate on guaranteed loans.

They represent the *ex-ante* cost of guarantees (which proves to be rather an upper bound of the ex-post cost according to figures available for sufficiently ancient generations). Here, we choose to consider multipliers which were effective when the guarantee was granted, given that this allows us to compute the public endowment which was effectively needed at the time.

Our estimations are the following (detailed figures for the cost / benefit analysis are displayed in appendix X). Regarding the "creation" fund, we estimate that the gross amount of the public endowment needed to create an additional job is around 3,500 euros when using the multiplier effective when granting the guarantee and around 2,400 euros when using the most recent multiplier. Regarding the "expansion fund", this gross amount is around 2,800 euros using the former coefficient (for now the "expansion" fund no longer run on a public endowment). Moreover, we estimate that one euro of public endownment for the "expansion" fund allows to increase tangible assets by 26 euros (using the former multiplier).

These estimates are consistent with the results of Barrot *et al.* (2020), which focus on another guarantee program also deployed by Bpifrance during the financial crisis of 2008-2009. They find that the gross *ex-ante* cost per job-year of this program is about 3,200 euros. They also compare this amount with estimates for other public schemes designed to foster employment and conclude that loan guarantees appear relatively efficient.

We acknowledge that our cost-benefit analysis does not account for general equilibrium effects, like for example the impact of loan guarantees on recipients' competitors, clients and/or suppliers or their incidence in terms of taxation and fiscal revenues. Indeed, by fostering firms' growth and employment, loan guarantees potentially increase corporate tax revenues as well as savings for unemployment insurance. In that regard, Barrot *et al.* (2020) show that the net cost of loan guarantees for taxpayers can turn out to be negative after accounting for savings on employment benefits.

Conclusion

Our paper provides an empirical assessment of the economic impact of the main national loan guarantee program in France. We first show that French commercial banks are more likely to use loan guarantees for ambitious entrepreneurs with relatively low collateral and/or no parallel income, as well as fast-growing mature companies with relatively low solvency or liquidity ratios. We also show that for a given risk profile, these guarantees tend to increase firm survival, sales, employment, investment and debt. The decrease of dissolution rates is concomitant with an increase of bankruptcy rates: we argue that this finding might reflect the fact that loan guarantees improve access to external finance (therefore increasing survival rates) but also mechanically increase the rate of bankruptcy procedures since they increase financial debt. This result might explain the seemingly opposite conclusions of the literature regarding the effect of loan guarantees on survival/default, although additional research is still needed to investigate this issue. Finally, we provide estimates for the gross cost per job created which are consistent with other empirical studies. All this evidence suggests that CGS are an efficient tool for alleviating SME's financial constraints.

References

Aklerlof G.A. (1970), "The market for "lemons": quality uncertainty and the market mechanism", Quarterly Journal of Economics, 84(3):488-500.

Aretz K., Campello M. and M-T. Marchica (2020), "Access to collateral and the democratization of credit: France's reform of the Napoleonic Security Code", Journal of Finance 75(1):45-90.

Arping S., Lóránth G., and A.D. Morrison (2010), "Public initiative to support entrepreneurs: credit guarantees vs co-funding", Journal of Financial Stability, 6(1):26-35..

Asdrubali P. and S. Signore (2015), "The economic impact of EU guarantees on credit to SMEs", European Investment Fund Research and Market Analysis, Working Paper n°2015/29.

Bachas N., Kim O.S. and C. Yannelis (2020), "Loan guarantees and credit supply", Journal of Financial Economics, *forthcoming*.

Barrot J-N, Thorsten M., Sauvagnat J. and B. Vallée (2019), "Employment effects of alleviating financing frictions: worker-level evidence from a loan guarantee program", Working paper.

Béatriz, M., Coffinet J. and T. Nicolas (2018), "Relationship lending and SMEs' funding costs over the cycle : why diversification of borrowing matters", Journal of Banking and Finance, available online.

Beck T. and A. Demirguc-Kunt (2006), "Small and medium size enterprises: access to finance as a growth constraint", *Journal of Banking and Finance*, 30(11): 2931-2943.

Beck T. (2010), "The typology of partial credit guarantee funds around the world", Journal of Financial Stability, 6(1):10-25.

Berger, A.N., and G.F. Udell (1998), "The economics of small business finance: the roles of private equity and debt markets in the financial growth cycle", Journal of Banking and Finance, 22(6-8):613–673.

Berger A.N., Espinosa-Vega M.A., Scott Frame W. and N.H. Miller (2011), "Why do borrowers pledge new collateral? New empirical evidence on the role of asymmetric information", Journal of Financial Intermediation, 20(1):55-70.

Bertoni F. Colombo M.G. and A. Quas (2018), "The effects of EU-funded guarantee instruments on the performance of Small and Medium Enterprises: evidence from France", European Investment Fund Research and Market Analysis, Working Paper n°2018/52.

Bester H. (1985), "Screening vs rationing in credit markets with imperfect information", American Evonomic Review, 75(4):850-855.

Boot A.W. (2000), "Relationship banking: what do we know?", *Journal of Financial Intermediation*, 9, 7-25.

Brault J. and S. Signore (2019), "The real effects of EU loan guarantee schemes for SMEs: a pan-European assessment", European Investment Fund Research and Market Analysis, Working Paper n°2019/56.

Brault J. et S. Signore (2020), "Credit guarantees in the Covid-19 crisis: relevance and economic impact", SUERF Policy Note, n°176.

Brown J.D. and J.S. Earle (2017), "Finance and growth at the firm level: evidence from SBA loans", *Journal of Finance*, 72(3): 1039-1080.

Bustamente C. and F. D'Acunto (2019), "Bank screening and the leverage of new firms", Mimeo.

Canales R. and R. Nanda (2012), "A darker side of decentralized banks: market power and credit rationing", Journal of Financial Economics, 105(2): 353-366.

Chaney P.K. and A.V. Thakor (1985), "Incentive effects of benevolent intervention, the case of government loan guarantees", *Journal of Public Economics*, 26: 169-189.

Chatzouz M., Gereben A., Lang Frank and W. Torfs (2017), "Credit guarantee schemes for SME lending in Western Europe", European Investment Fund Research and Market Analysis, Working Paper n°2017/42.

Ciani E., Gallo M. et Z. Rotondi (2020), "Public credit guarantees and financial additionalities across SME risk classes", Banca d'Italia, Temi di discussion, n°1265, February.

Columba F. Gambacorta L., and P.E. Mistrulli (2008), "Firms as monitors of other firms: mutual guarantee consortia and SME Finance", Presented at the PCG Conference, Washington DC, March 2008.

D'Acunto, F., Tate G. and L. Yang (2017), "Correcting market failures in entrepreneurial finance", Mimeo.

De Blasio G., De Mitri S., D'Ignazio A., Finaldi Russo P. and L. Stoppani (2017), "Public guarantees to SME borrowing. An RDD Evaluation", Banca d'Italia, Temi di discussione, n°1111.

De Meza D. (2002), « Overlending ? », The Economic Journal, 112(477) : F17-F31.

Derrien F., Mésonnier J-S. and G. Vuillemey (2020), "Set-up costs and the financing of young firms", CEPR Discussion Paper No. DP14512.

D'Ignazio A. and C. Menon (2012), "The causal effect of credit guarantees for SMEs: evidence from Italy", Spatial Economic Research Center, Document de travail n°123.

Gale W. (1990), "Federal lending and the market for credit", Journal of Public Economics, 42(2):177-193.

Gopinath, G. (2020), "Limiting the economic fallout of the coronavirus with large targeted policies", Vox.eu.

Hollander S. and A. Verriest (2016), "Bridging the gap: the design of bank loan contracts and distance", Journal of Financial Economics, 119(2): 399-419.

Holmstrom B. and J. Tirole (1997), "Financial intermediation, loanable funds, and the real sector", Quarterly Journal of Economics, 112(3):663-691.

Honohan P. (2010), "Partial Credit Guarantees: principles and practice", Journal of Financial Stability, 6(1):1-9.

Hubbard R.G., Kuttner K.N. and D.N. Palia (2002), "Are there bank effects in borrowers' costs of funds? Evidence from a matched sample of borrowers and banks", The Journal of Business, 75(4):559-581.

Knyazeva A. and D. Knyazeva (2012), "Does being your bank's neighbour matter?", Journal of banking and finance, 36(4): 1194-1209.

Landier A. and D. Thesmar (2009), "Financial contracting with optimistic entrepreneurs", The Review of Financial Studies, 22(1):117-150.

Lelarge C., Sraer D. and D. Thesmar (2010), "Entrepreneurship and credit constraints: evidence from a French loan guarantee program", dans J. Lerner et A. Schoar (ed.), *International differences in Entrepreneurship*, University of Chicago Press.

Marti J. and A. Quas (2017), "A beacon in the night: government certification of SMEs towards banks", *Small Business Economics*, 50 : 390 – 413.

Mullins W. and P. Toro (2018), "Credit guarantees and new bank relationships", Banco Central de Chile, Documento de trabajo n°820.

OECD (2013), "SME and entrepreneurship financing: the role of credit guarantee schemes and mutual guarantee societies in supporting finance for small and medium-sized enterprises".

OECD (2015), "G20 / OCDE High-Level Principles on SME financing".

OECD (2017), "Evaluating publicly supported credit guarantee programmes for SMEs".

OECD (2018), "Financing SMEs and Entrepreneurs 2018: An OECD Scoreboard".

OECD (2020), "Coronavirus (COVID-19): SME policy responses", Tackling Coronavirus Series.

Oh I., Lee J-D, Choi G-G and A. Heshmati (2009), "Evaluation of Credit Guarantee Policy Using Propensity Score Matching", *Small Business Economics*, 33: 335-351.

Ono A., Uesugi I. and Y. Yasuda (2013), "Are lending relationships beneficial or harmful for public credit guarantees? Evidence from Japan's Emergency Credit Guarantee Program", *Journal of Financial Stability*, 9:47-61.

Rosenbaum P.R. and D.B. Rubin (1983), "The central role of the propensity scores in observational studies for causal effects", Biometrika 70(1): 41-55.

Schich S. (2017), "To what extent do public authorities verify the cost-effectiveness of guarantees for credit to SMEs?", *Comparative Economic Studies*, 60(1) :69-86.

Stiglitz J.E. and A. Weiss (1981), "Credit rationing in markets with imperfect information", American Economic Review, 71(3): 393-410.

Uesugi I., Sakai K. and G.M. Yamashiro (2010), "The Effectiveness of Public Credit Guarantees in the Japanese Loan Market", *Journal of the Japanese and International Economies*, 24(4):457-480.

World Bank and Initiative First (2015), "Principles for public credit guarantee schemes for SMEs".

Zecchini S. and M. Ventura (2009), "The impact of public guarantees on credit to SMEs", Small Business Economic, 32:191-206.

Appendix I: literature review on the impact of public CGSs

Authors	Country (program)	Sample	Methodology	Horizon for impacts?	Financial additionality	Economic Additionality	Heterogeneous effects
Acunto, Tate and Yang (2017)	USA (SBA)	173 300 treated and untreated startups (guarantee data at the regional level), 2010 - 2014	IV	4 years	Not investigated	Lower growth of sales and workforce. No significant effect on survival (indicator : company identified as still active)	Distribution mode: negative effects more pronunced when applications are not screened by the SBA. Ex-ante uncertainty: negative effects more pronounced when uncertainty is high
Asdrubali and Signore (2015)	CESEE Countries (MAP)	2595 treated firms, 2005 - 2012	Propensity-score matching	5 years	Not investigated	Increase of employment and sales. No significant impact on profitability (ROA). Decrease of total factor productivity	Firm size: greater effects for small companies. Firm age: greater effects for young companies. Signature year (2005, 2006, 2007): greater effects on employment for 2005 and 2006
Barrot, Martin, Sauvagnat and Vallée (2020)	France (Oséo)	1133 treated firms, 2009 - 2015	IV	6 years	Increase of bank debt	Increase of employment and earnings at the worker-level. Decrease of the probability of filing a bankruptcy	Ex-ante financial constraints: greater effects (employment, earnings) for companies with low cash-flow or low collateral and for companies not paying dividends. Credit risk (inverse of interest coverage ratio): no effects (employment, earnings) for low-credit risk firms. Worker characteristics: greater effects (employment, earnings) for young, male and high-income workers
Bertoni, Colombo and Quas (2019)	France (MAP, CIP)	57208 treated firms, 2002 - 2016	Propensity-score matching, difference in difference	10 years	Increase of credit events (net increases of liabilities / total assets)	Positive impact on firm survival (indicator : absence of dissolution of the company), sales, employment, total assets and total factor productivity. No significant impact on profitability (ROA)	Firm size: greater effects for smaller companies. Firm age: greater effects for younger companies. Industry: no heteregenous effects with some exceptions (smaller effects in knowledge industries). Macroeconomic conditions: no heteregenous effects. Region: no heteregenous effects. Loan amount: greater effects for large loan amounts
Boschi, Girardi and Ventura (2014)	Italy (FCG)	1243 treated firms, 1999 - 2004	Difference in difference, propensity-score matching	Contemporary effects	Increase of bank debt	Not investigated	Coverage ratio: non-linear effects (no significant effects for ratio < 25 %)
Brown and Earle (2017)	USA (SBA)	SBA loans recipients, 1992 - 2009	IV, propensity-score matching	5 years	Not investigated	Positive impact on employment	Firm size: greater effects for larger firms. Firm age: greater effects for young companies. Guarantee program (7(a) vs 504): no heterogeneous effects. Business cycle: greater effects for years with higher unemployment. Local credit conditions: greater effects in regions with access to credit is more difficult
Ciani, Gallo and Rotondi (2020)	Italy (FCG)	1636 guaranteed loans granted by UniCredit, 2013 - 2014	IV	1 year	Increase of the amount of loans (short and long term). Decrease of average interest rates for long-term loans only	Not investigated	Loan maturity : greater impact on short-term loan availability, no impact on short term loans' interest rates. Risk class (safe / solvent / vulnerable / risky): greater loan availability only for solvent firms, lower interest rates for solvent and risky firms
De Blasio, De Mitri, D'Ignazio and Finaldi Russo (2018)	Italy (FCG)	12252 treated firms, 2005 - 2010	Fuzzy RDD	2 years	Increase of the availability of bank loans. No significant impact on the cost of credit	No significant impact on investment and sales. Positive impact on inventories and accounts receivable. Increase of the probability of being classified as a bad loan	Industry : no heterogeneous effects. Firms guaranteed by mutual guarantees associations : no heterogeneous effects
Gonzalez-Uribe and Wang (2020)	UK (EFG)	5044 eligible (not necessarily treated) companies, 2004 - 2013	Difference in difference, IV	4 years	Increase of external debt both at the extensive and the intensive margin	Increase of labour productivity, employment profits and survival (indicator : filing of financial accounts). No significant impact on investment	Training costs: greater effects for firms with high training costs
Ignazio and Menon (2013)	Italy (regional fund)	152 treated firms, 2003 - 2010	IV	3 years	Increase of long term bank debt but no increase of total debt. Decrease of average interest rates	Increase of the growth rate of investments in year 1 only. Slight increase of the probability of being classified as a bad loan in the first two years (non significant in year 3)	Firm size and firm age: no heterogeneous effects (but small sample size)
Lelarge, Sraer and Thesmar (2010)	France (SOFARIS)	1362 treated firms, 1989 - 2000	IV, difference in difference	6 years	Increase of financial debt. Decrease of financial expenditures / financial debt	No increase of the number of new businesses, but higher initial size. Increase of employment. Increase of the probability of bankruptcy	No investigation of heterogeneous effects
Mullins and Toro (2018)	Chile (FOGAPE)	2011 - 2012	RDD	1 - 3 years (depending on output variables)	Increase of credit availability. Increase of the number of bank relationships. No significant impact on the cost of credit	Non significant impact on probability of default. Increase of sales, employment and input pruchases	No investigation of heterogeneous effects
Oh, Lee, Choi and Heshmati (2009)	South Korea (KOTEC, KCGF)	3996 firms treated by KOTEC, 3818 firms treated by KCGF, 2000 - 2003	Propensity-score matching	1 - 2 years	Not investigated	Increase of sales, employment, mean wage. Decrease of firm exit (disappearance from survey data). Negative impact on investment intensity (growth of fixed assets / sales). Positive impact on total factor productivity, only for firms supported by both guarantee programs (KOTEC and KCGF)	Guarantee program: effects on performance greater for KOTEC, effects on survival greater for KCGF
Uesugi, Sakai et Yamashiro (2010)	Japan (SCG)	2066 treated firms, 1998 - 2005	Propensity-score matching, difference in difference	Four years	Increase of long term loan availability (long term loans / total loans), no significant impact on short term loan availability. Increase of the cost of debt (interest payments / total loans)	Increse of the ratio fixed tangible assets / total assets in T and T+1. Decrease of profitability (ROA) between T and T+2. Increase of the probability of default (only in T+2 and T+3)	Bank types (major vs regional): no persistence of long term loan greater availability for the least capitalized major banks. Amount of outsanding loans in T-1: more significant decrease of performance (profitability / defaults) for lower amounts. Ex-ante borrower net worth: more significant decrease of profitability for lower net worth
Zecchini and Ventura (2009)	Italy (FCG)	1243 treated firms, 1999 - 2004	Difference in difference	1 - 4 years	Additional loans and reduction of borrowing costs	Not investigated	No investigation of heterogeneous effects

Source: authors' review.

Appendix II: data description

Dataset for the "creation" fund

Creation guarantee: number of treated firms in the final sample for each cohort

Cohort (year of treatment T)	2010	2011	2012	2013	2014
Initial sample (firms interviewed in T)					
Number of firms	52 053				45 515
Final sample for analyzing the impact on firm survival at a 3 year horizon					
Number of firms	38 224				33 660
in % of the initial sample	73%				74%
Final sample for analyzing the impact on firms' employment at a 3 year horizon					
Number of firms	24 487				23 456
in % of the initial sample	47%				52%

Source: SINE, authors' calculation. We do not include cohorts of 2011, 2012 and 2013, since the last surveys are conducted in 2010 and 2014.

Reading: cohort 2010 initially includes 52,053 firms interviewed by the SINE survey. After cleaning the sample (exclusion of entrepreneurs taking over an existing business, exclusion of new companies which correspond to affiliates of existing business groups, exclusion of firms obtaining a guaranteed loan after the year of foundation) this number goes down to 38,224. Among these companies, a subsample of 24,487 firms is available for the analysis of firms' employment growth conditional to survival.

Dataset for the "expansion" fund

Expansion guarantee: number of treated firms in the final sample for each cohort

Cohort (year of treatment T)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Initial sample (firms with accounting data available in T-1)										
Number of firms	2040	2255				7559	8067	8076	8488	8367
Sample after cleaning the data										
Number of firms	1559	1782				5401	5767	5723	6260	6375
in % of the initial sample	76%	79%				71%	71%	71%	74%	76%
Final sample for analyzing the impact on firm survival at a 3 year horizon										
Number of firms	1366	1542				4113	4496			
in % of the initial sample	67%	68%				54%	56%			
Final sample for analyzing the impact on firms' sales at a 3 year horizon										
Number of firms	1089	1178				4061	4479			
in % of the initial sample	53%	52%				54%	56%			

Source: FARE, authors' calculation. We do not include cohorts of 2009, 2010 and 2011, since for these cohorts, we do not have data on firms' balance sheets between T-3 and T-1.

Reading: cohort 2013 initially includes 8,067 treated firms with accounting data for year 2012 (which corresponds to T-1). After cleaning the sample (exclusion of holding companies, exclusion of industries / legal forms non-relevant for the analysis, exclusion of companies for which the French Office of Statistics has imputed accounting data, exclusion of companies for which needed variables for matching are unavailable …), this number goes down to 5,767. Among these companies, a subsample of 4,496 is available for the analysis of firm survival (exclusion of sole proprietorships, whose dissolution events are not tracked by our data) and a subsample of 4,479 firms is available for the analysis of firms' growth conditional to survival (exclusion of companies for which sales are available from T-3 to T+3 and not imputed, exclusion of some outliers).

Appendix III: brief review of public schemes providing support for new businesses

In France, several public schemes are designed to provide financial and non-financial support to new businesses:

- Loans called "Prêts d'honneur" are unsecured personal loans without any interest. They are granted by several networks of entrepreneurs like "Réseau Entreprendre" or "Initiative France" and target entrepreneurs with no or little ability to pledge collateral. The objective of these loans is to increase entrepreneurs' equity, to strengthen the credibility of projects and ultimately to help them obtaining a bank loan. These personal loans are often conditioned on the obtaining of a private bank loan (of a similar or superior amount) and coupled with non-financial support from the networks mentioned above;

- NACRE loans follow the same logic than "prêts d'honneur". These are also unsecured personal loans without interest and their amount ranges between 1,000 and 10,000 euros, with a total financing plan that cannot exceed 75,000€. They explicity target unemployed entrepreneurs or individuals having difficulties to go into long term employment. They are also coupled both with the obtaining of a bank loan (whose amount must meet at least the amount of the NACRE loan) and with assistance for maturing the project, searching financial resources and developing the company;

- Loans for business creation ("prêts à la création d'entreprise" – PCE) is a former scheme deployed by the French public development bank, Bpifrance (it was stopped in 2015). These were corporate loans whose amount ranged between 2,000 and 7,000 euros, for financing plans reaching until 45,000 euros. They were designed to cover intangible expenses such as costs for setup or the need for working capital, whereas the complementary loan could cover tangible assets. The granting process was completely outsourced to commercial banks and networks of entrepreneurs, which had to contract with Bpifrance;

- The ACCRE ("Aide aux chômeurs créateurs ou repreneurs d'entreprise") scheme is an exemption of social charges for new entrepreneurs, covering the period of one year. It explicitly targets low-income entrepreneurs, and especially young and unemployed ones.

Appendix IV: relative characteristics of recipients of the "creation" fund

Age	Entrepreneurs which obtained a guaranteed loan	Entrepreneurs which obtained a bank loan without the guarantee of Bpifrance but received other subsidized loans	Entrepreneurs which obtained a bank loan without any guarantee nor subsidized loans	Entrepreneurs which did not use / obtain a bank loan
Less than 30 years old	20%	23%	17%	19%
Between 30 and 50 years old	67%	66%	65%	61%
More than 50 years old	13%	11%	17%	20%

Question : When were you born ?

Gender	Entrepreneurs which obtained a guaranteed loan	Entrepreneurs which obtained a bank loan without the guarantee of Bpifrance but received other subsidized loans	Entrepreneurs which obtained a bank loan without any guarantee nor subsidized loans	Entrepreneurs which did not use / obtain a bank loan
Female	28%	31%	28%	29%
Male	72%	69%	72%	71%

Question : What is your gender ?

Nationality	Entrepreneurs which obtained a guaranteed loan	Entrepreneurs which obtained a bank loan without the guarantee of Bpifrance but received other subsidized loans	Entrepreneurs which obtained a bank loan without any guarantee nor subsidized loans	Entrepreneurs which did not use / obtain a bank loan
Foreigner	4%	5%	6%	10%
French	96%	95%	94%	90%

Question : What is your nationality ?

Marital status	Entrepreneurs which obtained a guaranteed loan	Entrepreneurs which obtained a bank loan without the guarantee of Bpifrance but received other subsidized loans	Entrepreneurs which obtained a bank loan without any guarantee nor subsidized loans	Entrepreneurs which did not use / obtain a bank loan
Couple	75%	73%	77%	71%
Single	25%	27%	23%	29%

Question : What is your marital status ?

Diploma	Entrepreneurs which obtained a guaranteed loan	Entrepreneurs which obtained a bank loan without the guarantee of Bpifrance but received other subsidized loans	Entrepreneurs which obtained a bank loan without any guarantee nor subsidized loans	Entrepreneurs which did not use / obtain a bank loan
No diploma	10%	9%	10%	13%
High-School diploma or less	56%	57%	52%	44%
Undergraduate or graduate diploma	30%	30%	33%	37%
Postgraduate diploma	4%	4%	4%	6%

Question : What is the highest degree that you obtained ?

Work situation before creating the firm	Entrepreneurs which obtained a guaranteed loan	Entrepreneurs which obtained a bank loan without the guarantee of Bpifrance but received other subsidized loans	Entrepreneurs which obtained a bank loan without any guarantee nor subsidized loans	Entrepreneurs which did not use / obtain a bank loan
Short-term unemployment	27%	39%	19%	21%
Long-term unemployment	13%	18%	9%	11%
Inactive	7%	7%	9%	13%
Self-employment or entrepreneurship	20%	8%	31%	24%
Employment	32%	29%	33%	31%

Question : What was your main work situation right before creating your company ?

Work experience in the same activity	Entrepreneurs which obtained a guaranteed loan	Entrepreneurs which obtained a bank loan without the guarantee of Bpifrance but received other subsidized loans	Entrepreneurs which obtained a bank loan without any guarantee nor subsidized loans	Entrepreneurs which did not use / obtain a bank loan
No work experience in the same activity	45%	41%	45%	41%
Less than 3 years of work experience in the same activity	5%	7%	6%	8%
Between 3 and 10 years of work experience in the same acti	19%	24%	20%	21%
More than 10 years of work experience in the same activity	30%	28%	29%	31%

Question : What is your experience in this activity ?

Experience in business creation	Entrepreneurs which obtained a guaranteed loan	Entrepreneurs which obtained a bank loan without the guarantee of Bpifrance but received other subsidized loans	Entrepreneurs which obtained a bank loan without any guarantee nor subsidized loans	Entrepreneurs which did not use / obtain a bank loan
No experience in business creation	71%	81%	63%	65%
Experience in business creation	29%	19%	37%	35%

Question : Have you ever created or taken over a business before 2010 ?

Entrepreneurs among relatives	Entrepreneurs which obtained a guaranteed loan	Entrepreneurs which obtained a bank loan without the guarantee of Bpifrance but received other subsidized loans	Entrepreneurs which obtained a bank loan without any guarantee nor subsidized loans	Entrepreneurs which did not use / obtain a bank loan
Entrepreneurs among relatives	73%	71%	72%	69%
No entrepreneurs among relatives	27%	29%	28%	31%

Question : Do you have entrepreneurs among relatives ?

Support received from suppliers or clients	Entrepreneurs which obtained a guaranteed loan	Entrepreneurs which obtained a bank loan without the guarantee of Bpifrance but received other subsidized loans	Entrepreneurs which obtained a bank loan without any guarantee nor subsidized loans	Entrepreneurs which did not use / obtain a bank loan
Support received from suppliers or clients	39%	42%	35%	35%
No support received from suppliers or clients	61%	58%	65%	65%

Question : Did you received support from suppliers or clients when starting your business ?

Support received from former employer	Entrepreneurs which obtained a guaranteed loan	Entrepreneurs which obtained a bank loan without the guarantee of Bpifrance but received other subsidized loans	Entrepreneurs which obtained a bank loan without any guarantee nor subsidized loans	Entrepreneurs which did not use / obtain a bank loan
Support received from former employer	7%	10%	9%	9%
No support received from former employer	93%	90%	91%	91%

Question : Did you received support from your former employer when starting your business ?

Other support received	Entrepreneurs which obtained a guaranteed loan	Entrepreneurs which obtained a bank loan without the guarantee of Bpifrance but received other subsidized loans	Entrepreneurs which obtained a bank loan without any guarantee nor subsidized loans	Entrepreneurs which did not use / obtain a bank loan
Support received from structures dedicated to creation	38%	60%	28%	23%
Support received from structures dedicated to innovation	4%	7%	2%	2%
Support received from experts	26%	25%	28%	19%

Question : Did you receive support such as counseling, informational, logistic or financial support when starting your business (outside banks) ?

Support received from ACCRE or NACRE	Entrepreneurs which obtained a guaranteed loan	Entrepreneurs which obtained a bank loan without the guarantee of Bpifrance but received other subsidized loans	Entrepreneurs which obtained a bank loan without any guarantee nor subsidized loans	Entrepreneurs which did not use / obtain a bank loan
Support received from ACCRE or NACRE	51%	68%	36%	39%
Support not received from ACCRE or NACRE	49%	32%	64%	61%

Question : Did you received support from ACCRE or NACRE ?

Paid side-line job	Entrepreneurs which obtained a guaranteed loan	Entrepreneurs which obtained a bank loan without the guarantee of Bpifrance but received other subsidized loans	Entrepreneurs which obtained a bank loan without any guarantee nor subsidized loans	Entrepreneurs which did not use / obtain a bank loan
Full-time paid side-line job	10%	5%	17%	12%
Part-time paid side-line job	5%	4%	8%	7%
No paid side-line job	84%	91%	75%	80%

Question : Do you currently have any paid sideline activity besides this firm ?
If yes, what sort of activity is it ?

Minimum social benefit received	Entrepreneurs which obtained a guaranteed loan	Entrepreneurs which obtained a bank loan without the guarantee of Bpifrance but received other subsidized loans	Entrepreneurs which obtained a bank loan without any guarantee nor subsidized loans	Entrepreneurs which did not use / obtain a bank loan
One or several social benefits* received	48%	66%	33%	39%
No minimum social benefit received	52%	34%	67%	61%

Did you received minimum social benefits right before creating your firm ?

Amount of the project	Entrepreneurs which obtained a guaranteed loan	Entrepreneurs which obtained a bank loan without the guarantee of Bpifrance but received other subsidized loans	Entrepreneurs which obtained a bank loan without any guarantee nor subsidized loans	Entrepreneurs which did not use / obtain a bank loan
Between 2K et 8K euros	16%	24%	25%	66%
Between 8K et 16K euros	13%	21%	16%	17%
Between 14K et 40K euros	22%	35%	22%	10%
Between 40K et 80K euros	20%	13%	12%	4%
Over 80K euros	29%	8%	25%	3%

Question : What was the amount of financial resources that you needed to start your business ?

Main goal as an entrepreneur	Entrepreneurs which obtained a guaranteed loan	Entrepreneurs which obtained a bank loan without the guarantee of Bpifrance but received other subsidized loans	Entrepreneurs which obtained a bank loan without any guarantee nor subsidized loans	Entrepreneurs which did not use / obtain a bank loan
Hire employees	30%	23%	21%	19%
Invest	16%	11%	17%	12%
Create your own job	54%	66%	62%	69%

Question : What is your main goal as an entrepreneur ?

Motive for creating firms	Entrepreneurs which obtained a guaranteed loan	Entrepreneurs which obtained a bank loan without the guarantee of Bpifrance but received other subsidized loans	Entrepreneurs which obtained a bank loan without any guarantee nor subsidized loans	Entrepreneurs which did not use / obtain a bank loan
Entrepreneurial spirit	53%	50%	48%	39%

Question : What are your main motives for creating your firm ?

Legal form	Entrepreneurs which obtained a guaranteed loan	Entrepreneurs which obtained a bank loan without the guarantee of Bpifrance but received other subsidized loans	Entrepreneurs which obtained a bank loan without any guarantee nor subsidized loans	Entrepreneurs which did not use / obtain a bank loan
Legal entity	78%	57%	62%	53%
Sole proprietorship	22%	43%	38%	47%

Total workforce	Entrepreneurs which obtained a guaranteed loan	Entrepreneurs which obtained a bank loan without the guarantee of Bpifrance but received other subsidized loans	Entrepreneurs which obtained a bank loan without any guarantee nor subsidized loans	Entrepreneurs which did not use / obtain a bank loan
Between 1 or 2 employees	74%	91%	81%	87%
Between 3 or 5 employees	19%	6%	11%	7%
Between 6 or 9 employees	5%	1%	3%	1%
More than 10 employees	1%	0%	1%	0%

Appendix V: definition of regressors in the logit model

Regressors in the logit model for the "creation" fund"

Regressor	Source	Definition
Age	SINE	Age of the entrepreneur
Gender	SINE	Gender of the entrepreneur
Nationality	SINE	Nationality of the entrepreneur
Marital status	SINE	Marital status of the entrepreneur
Diploma	SINE	Diploma of the entrepreneur
Experience in creating firms	SINE	Dummies for entrepreneurs with no experience in creating firms
Work situation before creating the firm	SINE	Work situation of the entrepreneur before creating the firm
Minimum social benefit	SINE	Dummies for entrepreneurs which received minimum social benefits
ACCRE support	SINE	Dummies for entrepreneurs which received support from the ACCRE scheme (see appendix III for details)
NACRE loan	SINE	Dummies for entrepreneurs which received support from the NACRE scheme (see appendix III for details)
"Prêt d'honneur" loan	SINE	Dummies for entrepreneurs which obtained a "prêt d'honneur" (see appendix III for details)
PCE loan	SINE	Dummies for entrepreneurs which received support from the PCE scheme (see appendix III for details)
Work experience in the same activity	SINE	Number of years of work experience in the same activity
Paid side-line job	SINE	Dummies for entrepreneurs with (i) no paid side-line jobs (ii) full-time paid side-line jobs (iii) part-time paid side-line jobs
Entrepreneurs among relatives	SINE	Dummies for entrepreneurs whose some relatives are also entrepreneurs
Support received from suppliers or clients	SINE	Dummies for entrepreneurs supported by suppliers or clients
Support received from former firms	SINE	Dummies for entrepreneurs supported by former firms

Support received from structures dedicated to creation	SINE	Dummies for entrepreneurs supported by structures dedicated to creation
Support received from structures dedicated to innovation	SINE	Dummies for entrepreneurs supported by structures dedicated to innovation
Support received from experts	SINE	Dummies for entrepreneurs supported by experts
Main goal for creating firms	SINE	Main goal of the entrepreneur when creating his/her firms
Motive for creating firms: Autonomy	SINE	Dummies for entrepreneurs whose motive for creating firms is autonomy
Motive for creating firms: Entrepreneurial spirit	SINE	Dummies for entrepreneurs whose motive for creating firms is entrepreneurial spirit
Motive for creating firms: Opportunity to increase his/her own revenue	SINE	Dummies for entrepreneurs whose motive for creating firms is to increase his/her own revenue
Motive for creating firms: Opportunity to create his/her own firm	SINE	Dummies for entrepreneurs whose motive for creating firms is to create his/her own firm
Motive for creating firms: New idea	SINE	Dummies for entrepreneurs whose motive for creating firms is to develop a new idea
Motive for creating firms: No other solution to carry out his/her work	SINE	Dummies for entrepreneurs whose motive for creating firms is autonomy
Legal form	SINE	Dummy for sole proprietorships
Industry	SINE	Dummies for the main activity of the firm (10 levels)
Region	SINE	Dummies for French administrative regions

Regressors in the logit model for the "expansion" fund

Regressor	Source	Definition
Turnover (deciles) in T-1	FARE	Total of domestic sales and exports
Total assets (deciles) in T-1	FARE	Total of fixed and current assets
Legal form	FARE	Dummy for sole proprietorships
Industry	FARE	Dummies for the main activity of the firm (21 levels)
Region	FARE	Dummies for French administrative regions
Export intensity (deciles for positive values) in T-1	FARE	Exports / total sales.
Age in T-1 (deciles)	FARE	Difference between the year of foundation and year T-1 (in years).
Growth rate of total sales between T-3 and T-1 (deciles)	FARE	Total sales in T-1 / total sales T-3
Growth rate of employees between T-3 and T-1 (deciles)	FARE	Number of employees in T-1 / Number of employees in T-3
Growth rate of tangible assets between T-3 and T-1 (deciles)	FARE	Stock of tangible assets in T-1 / stock of tangible assets in T-3
Group affiliation	LiFi survey	Dummies for (i) firms belonging to a French business group (ii) foreign-owned firms
Economic profitability in T-1 and in T-3	FARE	Profits before taxes / (fixed assets + working capital)
Cost of debt (deciles for positive values) in T-1	FARE	Interest expenses / financial debt
Solvency ratio (deciles for positive values) in T-1 and in T-3	FARE	Equity / total assets
Liquidity ratio (deciles) in T-1	FARE	Current assets (cash, securities, receivables) / current liabilities (suppliers, social and tax debts, debt on fixed assets, bank overdrafts when available)
Repayment capacity (deciles) in T-1	FARE	(Financial debt net of cash and securities) / EBITDA
Jumps of financial debt between T-3 and T-2 and between T-2 and T-1 (dummies)	FARE	Dummies for firms experiencing jumps of their financial debt in T-2 or T-1. Dummies are constructed with the following thresholds: 0 K€, 20 K€ and 100 K€
Jumps of equity between T-3 and T-2 and between T-2 and T-1 (dummies)	FARE	Dummies for firms experiencing jumps of their equity in T-2 or T-1. Dummies are constructed with the following thresholds: 0 K€, 20 K€ and 100 K€
Support by loan guarantees between T-8 and T-1	Bpifrance	Dummy for firms which obtained a loan guaranteed by Bpifrance between T-8 and T-1
Support for innovation activities between T-8 and T-1	Bpifrance	Dummy for firms whose innovation activities were funded by Bpifrance between T-8 and T-1
Other support from Bpifrance between T-8 and T-1	Bpifrance	Dummy for firms which received other types of funding from Bpifrance between T-8 and T-1

Appendix VI: results of the logit model

Creation guarantees: logit model for the probability of treatment in T according to initial characteristics

Regressors	Coefficient	Standard deviation	Coefficient significance
Age (reference: Less than 30 years old)			
Between 30 and 50 years old	-0,051	0,066	
More than 50 years old	-0,341	0,093	***
Gender (reference: Male)			
Female	-0,036	0,055	
Nationality (reference: Foreigner)			
French	0,41	0,113	***
Marital status (reference: Single)			
Couple	0,047	0,056	
Diploma (référence : No diploma)			
High-School diploma or less	0,062	0,083	
Undergraduate or graduate diploma	-0,037	0,089	
Postgraduate diploma	-0,261	0,144	*
No experience in creating firms	-0,005	0,061	
Work situation before creating the firm (reference : Short-term unemployment)			
Long-term unemployment	-0,012	0,078	
Inactive	-0,22	0,106	**
Self-employment or entrepreneurship	-0,247	0,096	***
Employment	0,1	0,073	
Minimum social benefit	-0,054	0,068	
Support from the ACCRE scheme	0,088	0,063	
Support from the NACCRE scheme	0,72	0,069	***
Support from a "Prêt d'honneur"	0,694	0,07	***
Support from the PCE scheme	-2,36		***
Work experience in the same job (référence : No work experience in the same job)			
Less than 3 years of work experience	-0,054	0,107	
Between 3 and 10 years of work experience	-0,018	0,067	
More than 10 years of work experience	0,04	0,06	
Paid side-line job (reference : No paid side-line job)			
Full-time paid side-line job	-0,334	0,087	***
Part-time paid side-line job	-0,2	0,104	**
Entrepreneurs among relatives	0,071	0,053	
Support received from suppliers or clients	-0,038	0,05	
Support received from former firms	-0,351	0,09	***
Support received from structures dedicated to creation	0,209	0,055	***
Support received from structures dedicated to innovation	0,392	0,112	***
Support received from experts	0,042	0,054	
Main goal for creating firms (reference : Create his/her own job)			
Hire employees	0,372	0,056	***
Invest	0,302	0,069	***
Motive for creating firms: Autonomy	0,002	0,053	
Motive for creating firms: Entrepreneurial spirit	0,204	0,049	***
Motive for creating firms: Opportunity to increase his/her own revenue	-0,136	0,057	***
Motive for creating firms: Opportunity to create his/her own firm	0,15	0,058	***
Motive for creating firms: New idea	0,032	0,063	
Motive for creating firms: No other solution to carry out his/her work	-0,108	0,11	
Legal form (reference: sole proprietorship)			
Corporation	1,113	0,058	***
Industry fixed effects	Yes		
Region fixed effects	Yes		
N	38 224		
N treated firms	2 152		
- 2 L	14 171		
Somers'D	0,569		

Expansion guarantees: logit model for the probability of treatment in T according to characteristics in T-1

Regressors	Coefficient	Standard deviation	Coefficient significance
Group affiliation (reference: independant companies)			
Companies belonging to a French business group	-0,032	0,052	
Foreign-owned companies	-1,624	0,337	***
Current assets / current liabilities (reference: 5th quintile)			
1rst quintile	-0,181	0,043	***
2nd quintile	-0,314	0,049	***
3rd quintile	-0,558	0,059	***
4th quintile	-0,837	0,080	***
Economic profitability in T-1 (reference: 1st quintile)			
2nd quintile	0,390	0,058	***
3rd quintile	0,228	0,061	***
4th quintile	0,078	0,066	
5th quintile	-0,080	0,072	
Economic profitability in T-3 (reference: 1st quintile)			
2nd quintile	0,056	0,047	
3rd quintile	-0,052	0,050	
4th quintile	-0,118	0,054	**
5th quintile	-0,182	0,061	***
Equity / total assets in T-1 (reference: 1st quintile)			
Negative equity	-0,628	0,073	***
2nd quintile	0,136	0,045	***
3rd quintile	0,047	0,058	
4th quintile	0,091	0,073	
5th quintile	0,044	0,103	
Equity / total assets in T-3 (reference: 1st quintile)			
Negative equity	0,105	0,063	*
2nd quintile	-0,099	0,046	**
3rd quintile	-0,247	0,057	***
4th quintile	-0,393	0,071	***
5th quintile	-0,632	0,098	***
Net financial debt / EBITDA in T-1 (reference: 1st quintile of firms with positive EBITDA)			
Negative EBITDA	0,301	0,082	***
2nd quintile (positive EBITDA)	0,289	0,073	***
3rd quintile (positive EBITDA)	0,538	0,073	***
4th quintile (positive EBITDA)	0,627	0,071	***
5th quintile (positive EBITDA)	0,459	0,074	***
Interest expenses / financial debt in T-1 (reference: no interest expenses)			
No financial debt	0,058	0,081	
Financial debt with no interest expenses	-0,031	0,081	
2nd quintile (positive interest expenses)	0,061	0,056	
3rd quintile (positive interest expenses)	0,263	0,057	***
4th quintile (positive interest expenses)	0,354	0,058	***
5th quintile (positive interest expenses)	0,539	0,059	***
Growth of sales between T-3 and T-1 (reference: 1st quintile)			
2nd quintile	-0,019	0,060	
3rd quintile	0,076	0,059	
4th quintile	0,137	0,058	**
5th quintile	0,301	0,060	***
Growth of workforce between T-3 and T-1 (reference: 1st quintile)			
No change	-0,139	0,064	**
2nd quintile (firms with change)	-0,078	0,075	
3rd quintile (firms with change)	-0,025	0,079	
4th quintile (firms with change)	0,008	0,074	
5th quintile (firms with change)	0,045	0,071	
Valeur manquante	-0,115	0,069	*
Growth of tangible assets between T-3 and T-1 (reference: 1st quintile)			
No change	-0,176	0,072	**
2nd quintile (firms with change)	-0,111	0,057	*
3rd quintile (firms with change)	-0,015	0,055	
4th quintile (firms with change)	0,026	0,054	
5th quintile (firms with change)	0,135	0,056	**
Support by loan guarantees between T-8 and T-1 (reference: no support)			
Firms with previous support	1,270	0,039	***
Support of Bpifrance for innovation activities between T-8 and T-1 (reference: no support)			
Firms with previous support	0,093	0,106	
Other support of Bpifrance between T-8 and T-1 (reference: no support)			
Firms with previous support	0,136	0,049	***
Variation of financial debt between T-3 and T-2 (reference: stability or decrease)			
Increase of less than 20 K€	0,1222	0,0427	***
Increase between 20 K€ and 100 K€	0,1121	0,0538	**
Increase superior to 100 K€	0,00851	0,0746	
Variation of financial debt between T-2 and T-1 (reference: stability or decrease)			
Increase of less than 20 K€	0,149	0,0442	***
Increase between 20 K€ and 100 K€	0,1753	0,0547	***
Increase superior to 100 K€	0,2276	0,0732	***
Variation of total assets between T-3 and T-2 (reference: stability or decrease)			
Increase of less than 20 K€	0,0613	0,0423	
Increase between 20 K€ and 100 K€	0,0331	0,0462	
Increase superior to 100 K€	0,1347	0,0592	**
Variation of total assets between T-2 and T-1 (reference: stability or decrease)			
Increase of less than 20 K€	0,1735	0,0432	***
Increase between 20 K€ and 100 K€	0,3619	0,0464	***
Increase superior to 100 K€	0,5675	0,0587	***
Industry fixed effects	Yes		
Region fixed effects	Yes		
Sales fixed effects	Yes		
Total assets fixed effects	Yes		
Age fixed effects	Yes		
Export ratio (exports / sales) fixed effects	Yes		
N	734 675		
N treated firms	4 479		
- 2 L	48 780		
Somers'D	0,574		

Appendix VII: statistics on the balanced sample

Creation guarantees: balance statistics on the matched sample

Firms' characteristics (% column)	Before matching		After matching	
	Treated firms	Non-treated firms	Treated firms	Non-treated firms
Age				
Less than 30 years old	20%	19%	20%	20%
Between 30 and 50 years old	68%	63%	68%	69%
More than 50 years old	12%	18%	12%	12%
Male	72%	71%	72%	72%
French	96%	92%	96%	96%
Couple	75%	73%	75%	74%
Diploma				
No diploma	9%	12%	9%	10%
High-School diploma or less	55%	48%	55%	54%
Undergraduate or graduate diploma	32%	35%	32%	32%
Postgraduate diploma	4%	5%	4%	4%
No experience in creating firms	73%	68%	73%	73%
Work situation before creating the firm				
Short-term unemployment	29%	23%	29%	31%
Long-term unemployment	14%	12%	14%	13%
Inactive	7%	11%	7%	7%
Self-employment or entrepreneurship	18%	23%	18%	17%
Employment	32%	31%	32%	33%
Minimum social benefit	51%	42%	51%	52%
Support from the ACCRE scheme	54%	44%	54%	56%
Support from the NACCRE scheme	25%	9%	25%	25%
Support from a "Prêt d'honneur"	21%	7%	21%	22%
Support from the PCE scheme	2%	8%	2%	2%
Work experience in the same job				
No work experience in the same job	46%	42%	46%	47%
Less than 3 years of work experience	6%	7%	6%	5%
Between 3 and 10 years of work experience	20%	21%	20%	20%
More than 10 years of work experience	29%	30%	29%	28%
Paid side-line job				
No paid side-line job	85%	81%	85%	87%
Full-time paid side-line job	9%	12%	9%	8%
Part-time paid side-line job	6%	7%	6%	5%
Entrepreneurs among relatives	73%	70%	73%	74%
Support received from suppliers or clients	40%	36%	40%	41%
Support received from former firms	7%	10%	7%	8%
Support received from structures dedicated to creation	45%	31%	45%	46%
Support received from structures dedicated to innovation	5%	3%	5%	5%
Support received from experts	27%	22%	27%	28%
Main goal for creating firms				
Create his/her own job	55%	67%	55%	55%
Hire employees	29%	20%	29%	30%
Invest	16%	13%	16%	15%
Motive for creating firms: Autonomy	63%	61%	63%	63%
Motive for creating firms: Entrepreneurial spirit	54%	43%	54%	55%
Motive for creating firms: Opportunity to increase his/her own revenue	23%	27%	23%	21%
Motive for creating firms: Opportunity to create his/her own firm	25%	20%	25%	25%
Motive for creating firms: New idea	19%	15%	19%	20%
Motive for creating firms: No other solution to carry out his/her work	5%	8%	5%	5%
Legal entity : corporation	78%	56%	78%	78%

Expansion guarantees: balance statistics on the matched sample

Firms' characteristics (% column)	Before matching		After matching	
	Treated firms	Non-treated firms	Treated firms	Non-treated firms
Sales				
Until 50 K€	3%	9%	3%	3%
]50 - 100 K€]	7%	15%	7%	7%
]100 - 200 K€]	15%	20%	15%	16%
]200 - 500 K€]	26%	24%	26%	26%
]500 K€ - 1 M€]	19%	13%	19%	19%
]1 - 2 M€]	12%	9%	12%	13%
]2 - 5 M€]	9%	6%	9%	9%
]5 - 10 M€]	5%	2%	5%	4%
]10 - 20 M€]	2%	1%	2%	2%
More than 20 M€	1%	1%	1%	1%
Business group affiliation				
Independant companies	85%	90%	85%	85%
Companies belonging to a French business group	14%	9%	14%	14%
Foreign-owned companies	0%	1%	0%	0%
Economic profitability in T-1				
1rst quintile	15%	20%	15%	15%
2nd quintile	30%	20%	30%	28%
3rd quintile	24%	20%	24%	25%
4th quintile	18%	20%	18%	19%
5th quintile	12%	20%	12%	13%
Economic profitability in T-3				
1rst quintile	21%	20%	21%	21%
2nd quintile	28%	20%	28%	26%
3rd quintile	22%	20%	22%	22%
4th quintile	17%	20%	17%	17%
5th quintile	12%	20%	12%	14%
Equity / total assets in T-1				
Negative equity	8%	11%	8%	8%
1rst quintile	30%	18%	30%	30%
2nd quintile	28%	18%	28%	27%
3rd quintile	18%	18%	18%	19%
4th quintile	11%	18%	11%	11%
5th quintile	5%	18%	5%	5%
Net financial debt / EBITDA in T-1				
Negative EBITDA	10%	14%	10%	10%
1rst quintile (positive EBITDA)	7%	17%	7%	7%
2nd quintile (positive EBITDA)	11%	17%	11%	12%
3rd quintile (positive EBITDA)	15%	17%	15%	14%
4th quintile (positive EBITDA)	26%	17%	26%	25%
5th quintile (positive EBITDA)	31%	17%	31%	32%
Current assets / current liabilities in T-1				
1rst quintile	27%	20%	27%	28%
2nd quintile	27%	20%	27%	26%
3rd quintile	24%	20%	24%	24%
4th quintile	15%	20%	15%	16%
5th quintile	6%	20%	6%	6%
Interest expenses / financial debt				
No financial debt	7%	22%	7%	7%
Financial debt with no interest expenses	5%	11%	5%	5%
1rst quintile (positive interest expenses)	14%	13%	14%	14%
2nd quintile (positive interest expenses)	16%	13%	16%	16%
3rd quintile (positive interest expenses)	18%	13%	18%	18%
4th quintile (positive interest expenses)	19%	13%	19%	20%
5th quintile (positive interest expenses)	19%	13%	19%	20%
Growth of sales between T-3 and T-1				
1rst quintile	12%	20%	12%	12%
2nd quintile	15%	20%	15%	15%
3rd quintile	18%	20%	18%	17%
4th quintile	23%	20%	23%	23%
5th quintile	32%	20%	32%	32%
Growth of workforce between T-3 and T-1				
No change	23%	27%	23%	22%
1rst quintile (firms with change of workforce)	8%	8%	8%	8%
2nd quintile (firms with change of workforce)	10%	9%	10%	9%
3rd quintile (firms with change of workforce)	12%	8%	12%	11%
4th quintile (firms with change of workforce)	14%	8%	14%	15%
5th quintile (firms with change of workforce)	15%	8%	15%	15%
Missing value	19%	32%	19%	19%
Growth of tangible assets between T-3 and T-1				
No change	7%	15%	7%	6%
1rst quintile	14%	17%	14%	15%
2nd quintile	14%	17%	14%	14%
3rd quintile	18%	17%	18%	17%
4th quintile	21%	17%	21%	21%
5th quintile	26%	17%	26%	26%
Previous support by a loan guarantee				
No	62%	91%	62%	61%
Yes	38%	9%	38%	39%
Previous public support for innovation activities				
No	97%	99%	97%	97%
Yes	3%	1%	3%	3%
Other previous financial support by Bpifrance				
No	83%	95%	83%	83%
Yes	17%	5%	17%	17%
Variation of total assets between T-3 and T-2				
No increase	42%	48%	42%	43%
Increase of less than 20 K€	21%	25%	21%	19%
Increase between 20 K€ and 100 K€	20%	18%	20%	20%
Increase superior to 100 K€	17%	10%	17%	17%
Variation of total assets between T-2 and T-1				
No increase	43%	54%	43%	44%
Increase of less than 20 K€	19%	23%	19%	19%
Increase between 20 K€ and 100 K€	20%	15%	20%	20%
Increase superior to 100 K€	17%	8%	17%	16%
Variation of financial debt between T-3 and T-2				
No increase	64%	71%	64%	65%
Increase of less than 20 K€	18%	18%	18%	17%
Increase between 20 K€ and 100 K€	12%	8%	12%	11%
Increase superior to 100 K€	7%	4%	7%	7%
Variation of financial debt between T-2 and T-1				
No increase	61%	70%	61%	62%
Increase of less than 20 K€	18%	18%	18%	18%
Increase between 20 K€ and 100 K€	12%	8%	12%	12%
Increase superior to 100 K€	8%	4%	8%	8%

Appendix VIII: impact of the "creation" fund – sensitivity tests

Robustness checks on cohort 2010: comparison of treated firms with similar control firms also obtaining a bank loan

Indicateurs d'impact	N Treated firms	ATT - NN1 matching with other similar firms obtaining a bank loan
Impact on survival rate in T+3 (percentage points)	2 152	0,01
		(0,013)
Impact on total employment in T+3	1 551	-0,2
		(0,295)

Impact estimates for cohort 2014

	Number of observations			
	Total sample	Treated firms	Treated firms after caliper	ATT - NN1
Impact on survival rate in T+3 (percentage points)	33 660	2 225	2 225	0,08*** (0,011)
Variation of number of employees between T-1 and T	23 456	1 837	1 837	0,9*** (0,136)

Appendix IX: impact of the "expansion" fund – sensitivity tests

Robustness checks on cohort 2013: results for different subsamples

	Comparaison with similar control firms also obtaining a bank loan in T (without a guarantee)	Sample excluding firms supported by Bpifrance before and after T
Impact on survival rate in T+3 (percentage points)	0,005	-0,018***
	(0,007)	(0,009)
Variation of sales between T-1 and T+3 (K€)	105,11	52,77***
	(65,1)	(18,71)
Variation of value added between T-1 and T+3 (K€)	23,78	18,87***
	(20,15)	(6,76)
Variation of number of employees between T-1 and T+3	-0,1	0,74***
	(0,49)	(0,19)
Variation of wages between T-1 and T+3 (K€)	13,85	11,63***
	(10,1)	(3,6)
Variation of financial debt between T-1 and T+3 (K€)		26,27*
		(13,71)
Variation of tangible assets between T-1 and T+3 (K€)		51,2***
		(15,42)
Variation of profitability* between T-1 and T+3 (percentage points)	-0,017	-0,012
	(0,018)	(0,01)

Impact estimates for cohort 2012

	Number of observations			Impact estimates according to methodology			
	Total sample	Treated firms	Treated firms after caliper	ATT - NN1	ATT - NN3	ATT - Inverse probability weighting matching	ATT - difference in difference estimator (NN 3)
Impact on survival rate in T+3 (percentage points)	653 018	4 113	4 112	0,021***	0,023***	0,023***	
				(0,006)	(0,006)	(0,001)	
Variation of sales between T-1 and T+3 (K€)	709 568	4 061	4 060	153,48***	145,33***	150,77***	154,34***
				(39,34)	(38,12)	(4,19)	(35,21)
Variation of value added between T-1 and T+3 (K€)	709 568	4 061	4 060	33,19***	34,45***	39,35***	36,29***
				(13,22)	(12,43)	(1,36)	(10,72)
Variation of number of employees between T-1 and T+3	467 857	2 797	2 797	0,95***	0,92***	0,89***	0,97***
				(0,27)	(0,26)	(0,03)	(0,24)
Variation of wages between T-1 and T+3 (K€)	709 568	4 061	4 060	16,81***	20,37***	20,33***	23,24***
				(6,06)	(5,54)	(0,63)	(4,95)
Variation of financial debt between T-1 and T+3 (K€)	709 568	4 061	4 060	80,41***	86,8***	86,48***	88,3***
				(13,84)	(12,85)	(1,54)	(11,8)
Variation of tangible assets between T-1 and T+3 (K€)	709 568	4 061	4 060	87,18***	88,77***	86,14***	99,05***
				(19,87)	(16,71)	(1,79)	(15,88)
Variation of mean wage between T-1 and T+3 (K€)	364 008	2 579	2 578	0,04	0,08	0,002	0,7
				(0,74)	(0,72)	(0,09)	(0,65)
Variation of profitability* between T-1 and T+3 (percentage points)	540 800	3 481	3 478	-0,013*	-0,012	-0,017***	-0,013*
				(0,008)	(0,008)	(0,001)	(0,007)

Impact estimates for cohort 2008

	Number of observations			Impact estimates according to methodology - total sample				Impact estimates according to methodology - sample excluding outliers			
	Total sample	Treated firms	Treated firms after caliper	ATT - NN1	ATT - NN3	ATT - Inverse probability weighting matching	ATT - difference in difference estimator (NN 3)	ATT - NN1	ATT - NN3	ATT - Inverse probability weighting matching	ATT - difference in difference estimator (NN 3)
Impact on survival rate in T+3 (percentage points)	635 020	1 542	1 539	-0,011	0,002	-0,008***		-0,011	0,002	-0,008***	
				(0,011)	(0,011)	(0,0008)		(0,011)	(0,011)	(0,001)	
Variation of sales between T-1 and T+3 (K€)	625 571	1 178	1 178	166,99	157,82	186,68***	165,07*	144,06**	177,49***	180,06***	167,04***
				(102,1)	(105,59)	(6,42)	(90,4)	(65,22)	(64,53)	(3,98)	(59,8)
Variation of value added between T-1 and T+3 (K€)	625 571	1 178	1 178	21,03	30,15	43,78***	22,812	44,21*	57,82**	49,99***	60,22***
				(32,68)	(34,56)	(1,95)	(26,47)	(24,32)	(22,59)	(1,4)	(18,23)
Variation of number of employees between T-1 and T+3	482 028	1 073	1 069	1,12**	1,34**	1,45***	1,15**	1,67***	1,53***	1,39***	1,49***
				(0,57)	(0,6)	(0,04)	(0,54)	(0,39)	(0,4)	(0,03)	(0,36)
Variation of wages between T-1 and T+3 (K€)	625 571	1 178	1 178	13,27	22,92	30,89***	24,91*	28,46**	32,65***	32,28***	38,9***
				(17,44)	(17,32)	(1)	(13,85)	(12,67)	(12,57)	(0,78)	(9,89)
Variation of tangible assets between T-1 and T+3 (K€)	625 571	1 178	1 178	74,41	107,38***	110,37***	133,07***	64,7*	112,41***	99,47***	131,73***
				(46,14)	(44,9)	(2,64)	(42,98)	(33,07)	(30,59)	(1,91)	(29,35)

Impact estimates for cohort 2007

	Number of observations			Impact estimates according to methodology - total sample				Impact estimates according to methodology - sample excluding outliers			
	Total sample	Treated firms	Treated firms after caliper	ATT - NN1	ATT - NN3	ATT - Inverse probability weighting matching	ATT - difference in difference estimator (NN 3)	ATT - NN1	ATT - NN3	ATT - Inverse probability weighting matching	ATT - difference in difference estimator (NN 3)
Impact on survival rate in T+3 (percentage points)	602 282	1 366	1 362	0,01 (0,011)	0,003 (0,011)	0,002*** (0,0001)		0,001 (0,0113)	-0,003 (0,011)	0,002*** (0,001)	
Variation of sales between T-1 and T+3 (K€)	612 767	1 089	1 087	173,32 (122,63)	207,96* (117,7)	208,74*** (7,045)	154,93 (105,53)	231,88*** (71,58)	228,23*** (71,98)	209,85*** (4,17)	186,74*** (65,07)
Variation of value added between T-1 and T+3 (K€)	612 767	1 089	1 087	26,98 (39,97)	61,23 (37,83)	45,696*** (2,34)	47,73 (32,76)	22,78 (40,63)	62,61** (27,09)	50,94*** (1,57)	47,8** (23,68)
Variation of number of employees between T-1 and T+3	483 492	1 030	1 027	2,59*** (0,73)	2,61*** (0,76)	2,04*** (0,05)	2,81*** (0,71)	1,56*** (0,42)	1,48*** (0,43)	1,29*** (0,027)	1,51*** (0,4)
Variation of wages between T-1 and T+3 (K€)	612 767	1 089	1 087	47,17*** (19,04)	52,84*** (18,96)	50,54*** (1,18)	50,09*** (17,76)	38,04*** (11,47)	41,39*** (11,98)	39,53*** (0,69)	36,41*** (11,11)
Variation of tangible assets between T-1 and T+3 (K€)	612 767	1 089	1 087	112,93*** (42,89)	106,06** (50,83)	120,12*** (2,64)	101,38** (45,5)	117,1*** (42,92)	137,02*** (39,42)	123,05*** (2,27)	140,52*** (37,49)

Appendix X: cost-benefit analysis

Creation guarantees: cost-benefit analysis

	Cohort		
	2010	**2014**	**TOTAL**
Full number of treated companies (missing or not in accounting data)	28 489	25 651	**54 140**
Amount of guarantees (M€)	666	582	**1 248**
Average impact of loan guarantees between T-1 and T+3			
Variation in the survival rate (percentage points)	5,0%	8,0%	
Variation of the number of employees	0,5	0,9	
Impact of loan guarantees on survival (A)			
Number of saved companies thanks to loan guarantees	1424	2052	**3 477**
Average number of employees for preserved firms	2,1	2,2	
Total of additional jobs	2 991	4 515	**7 506**
Impact of loan guarantees on firms' growth, conditionally to survival (B)			
Number of companies surviving at a three year horizon	22 506	22 573	**45 079**
Total of additional jobs	11 253	20 316	**31 569**
Total impact of loan guarantees (A + B)			
Total of additional jobs	14 245	24 830	**39 075**

Source: Authors' calculation.

Expansion guarantees: cost-benefit analysis

	Cohort				
	2007	**2008**	**2012**	**2013**	**TOTAL**
Full number of treated companies (missing or not in accounting data)	2 252	2 419	7 853	8 459	20 983
Amount of guarantees (M€)	253	272	389	399	1 313
Average impact of loan guarantees between T-1 and T+3					
Variation in the survival rate (percentage points)	0,2%	-0,8%	2,4%	3,4%	
Variation of the number of employees	1,3	1,4	0,9	1,2	
Variation of tangible assets (K€)	123	99	86	79	
Impact of loan guarantees on survival (A)					
Number of saved companies thanks to loan guarantees	5	-19	188	288	461
Median number of employees for preserved firms	9	8	4	4	
Median tangible assets of preserved companies*	141	152	68	77	
Total of additional jobs	41	-155	754	1 150	1 790
Total of additional tangible assets (K€)	635	-2 942	12 866	22 172	32 732
Impact of loan guarantees on firms' growth, conditionally to survival (B)					
Number of companies surviving at a three year horizon	2 045	2 165	7 225	7 875	19 310
Total of additional jobs	2 638	3 009	6 430	9 687	21 764
Total of additional tangible assets (K€)	251 615	215 353	622 341	624 356	1 713 665
Total impact of loan guarantees (A + B)					
Total of additional jobs	2 678	2 855	7 184	10 837	23 554
Total of additional tangible assets (K€)	252 250	212 412	635 207	646 528	1 746 396

Source: Authors' calculation. Average impacts are computed using inverse propensity score weighting.