BJM BRITISH JOURNAL of MANAGEMENT
BRITISH ACADEMY OF MANAGEMENT
*British Journal of Management, Vol. 34, 390–409 (2023)*
DOI: 10.1111/1467-8551.12593

Check for updates

# Private Equity and Bank Capital Requirements: Evidence from European Firms

Paul Lavery, Marina-Eliza Spaliara and Serafeim Tsoukas
Adam Smith Business School, University of Glasgow, Glasgow, G12 8QQ, UK
Corresponding author email: paul.lavery@glasgow.ac.uk

**Using firm-level data from 16 euro-area countries over 2008–2014, we investigate how the performance of bank-affiliated private equity-backed companies evolves after the European Banking Authority increased capital requirements for their parent banks. We find that portfolio companies connected to exposed banks reduce their level of investment and experience weaker asset growth, employment growth and profitability following the capital exercise. We further show that the effect is stronger for companies likely to face financial constraints. Finally, the findings indicate that the negative effect of the capital exercise is muted when the private equity sponsor is more experienced.**

## Introduction

Recent decades have seen a significant growth in empirical investigations of private equity (PE)-backed firms' post-buyout performance (Amess, Stiebale and Wright, 2016; Cumming, Peter and Tarsalewska, 2020; Kellard *et al*., 2021; Wilson, Amini and Wright, 2021). Over this period, banks have been active PE investors. Based on data from S&P Capital IQ over 1990 to 2018, the PE arms of banks were responsible for 12% of European PE buyouts. Fang, Ivashina and Lerner (2013) report that this is the case for almost 30% of US deals completed between 1983 and 2009. Although a rich literature to date considers how banks can transmit banking sector shocks onto the real economy via their commercial lending arms (for reviews, see Berger, Molyneux and Wilson, 2020; Gueller *et al*., 2021), there is no empirical evidence on how an exogenous shock to a bank affects its PE arm and the portfolio companies in which it invests. This paper provides, for the first time, a systematic empirical analysis of the mechanism through which an exogenous increase in capital requirements affects the portfolio companies of the PE arms of exposed banks.

The theoretical and empirical literature to date points to differences in the motives of independent PE investors and bank-affiliated PE investors, as well as the selection of target companies, and the value-added to their portfolio companies (Andrieu and Groh, 2012; Hellmann, 2002). Given the reliance on securing fundraising from external institutional investors to raise a new fund successfully every 5 to 10 years, financial returns and sufficient returns for investors drive independent PE investors. Captive investors, on the other hand, such as those affiliated with a bank, are strategic investors focused on increasing synergies and the strategic value-added to the parent organization, rather than pure financial gain. Hellmann, Lindsey and Puri (2007) provide empirical evidence that bank-affiliated investors use the PE market to create relationships, as companies receiving investment from bank-affiliated investors are significantly more likely to receive future loans

We have received very helpful comments from the editor (Sofia Johan), three anonymous referees and participants at the 2021 Money Macro and Finance Conference and the 2021 Financial Engineering and Banking Society. Any remaining errors are our own.

© 2022 The Authors. *British Journal of Management* published by John Wiley & Sons Ltd on behalf of British Academy of Management. Published by John Wiley & Sons Ltd, 9600 Garsington Road, Oxford OX4 2DQ, UK and 350 Main Street, Malden, MA, 02148, USA.
This is an open access article under the terms of the Creative Commons Attribution which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

14678551, 2023, 1, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/1467-8551.12593 by University Of Glasgow, Wiley Online Library on [09/01/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

from the lending arms of the parent banks. Independent and bank-affiliated investors also differ in the types of companies they target. Mayer, Schoors and Yafeh (2005) and Hellmann, Lindsey and Puri (2007) find bank-affiliated investors favour less risky transactions; similarly, Johan and Murtinu (2018) show that bank-affiliated deals are more likely to occur in 'safer' countries with better developed markets and stronger creditor rights. Lastly, Wang (2017) finds that bank-affiliated targets in the UK enjoy higher pre-buyout profitability and have less volatile cash flows.

There are also important differences between bank-affiliated PE investors and independent PE investors in organizational structure, source of capital and lifecycle. In a standard, independent, PE fund, the fund manager (also known as the general partner, GP) raises capital from external institutional investors such as pension funds, insurance companies and endowments (also known as limited partners, LPs) when raising a new fund, which typically occurs every 7 to 10 years.[1] LPs commit capital to the fund, and the GP draws this down over time by investing in portfolio companies during the fund's investment period.

Although independent PE investors are typically structured as a limited partnership, where bank-affiliated investors are concerned, the investor is a division of the parent bank. As such, the organizational structure differs from that of standard, independent PE funds. Bank-affiliated investors typically do not raise funds from external institutional investors, but instead receive their investment capital from their parent banks, and so do not follow the typical PE fund lifecycle. The literature on bank-affiliated PE widely acknowledges that the parent bank is typically the sole provider of capital to its PE arm (Barry, 1994; Croce, D'Adda and Ughetto, 2015; Tykvova, 2006).[2] However, unlike capital commitments to an independent PE fund, this funding is not ringfenced, and the amount set aside can be adjusted. As such, the parent bank can simply reduce the funding, and there is no legal restriction on them doing so, given that the bank is the ultimate owner of its PE division.[3] Consequently, if a shock hits the parent bank, there can be repercussions for its PE arm, as the bank may reduce the funding available for PE activities. Given that PE investing does not typically represent a core activity of a bank, the bank may decrease its PE funding when an external shock requires it to restructure its balance sheet. Moreover, along similar lines, the extant literature acknowledges that although independent PE investors are structured as LPs, bank-affiliated investors are influenced by the pressure from their parent bank in their day-to-day activities (Johan and Murtinu, 2018). This begs the question of how parent banks respond to exogenous shocks with respect to financing their PE arms.

In this paper, we shed light on the question by exploiting the European Banking Authority (EBA) 2011 capital exercise, where selected banks had to increase their core tier 1 (CT1) capital ratios to 9% of their risk-weighted assets by June 2012. The regulatory exercise was unexpected, not only in its magnitude (Jenkins, Atkins and Spiegel, 2011), but also in its timing.[4] We study whether, after the capital exercise, the PE portfolio companies of exposed banks are negatively affected relative to portfolio companies of unexposed banks. Additionally, we argue that the effect might differ across the sample of companies under PE ownership. That is, we investigate whether financially constrained firms, for whom access to external financing may be difficult or prohibitively expensive, experience stronger effects after the capital exercise compared to their unconstrained counterparts. Finally, we examine the extent to which portfolio companies of more experienced investors are likely to weather the negative impact of the policy intervention.

Our analysis is based on a sample of over 300 companies backed by the PE arms of European banks prior to the EBA capital exercise in 2011. The dataset offers a symmetric window around the 2011 EBA capital exercise, from 2008 to 2014. In a difference-in-differences setting, we examine how

[1]They may also raise funds from high-net-worth individuals and family offices.

[2]Our own discussions with senior bank-affiliated PE practitioners indicate that, in Europe, the bank is indeed the sole provider of capital to its PE arm.

[3]An institutional LP (such as a pension fund or insurance company) in a standard, independent, PE fund cannot typically do this, as it commits a fixed amount of capital to the fund, which the fund manager has a legal right to call down for investment purposes. This committed capital is typically called down gradually over the course of the fund's investment period.

[4]The EBA carried out stress tests across European banks fewer than 5 months prior to the EBA capital exercise.

© 2022 The Authors. *British Journal of Management* published by John Wiley & Sons Ltd on behalf of British Academy of Management.

14678551, 2023, 1, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/1467-8551.12593 by University Of Glasgow, Wiley Online Library on [09/01/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

the growth, investment and profitability of these companies change after the EBA policy change. We divide firms into two groups: exposed and non-exposed. The former group includes firms that receive PE investment from an investor affiliated with a bank subject to the EBA intervention and that had a large (above the median) capital shortfall to address. The latter group consists of firms that receive funding from the PE arms of banks that were not subject to the capital exercise or those that had below-the-median shortfalls. The identifying assumption for the research design is that exposed and non-exposed firm groups behave similarly in the absence of the capital exercise. Our sub-samples of exposed and non-exposed portfolio companies have similar profitability, investment and leverage prior to the EBA capital exercise, and they exhibit similar pre-shock growth trends. As such, the dataset provides an ideal setting for a difference-in-differences analysis.

Our work contributes to the literature in three ways. First, we add to the body of literature examining how bank-affiliated PE activity affects deal outcomes and firm performance. Bottazzi, Da Rin and Hellmann (2008) find that bank-affiliated investors are significantly less active in their roles compared to independent investors and that bank-affiliated deals are less likely to enjoy a better exit (through acquisition or initial public offering, IPO). Focusing on the post-transaction firm-level profitability of the portfolio companies, Wang (2017) finds that, on average, bank-affiliated PE buyouts fail to create operating performance gains, and bank-affiliated PE targets underperform independent PE targets across market cycles. Similarly, Johan and Murtinu (2018) find only a small, negligible positive effect of bank-affiliated deals on target firm performance. Our findings extend these studies by showing that a shock to the parent bank of the PE investor weakens the financial positions of its portfolio companies.[5] We show that companies connected to exposed banks reduce their investment by 5% relative to companies receiving investment from the PE arms of non-exposed banks; this result is strongly significant when controlling for various fixed effects and firm-level covariates. We then consider the post-shock growth of portfolio companies by studying the growth in firms' assets and employment after the EBA capital exercise. We show that asset growth is 2–4% lower for companies linked to exposed banks, while growth in employment is around 3% lower. Finally, we document that post-EBA, exposed firms' return on assets falls by approximately 2%.

The second main contribution is that we uncover significant heterogeneity in firms' financial positions. An extensive literature on firm heterogeneity posits that firms facing constraints in some financial markets are more likely to have a higher degree of information asymmetry, and may therefore find it difficult to access external financing. Previous empirical studies on PE investment emphasize the importance of financing constraints. Bernstein, Lerner and Mezzanotti (2019) note that smaller firms, more leveraged firms or target firms operating in more financially dependent industries outperform buyout target firms less likely to be ex-ante constrained during the global financial crisis. Boucly, Sraer and Thesmar (2011) also observe stronger growth in companies that are ex-ante more likely to be constrained pre-buyout. We build on this line of work by showing that the negative impact of the shock on exposed banks' portfolio companies' performance is stronger for companies that were ex-ante more likely to be financially constrained prior to the shock. This is consistent for different measures of financial constraints, including firm size, firms' ratio of cash to assets and location in countries more exposed to the European sovereign debt crisis, which was ongoing at the time of the EBA exercise.

Finally, we exploit heterogeneity at the PE investor level. Hotchkiss, Strömberg and Smith (2014) find that portfolio companies of more experienced investors are associated with a higher likelihood of survival, implying they are less likely to fall into distress relative to inexperienced investors' portfolio companies. This implies that portfolio companies of PE investors with more reputational capital are less likely to fall into distress and more likely to perform better than those backed by less experienced investors. Furthermore, Tykvová and Borell (2012) show that more experienced PE investors are better able to manage distress risks than their less experienced counterparts, and their portfolio companies exhibit lower bankruptcy rates. In

[5] Although we are interested in the role of banks as GPs, Lerner, Schoar and Wongsunwai (2007) examine the role of banks as LPs investing in PE funds and find that banks' selection of PE funds is poorer relative to other types of LPs (such as endowments or pension funds) and they invest in poorer performing funds. They show that banks underperform other classes of LPs across both buyout and venture capital investments.

© 2022 The Authors. *British Journal of Management* published by John Wiley & Sons Ltd on behalf of British Academy of Management.

14678551, 2023, 1, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/1467-8551.12593 by University Of Glasgow, Wiley Online Library on [09/01/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

the context of the EBA capital exercise, we expect the shock to have a stronger effect on portfolio companies with less experienced investors. Those with greater experience are better able to engage their portfolio and help them maintain their level of performance. We therefore anticipate that the EBA exercise has a stronger impact on the portfolio companies of less experienced PE investors. We find that the negative effect on the performance of portfolio companies is muted for companies with more experienced PE investors.

The remainder of the paper proceeds as follows. Section 2 reviews the EBA capital exercise and develops the testable hypotheses. Sections 3 and 4 describe our dataset and empirical methodology, respectively. Section 5 presents the empirical results along with robustness tests. Section 6 concludes.

## Background and hypotheses

### *2011 EBA capital exercise*

In October 2011, in a bid to restore confidence in the European banking sector, the EBA required certain banks to set aside additional, temporary capital buffers but left requirements unchanged for all other banks. Specifically, selected banks with large exposures to sovereign debt were required to increase their CT1 capital ratios to 9% of their risk-weighted assets by the end of June 2012 in order to mitigate risks related to sovereign bond exposure and to increase confidence across the banking sector. In order to meet the new regulatory requirement, banks could increase their CT1 ratios by either issuing more capital, or reducing their risk-weighted assets.

Just as the magnitude of the shock was unexpected (Jenkins, Atkins and Spiegel, 2011), so was the timing. Fewer than 5 months earlier, the EBA carried out stress tests across European banks. As a result, the new capital requirements plausibly surprised the participating banks. The previous stress tests, however, were not without criticism. The integrity of these tests was questioned after the Belgian bank, Dexia, failed only a few months later. The tests indicated that Dexia was one of the healthiest banks in Europe. Furthermore, the difference in magnitude of the shortfall that each of these regulatory actions reported was striking. The stress tests in June 2011 revealed banks had a € 2.5 billion deficit, and the capital exercise of October 2011 documented a shortfall of € 215 billion.

Banks were selected based on their total assets as of year-end 2010, ensuring that selection was not based on bank-specific events in the months prior to the capital exercise. In each country, the EBA sorted banks in descending order of market share (by total assets), such that the exercise covered at least 50% of the national banking sector. The June 2011 stress tests followed similar selection criteria. The country-specific selection threshold led to a considerable size overlap between selected and unselected banks. For example, the smallest bank in the exercise, Slovenian bank Nova Kreditna Banka Maribor, reported € 6 billion in total assets in 2010, and the largest bank not included, Credit Mutuel, had € 591 billion in total assets in the same year (Gropp *et al*., 2019). We take advantage of this exogenous banking sector policy change to study the portfolio companies of exposed and non-exposed banks' PE arms.

### *Hypotheses*

*PE firms' performance after the capital exercise.* The EBA capital exercise is a policy intervention aimed at increasing bank capital requirements. Banks could respond to this policy change by either increasing their levels of regulatory capital or reducing their risk-weighted assets. In a recent study, Gropp *et al*. (2019) provide evidence that European banks achieved the target set by the EBA by reducing their risk-weighted assets rather than by issuing new equity.[6] This is also borne out in our data, as EBA-exposed banks increased their equity by 5%, but cut their risk-weighted assets by 8%. In summary, it appears that affected banks tighten lending and transmit liquidity shocks to firms. De Jonghe, Dewachter and Ongena (2020), Fraisse, Lé and Thesmar (2020) and Blattner, Farinha and Rebelo (2021) report a decline in corporate lending with respect to the EBA capital exercise. Hence, firms that obtain most of their bank credit from affected banks suffer reductions in asset and investment growth (Gropp *et al*., 2019), lower firm-level productivity (Blattner, Farinha and Rebelo, 2021), lower employment growth (Juelsrud and Wold, 2020) and higher failure rates (Farinha, Spaliara and Tsoukas, 2019).

[6] Juelsrud and Wold (2020) find that Norwegian banks responded in a similar manner to a 2013 Norwegian policy reform, reducing their risk-weighted assets to achieve the new capital requirement.

© 2022 The Authors. *British Journal of Management* published by John Wiley & Sons Ltd on behalf of British Academy of Management.

14678551, 2023, 1, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/1467-8551.12593 by University Of Glasgow, Wiley Online Library on [09/01/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Importantly, to the extent that the capital exercise affects banks, the shock can move from the PE arm to its portfolio companies. In our context, the channel works through reduced investment provided to target firms when the PE arm is connected to an EBA-exposed bank. We expect shrinking investments, especially during extreme economic events, to affect firms' performance because one of the primary ways a PE investor helps its companies is by providing additional financing when other forms of financing are difficult to access (Bernstein, Lerner and Mezzanotti, 2019; Gompers, Kaplan and Mukharlyamov, 2016, 2020).

The literature around venture capital (VC) and PE underlines the importance of capital requirements and other regulations. Specifically, the scarcity of regulations appears to inhibit investment in PE (Cumming and Johan, 2007). In response to the global financial crisis, the Volcker Rule in the 2010 Dodd–Frank Act calls for significant cutbacks in banks' risky activities such as PE, proprietary trading and hedge funds. Fang, Ivashina and Lerner (2013) consider and empirically analyse the positive and negative effects of banks' involvement in PE on the market and the economy. On the negative side, a bank may take advantage of its superior information about firms, as well as the market conditions to make decisions that benefit the bank at the expense of other investors. On the positive side, through loan screening and monitoring (due to past interactions), banks obtain private information about their clients, which leads to a certification effect of banks' investment. They find that the ex-post performance of bank-affiliated buyouts is the same or worse compared to their standalone counterparts, which supports the negative views. A recent line of work (Johan and Murtinu, 2018; Wang, 2017) documents that bank-affiliated PE buyouts fail to create profitability gains, and even if they do, they have a small, negligible, positive effect on target firm performance. Based on this discussion, our first hypothesis is as follows.

*H1*: Following the capital exercise, portfolio companies of the PE arms of EBA-exposed banks experience lower investment, lower growth in assets and employment, and weaker profitability.

*Financial constraints.* Prior literature shows that financially constrained companies are more vulnerable to credit market downturns and shocks to the availability of bank financing (Bottero, Lenzu and Mezzanotti, 2020). Firm-level heterogeneity, measured by financial constraints, is a key contributor to PE portfolio companies' performance. Boucly, Sraer and Thesmar (2011) provide evidence that PE buyouts create value by relaxing credit constraints and allowing firms to grow and expand. Similarly, Cohn, Hotchkiss and Towery (2020) document that PE investors acquire companies that have growth potential but are highly leveraged and dependent upon external financing. Finally, Bernstein, Lerner and Mezzanotti (2019) note that smaller firms, more leveraged firms or target firms in more financially dependent industries outperformed buyout target firms less likely to be ex-ante constrained during the global financial crisis.

An implication of the mechanism described in the previous subsection is that companies connected to exposed banks are likely affected in a disproportionate manner. Although the literature indicates that PE investors alleviate financing constraints of portfolio companies, bank-affiliated PE arms that are negatively affected by the EBA exercise may reduce funding to their portfolio companies. Motivated by this consideration, we expect firms that are financially constrained to experience stronger effects compared to their less constrained counterparts.

*H2*: The effect of the capital exercise is stronger on portfolio companies that are more likely to be financially constrained.

*Investor experience.* Other important sources of heterogeneity likely matter in the context of PE investment. Specifically, the benefits of experience and investor reputation are well known. From a theoretical perspective, a more reputable investor may support portfolio companies in times of distress, as they are able to obtain external financing at more favourable rates (Demiroglu and James, 2010; Ivashina and Kovner, 2011). Prior empirical literature finds investor reputation important in a multitude of settings, such as fundraising (Barber and Yasuda, 2017), deal sourcing (Hsu, 2004), exits (Jenkinson and Sousa, 2015), investment outcomes (Krishnan *et al*., 2011; Nahata, 2008; Sørensen, 2007) and financial distress (Hotchkiss, Strömberg and Smith, 2014; Tykvová and Borell, 2012). Particularly pertinent to our

© 2022 The Authors. *British Journal of Management* published by John Wiley & Sons Ltd on behalf of British Academy of Management.

14678551, 2023, 1, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/1467-8551.12593 by University Of Glasgow, Wiley Online Library on [09/01/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

analysis, Hotchkiss, Strömberg and Smith (2014) find that portfolio companies of more experienced investors are more likely to survive, implying they are less likely to fall into distress relative to portfolio companies of less experienced investors. This suggests that portfolio companies of PE investors with more reputational capital are less likely to fall into distress and more likely to perform better than those backed by less experienced investors. Furthermore, Tykvová and Borell (2012) show that more experienced PE investors are better able to manage distress risks than their less experienced counterparts, and their portfolio companies exhibit lower bankruptcy rates. Our third hypothesis is as follows.

*H3*: Following the capital exercise, the performance of portfolio companies attached to EBA-exposed banks is likely to suffer, but less so for companies of more experienced PE investors.

## Data and descriptive statistics

*Data*

Our dataset of European PE buyouts by bank-affiliated PE investors comes from Capital IQ and covers 2008–2014.[7] We focus on bank-affiliated PE investors attached to European banks because we are interested in the 2011 EBA capital exercise as an external shock to the banking sector. Specifically, we consider deals where the target company is in Europe, as European companies are required to disclose annual accounting information in the public domain.[8] Our sample, which encompasses 16 European countries, is therefore representative of the European market for bank-affiliated PE buyouts.[9] We extract all PE buyout transactions, excluding VC deals, where investors typically acquire a minority stake and use little or no leverage to finance the deal.

We select transactions based on the following criteria: the target company is headquartered in Europe at the time of the transaction, the company received PE investment by the end of 2010 and the bank-affiliated investor had not exited by the end of 2011. Where club deals are concerned, where two or more PE firms jointly sponsor a deal, we drop all cases (55) that involve both the PE arm of an EBA-exposed bank and a non-exposed bank. Finally, we exclude deals for sponsored banks involved in any merger or acquisition during the sample period. This is a point worth noting, as many banks' PE arms have spun off and become independent PE investors.[10] We extract all relevant transaction information, such as the entry date, the PE sponsor(s), the location of the target company and of the acquirer, the number of investors and the transaction value.

We collect accounting data from the Amadeus database, which is distributed by Bureau van Dijk. Following prior literature, we apply more filters to our sample. First, we include only companies whose full accounts are available in Amadeus. In doing so, we exclude companies who file abbreviated accounts. Second, we exclude companies in the financial and real estate sectors (Bernstein, Lerner and Mezzanotti, 2019; Michaely and Roberts, 2011). To control for the potential influence of outliers, we winsorize the regression variables at the 5th and 95th percentiles. To identify exits, we use Capital IQ and relevant news articles to search for corporate events related to the target firm in each transaction, such as bankruptcies, trade sales, secondary buyouts and IPOs. This allows us to note the date and type of exit for each deal, where an exit occurs.

Information on the bank-affiliated PE investors is from Capital IQ and Thomson Reuters Eikon. Specifically, we gather investor-level information,

[7]This database is widely used for firm-level analysis on PE buyouts (see, e.g., Bernstein and Sheen, 2016; Bernstein, Lerner and Mezzanotti, 2019; Davis *et al*., 2014; Faccio and Hsu, 2017; Fang, Ivashina and Lerner, 2013; Jenkinson and Sousa, 2015).

[8]There is no reason to believe that restricting our sample to all-European deals (i.e. both the investor and the target based in Europe) should bias our results in any way. Indeed, from 1990 to 2016, 95% of all PE investments from European bank-affiliated PE investors were in European companies.

[9]Our sample includes transactions in the following countries: Austria, Belgium, Denmark, France, Germany, Hungary, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland and the UK.

[10]Specifically, as an example, we would only include a deal by Barclays Private Equity that Barclays Private Equity executed and where an exit occurs before Barclays Private Equity spun off and became Equistone. That is, Barclays Private Equity, and not Equistone, completed the deal. Nevertheless, when we estimate the baseline regression models after removing all deals of investors who spin off at any point during the sample period, we find that our results remain largely unchanged.

© 2022 The Authors. *British Journal of Management* published by John Wiley & Sons Ltd on behalf of British Academy of Management.

14678551, 2023, 1, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/1467-8551.12593 by University Of Glasgow, Wiley Online Library on [09/01/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

*Table 1. Industry distribution*

| Industry distribution | Exposed | non-exposed |
|---|---|---|
| Agriculture, forestry & fishing | 0% | 2% |
| Construction | 1% | 6% |
| Manufacturing | 51% | 40% |
| Retail trade | 4% | 6% |
| Services | 19% | 27% |
| Transport, communication, electric & gas | 11% | 8% |
| Wholesale trade | 15% | 11% |

*Source*: The table shows the industry distribution at the broad industry level (one-digit SIC) for the exposed and non-exposed sample of PE backed companies.

such as the PE firm's year of incorporation, its location, and the number and dates of all individual investments it has made. Following Jenkinson and Sousa (2015), where more than one PE firm participates in the same transaction, if one led the transaction (received a higher percentage of shares), we only use the information about the leader. If none of the PE firms receive more shares than the other(s) or no information on this is available, we obtain information on all PE firms and average the data on investor-level characteristics. Finally, in line with previous research, if the PE firm is founded before 1970, we use 1970 as the founding year, as there is very little activity in European PE markets prior to that date (Jenkinson and Sousa, 2015; Krishnan *et al.*, 2011).

Our combined panel has an unbalanced structure containing 2,039 annual observations (firm-years) on 308 portfolio companies. Of these firms, 106 are linked to the PE arm of an EBA-exposed bank, and 202 are linked to the PE arm of a non-exposed bank. Table 1 shows the industry distribution of the portfolio companies of both the exposed and unaffected non-exposed banks' PE arms in the sample at the broad industry level (one-digit SIC). The two samples exhibit similar properties. The majority of the firms in each sub-sample are concentrated in manufacturing and, to a slightly lesser extent, services. The industry distribution is also comparable with other studies examining bank-affiliated PE transactions in Europe (Wang, 2017).

### *Descriptive statistics*

In Figure 1, we graph the deal activity of the European PE market, focusing on independent and bank-affiliated PE buyouts. In terms of the number of deals executed, both deal types follow a similar pattern, rising considerably in the run-up to the global financial crisis, before dropping thereafter. Around the time of the EBA capital exercise in 2011, independent PE deal activity recovers, but the number of bank-affiliated deals drops slightly more after the capital exercise. Moving a step further, in Figure 2 we document the annual number of deals made by the PE arms of banks exposed to the EBA capital exercise versus those made by unexposed banks. The divergence around 2010 to 2012 suggests that in the post-capital exercise period, exposed banks are involved in relatively fewer PE buyouts compared to unexposed banks, relative to the pre-capital exercise period.

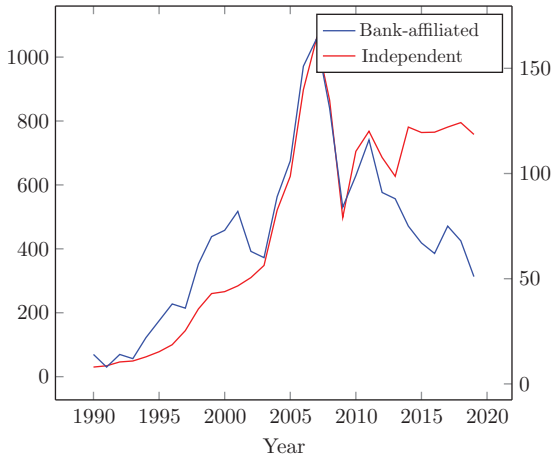


*Figure 1. Bank-affiliated vs independent buyouts in Europe 1990–2019*
*[Colour figure can be viewed at wileyonlinelibrary.com]*
*The graph shows the number of bank-affiliated PE buyouts in Europe (right axis) and the number of independent PE buyouts in Europe (left axis) from 1990 to 2019. A bank-affiliated deal is a transaction in which the sponsor is a bank-affiliated PE firm. An independent deal is one in which the equity sponsor is an independent limited partnership, unaffiliated with any other organization. PE transaction information is from S&P Capital IQ*

To appreciate that our two sub-samples of EBA-exposed bank-affiliated deals and non-exposed bank-affiliated deals are similar in nature, Tables 2 and 3 report some pre-EBA characteristics and trends of the two sets of companies. Across both groups, firms are very similar in terms of profitability (return on assets, ROA), earnings, cash flow, leverage and investment in the pre-shock period. The differences in these variables between the two sub-samples are small in magnitude and statistically insignificant. The mean values of sales and assets are relatively close, and these differences are

© 2022 The Authors. *British Journal of Management* published by John Wiley & Sons Ltd on behalf of British Academy of Management.

14678551, 2023, 1, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/1467-8551.12593 by University Of Glasgow, Wiley Online Library on [09/01/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

*Table 2. Portfolio company characteristics in 2010*

| | Exposed | | | | Non-exposed | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Variable | Firms | Mean | Median | SD | Firms | Mean | Median | SD | Diff. |
| Total assets | 103 | 79,928 | 24,099 | 132,346 | 201 | 120,867 | 33,374 | 342,110 | −40,939* |
| Sales | 101 | 54,353 | 20,163 | 69,793 | 201 | 88,855 | 32,618 | 230,001 | −34,502* |
| EBITDA | 101 | 0.08 | 0.09 | 0.21 | 183 | 0.10 | 0.10 | 0.23 | −0.02 |
| Cash flow | 99 | 0.04 | 0.06 | 0.21 | 186 | 0.06 | 0.08 | 0.22 | −0.02 |
| Investment | 101 | −0.01 | 0.02 | 0.31 | 187 | −0.01 | 0.02 | 0.26 | 0.00 |
| ROA | 101 | 0.10 | 0.09 | 0.12 | 183 | 0.11 | 0.10 | 0.12 | −0.01 |
| Leverage | 103 | 0.68 | 0.66 | 0.36 | 200 | 0.64 | 0.65 | 0.33 | 0.04 |

*Source*: The table reports descriptive statistics of sample firms in the last pre-policy year (2010) across exposed and non-exposed firms. Diff. refers to the difference in means across the two groups. See Appendix A1 for precise definitions of the variables. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively. We winsorize all variables at the 5th and 95th percentiles.

*Table 3. Portfolio company growth rates in 2010*

| | Exposed | | | | Non-exposed | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Variable | Firms | Mean | Median | SD | Firms | Mean | Median | SD | Diff. |
| 1-year growth rate | | | | | | | | | |
| Total assets | 103 | 0.10 | 0.03 | 0.27 | 201 | 0.09 | 0.05 | 0.27 | 0.01 |
| Sales | 97 | 0.13 | 0.10 | 0.29 | 195 | 0.09 | 0.06 | 0.25 | 0.04 |
| EBITDA | 100 | 0.11 | 0.02 | 0.99 | 177 | 0.06 | 0.00 | 0.96 | 0.05 |
| Cash flow | 89 | −0.09 | −0.03 | 1.30 | 163 | −0.17 | −0.09 | 1.10 | 0.08 |
| Investment | 100 | −0.95 | −0.66 | 3.92 | 180 | −0.96 | −0.56 | 4.25 | 0.01 |
| ROA | 95 | −0.02 | 0.00 | 0.83 | 175 | −0.10 | −0.01 | 0.86 | 0.08 |
| Leverage | 103 | 0.02 | −0.01 | 0.21 | 200 | 0.03 | 0.00 | 0.19 | −0.01 |
| 2-year growth rate | | | | | | | | | |
| Total assets | 103 | 0.34 | 0.03 | 0.97 | 200 | 0.36 | 0.01 | 1.18 | −0.02 |
| Sales | 93 | 0.30 | 0.00 | 1.15 | 186 | 0.33 | −0.02 | 1.21 | −0.03 |
| EBITDA | 93 | −0.14 | −0.17 | 1.25 | 173 | −0.04 | −0.10 | 1.30 | −0.04 |
| Cash flow | 86 | −0.15 | −0.25 | 1.46 | 159 | −0.18 | −0.19 | 1.47 | 0.03 |
| Investment | 86 | −0.98 | −0.77 | 3.58 | 174 | −0.45 | −0.82 | 4.45 | 0.53 |
| ROA | 89 | −0.15 | −0.11 | 1.06 | 168 | −0.10 | −0.08 | 1.17 | −0.05 |
| Leverage | 101 | 0.09 | 0.03 | 0.52 | 199 | 0.06 | −0.02 | 0.54 | 0.03 |

*Source*: The table reports the 1 and 2-year growth rates of firm characteristics in 2010. Diff. refers to the difference in means across the two groups. See Appendix A1 for precise definitions of the variables. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

statistically significant at the 10% level. We enrich this analysis by examining companies' growth rates in the aforementioned characteristics in Table 3. Once again, we find that the two sub-samples share similar pre-EBA shock trends in terms of their firm-level characteristics.

To provide a simple visual account of the evolution of firms' investment, asset growth, employment growth and ROA around the EBA capital exercise, we present Figure 3. Specifically, the graphs present the $\alpha_t$ of the following regression equation:

$$y_{i_t} = \alpha_t + \alpha_i + \varepsilon_{it} \quad (1)$$

where $y_{it}$ is investment measured by the change in fixed assets plus depreciation, the 1-year growth in total assets, the 1-year growth in employment or the ROA for firm i at time t. $\alpha_t$ captures year fixed effects and $\alpha_i$ denotes firm fixed effects. We use the year before the shock, 2010, as the base period, and we normalize its corresponding coefficient to zero. We estimate the equation separately for both the EBA and non-EBA samples, with standard errors clustered at the firm level. We observe that the two groups of companies follow relatively similar paths before the shock in terms of their levels of investment and their growth in assets and employment. This alleviates concerns that either group is

© 2022 The Authors. *British Journal of Management* published by John Wiley & Sons Ltd on behalf of British Academy of Management.

14678551, 2023, 1, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/1467-8551.12593 by University Of Glasgow, Wiley Online Library on [09/01/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

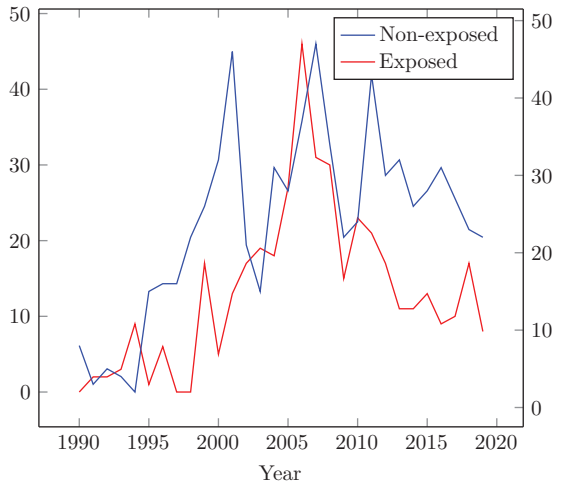


*Figure 2. Exposed vs non-exposed bank-affiliated PE buyouts [Colour figure can be viewed at wileyonlinelibrary.com] This figure charts the annual number of PE buyouts made by the PE arms of EBA-exposed and non-exposed banks from 1990 to 2019. Data comes from S&P Capital IQ*

substantially outperforming the other in the run-up to the EBA capital exercise. Thereafter, at the onset of the EBA shock, a divergence appears between the two groups, with portfolio companies of exposed banks' PE arms underperforming.

Overall, these analyses suggest that companies receiving PE investments from EBA-exposed banks are similar in nature and characteristics in the pre-shock period to companies receiving investment from the PE arms of non-exposed banks. They also share similar pre-shock growth rates and time-series trends in investment, growth in assets, growth in employment and profitability. This underlines that there is no reason to doubt there are any significant differences between the two subsamples in the run-up to the EBA capital exercise. In the following sections, a formal regression analysis framework tests the role of the policy initiative on the performance of the two groups of portfolio companies.

## Empirical specification

### *Baseline model*

We estimate our regressions using a difference-in-differences method to identify how bank capital requirements affect the performance of portfolio companies of the PE divisions of affected and less affected banks. The sample period offers a symmetrical window around the 2011 EBA capital exercise, from 2008 to 2014. Formally, we estimate the following equation:

$$y_{it} = \alpha_i + \alpha_c + \beta_1(\text{Exposed}_i * \text{Post}_t) + \beta_2 X_i * \text{Post}_t + \varepsilon_{it} \quad (2)$$

where $y_{it}$ is investment measured by the change in fixed assets plus depreciation, the 1-year growth in total assets, the 1-year growth in employment or ROA for firm i at time t. Exposed is a dummy variable that equals 1 if a firm receives PE investment from an investor affiliated with a bank subject to the EBA intervention and that had a large (above the median) capital shortfall to address. The dummy equals 0 for firms that receive investment from banks not subject to the capital exercise or those that fell below the median.[11] Post is a dummy that equals 1 for observations in the post-EBA period of 2011–2014, and 0 otherwise. The coefficient of interest in Equation (2) is $\beta_1$, which measures the relative evolution of firm outcomes between firms receiving funding from an exposed bank-affiliated investor and firms receiving funding from a non-exposed investor around the EBA capital exercise. Obtaining a negative coefficient on the interaction term supports H1.

The models include additional controls: firm fixed effects ($\alpha_i$) to account for unobserved firm heterogeneity and country*year fixed effects ($\alpha_c$) to account for potential differences across countries. In addition, we augment our specifications with firm-level control variables, $X_i$, to account for heterogeneity across firms prior to the EBA capital

[11]The EBA identifies the shortfall as follows: $\text{Shortfall}_{\text{Sept2011}} = (0.09 * \text{RWA}_{\text{Sept2011}} - \text{CT1}_{\text{Sept2011}}) + (\text{Bu\_erSov}_{\text{Sept2011}})$. RWA stands for the risk-weighted assets, CT1 is the core tier 1 capital ratio and BufferSov is the capital buffer on EEA sovereign exposures. Finally, the capital requirement is determined by a 9% CT1 threshold. For details on the methodology, see https://www.eba.europa.eu/sites/default/documents/files/documents/10180/26923/acac6c68-398e-4aa2-b8a1-c3dd7aa720d4/Sovereign-capital-shortfall_Methodology-FINAL.pdf We follow Blattner, Farinha and Rebelo (2021) and focus both on eligibility and exposure to sovereign debt to define firms exposed to the EBA capital exercise banks. This is an appealing characteristic because a substantial part of the capital shortfalls consisted of a new precautionary buffer against holdings of sovereign bonds, which attracted a high degree of risk during the European sovereign debt crisis. Hence, the use of shortfalls in our EBA-exposure definition helps us identify an exogenous financial instrument for European corporations at that time.

© 2022 The Authors. *British Journal of Management* published by John Wiley & Sons Ltd on behalf of British Academy of Management.

14678551, 2023, 1, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/1467-8551.12593 by University Of Glasgow, Wiley Online Library on [09/01/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

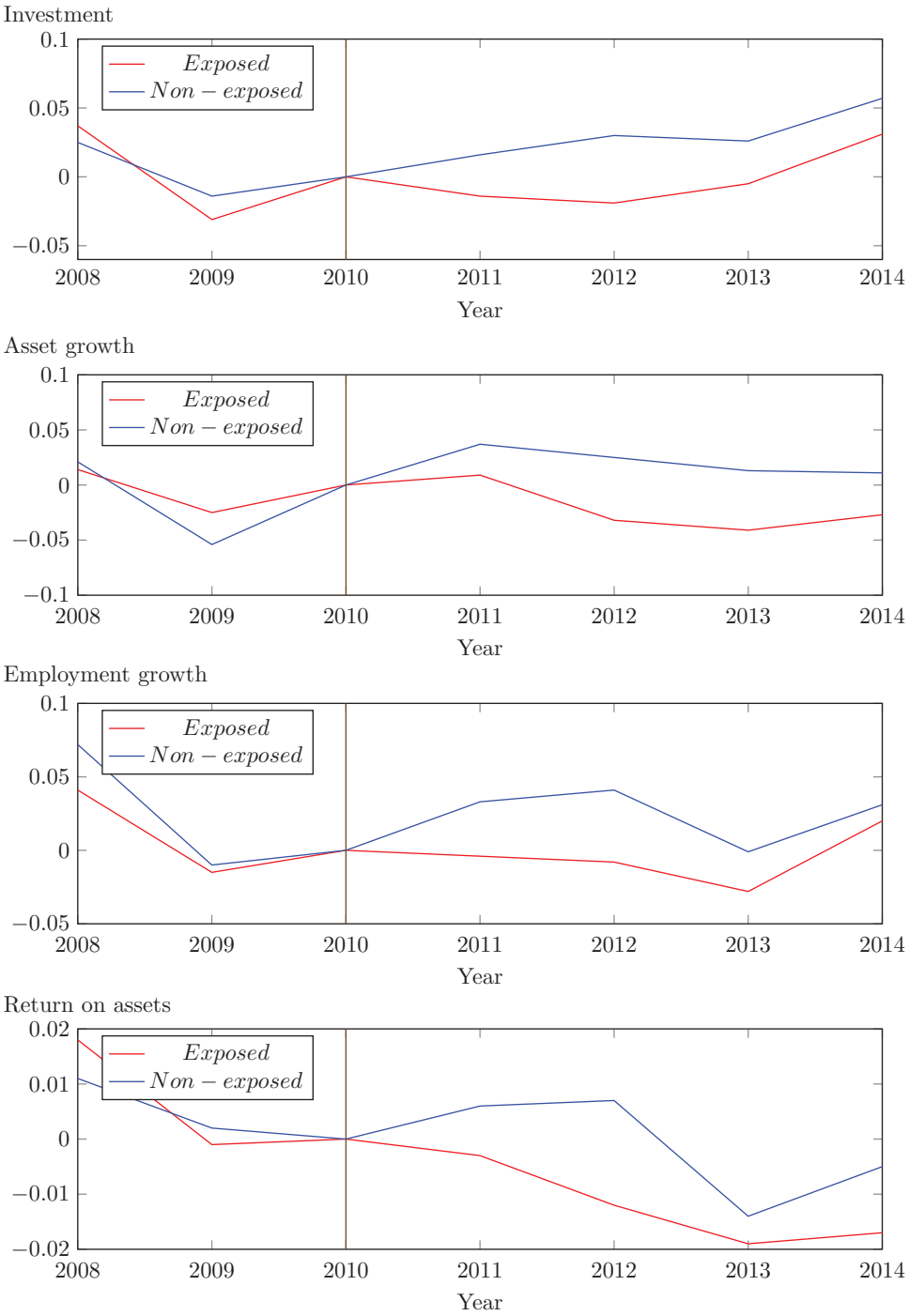


*Figure 3. Effect of EBA-exposed bank PE-backed companies on firm behaviour over time*
*[Colour figure can be viewed at wileyonlinelibrary.com]*
*The figure illustrates the change in investment, asset growth, employment growth and ROA for both exposed and non-exposed companies in our sample. Investment is the change in fixed assets over the past year, plus depreciation, and is scaled by total assets. Asset growth is the 1-year growth in total assets and employment growth is the 1-year growth in employment. ROA is the return on assets. Specifically, the figure reports the* $\alpha_t$ *of the following equation:* $(y_{it}) = \alpha_t + \alpha_i + \epsilon_{it}$, *where* $\alpha_t$ *captures year fixed effects and* $\alpha_i$ *captures company fixed effects. The year before the EBA intervention, 2010, is the base period, and its corresponding coefficient is normalized to zero. The equation is estimated separately for both the exposed and non-exposed samples, with standard errors clustered at the company level*

© 2022 The Authors. *British Journal of Management* published by John Wiley & Sons Ltd on behalf of British Academy of Management.

14678551, 2023, 1, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/1467-8551.12593 by University Of Glasgow, Wiley Online Library on [09/01/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

exercise. To avoid concerns regarding the endogeneity of the control variables, we measure them in the pre-shock period (2010) and then interact them with the Post dummy to allow a differential impact around the shock (Bernstein, Lerner and Mezzanotti, 2019; Gormley and Matsa, 2013). In particular, we control for firm size, cash flow normalized by total assets, profitability (ROA), leverage and the 1-year growth in sales.[12] Finally, to deal with serial correlation, we cluster standard errors at the firm level.

### *Accounting for financial constraints*

In order to enrich our understanding of our baseline findings, we now exploit heterogeneity at the portfolio company level. Specifically, we determine whether sponsorship by an EBA-exposed bank has a stronger effect on portfolio companies that are more likely to be financially constrained in the pre-shock period. To do so, we estimate the following model:

$$\begin{aligned} y_{it} = {} & \alpha_i + \alpha_c + \beta_1(\text{Exposed}_i * \text{Post}_t) + \beta_2(\text{Constrained}_i * \text{Post}_t) \\ & + \beta_3(\text{Constrained}_i * \text{Exposed}_i * \text{Post}_t) \\ & + \beta_4 X_i * \text{Post}_t + \varepsilon_{it} \end{aligned} \quad (3)$$

where Constrained is a dummy variable that equals 1 for firms classified as financially constrained, and 0 otherwise. In this paper we employ firm size and cash holdings as measures of ex-ante financial constraints. Size is a criterion in Almeida and Campello (2010) and is the key proxy for capital market access in Gertler and Gilchrist (1994) because small firms are more vulnerable to capital market imperfections and thus more likely to be financially constrained. In addition, firms hold cash as a precaution against potential future financial constraints. The cash-to-assets ratio helps to underline the strength of a company's balance sheet, and firms with lower cash reserves are typically more vulnerable in times of uncertainty or when hit by an unexpected shock, as they have a lower cash buffer to draw upon if their sales and operating cash flow dry up. Therefore, firms' cash holdings should be positively related to the degree to which firms expect to face financial constraints in the future (Almeida, Campello and Weisbach, 2004; Opler *et al.*, 1999). Specifically, we create the dummy variable Constrained, which equals 1 if the firm's size and cash-to-assets ratio are in the bottom 25th percentile of the distribution of size and cash of all the firms in 2010, which is the last year prior to the EBA capital exercise. Finally, we define constrained firms as those in Greece, Ireland, Italy, Portugal and Spain (GIIPS) due to the EBA exercise occurring in parallel with the sovereign debt crisis, which led to severe credit shortages in the aforementioned countries. The main term is the triple-interaction coefficient on $\beta_3$, which measures whether financially constrained firms face greater performance reductions following the EBA capital exercise. Negative coefficients on both $\beta_1$ and $\beta_3$ support H2. The remaining control variables and fixed effects remain unchanged.

### *PE group reputation*

In the final section, we turn our attention to investor-level heterogeneity, where we consider the impact of the experience of the PE investor. Formally, we estimate the following model:

$$\begin{aligned} y_{it} = {} & \alpha_i + \alpha_c + \beta_1(\text{Exposed}_i * \text{Post}_t) + \beta_2(\text{Reputation}_i * \text{Post}_t) \\ & + \beta_3(\text{Reputation}_i * \text{Exposed}_i * \text{Post}_t) \\ & + \beta_4 X_i * \text{Post}_t + \varepsilon_{it} \end{aligned} \quad (4)$$

where Reputation is a dummy variable that equals 1 if the PE investor is more likely to be experienced. It is worth noting that the scholarly literature has not settled on a universally accepted strategy to identify PE investor experience and reputation. However, given that our sample contains deals by bank-affiliated PE investors, where often there is no formal fund structure in place, we focus on two measures of investor experience.[13] First, we consider the number of prior PE deals the investor has made at the time of each buyout. Investor reputation and experience are intrinsically linked to its level of activity and, in turn, the success of its investments (Nahata, 2008; Sørensen,

[12] In unreported regressions, we further control for the wider macroeconomic environment and its potential implications on parent banks and their other activities aside from PE involvements. Specifically, we control for GDP growth in the portfolio company's country of location in the four quarters up to the transaction date of the buyout, and the high yield credit spread in the month of the buyout closing. Our main findings remain intact.

[13] Prior research also uses the number and value of funds raised by investors as proxies of experience.

© 2022 The Authors. *British Journal of Management* published by John Wiley & Sons Ltd on behalf of British Academy of Management.

14678551, 2023, 1, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/1467-8551.12593 by University Of Glasgow, Wiley Online Library on [09/01/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

*Table 4. Firm outcomes*

| | Investment | | Asset growth | | Employment growth | | ROA | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Exposed∗Post | −0.042*** | −0.057*** | −0.035** | −0.028** | −0.036** | −0.033** | −0.022*** | −0.016** |
| | (0.013) | (0.016) | (0.014) | (0.015) | (0.015) | (0.014) | (0.006) | (0.007) |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country*Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 1,750 | 1,750 | 2,039 | 2,039 | 1,323 | 1,323 | 1,914 | 1,914 |

*Source*: The table reports the estimates of a difference-in-differences fixed effects model. In columns 1 and 2 the dependent variable is investment scaled by assets; in columns 3 and 4 it is the 1-year growth in assets; in columns 5 and 6 it is the 1-year growth in employment; and in columns 7 and 8 it is the ROA (net income scaled by assets). All specifications include firm and country*year fixed effects. The main parameter of interest is the interaction between $Post_t$, which equals 1 for years after 2011, and $Exposed_i$, which equals 1 if the PE arm of a bank that was subject to the intervention and had an above-the-median capital shortfall backs the company. Even-numbered columns augment the baseline model with a set of firm-level controls measured before the EBA exercise in 2010 and interacted with the $Post_t$ dummy. These variables include firm size (log of revenue), cash flow over assets, ROA, leverage (total debt divided by total assets) and the 1-year growth in sales. Standard errors, reported in parentheses, are clustered at the firm level. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

2007). By participating in more deals and engaging with more companies, investors can not only learn more about company selection and monitoring, but also expand their network of deal flow suppliers, customers and other intermediaries. Second, we take PE investor age at the time of the deal, which indicates staying power in the market over time.[14]

To support H3 we should observe a negative coefficient on $\beta_1$ and a positive coefficient on $\beta_3$. This implies that firms' outcomes are adversely affected after the capital exercise, but less so for portfolio companies of experienced investors.

## Results

### *Firm performance*

We start by considering whether companies backed by PE groups affiliated with EBA-exposed banks perform worse after the EBA capital exercise, relative to companies backed by the PE arms of less affected banks. Table 4 shows the results of estimating Equation (2) with and without firm controls. We report coefficient estimates with standard errors clustered by firm. In column 1 we find that firms receiving investment from PE firms affiliated with EBA shock-affected banks reduce their levels of investment relative to those receiving investment from less affected banks. The effect is strong in statistical significance and economic magnitude. Specifically, firms attached to exposed banks lower their investment by around 4% after the shock relative to less affected banks' portfolio companies. Moreover, in column 2, the effect remains significant and actually strengthens when we control for a host of firm-level covariates. Moving to the following columns of the table, we show that the effect persists for firms' growth in assets and employment as well as ROA. Specifically, we find that EBA-exposed companies' asset growth falls by 2–4% relative to non-EBA bank-backed companies. In addition, portfolio companies of EBA-exposed banks suffer around 3% weaker employment growth and around a 2% fall in ROA relative to their counterparts.[15]

Our results are relevant to the general literature studying the real impact of bank capital regulation (see, e.g., Aiyar *et al*., 2014; De Jonghe, Dewachter and Ongena, 2020; De Marco and Wieladek, 2015; Fraisse, Lé and Thesmar, 2020; Gropp *et al*., 2019; Hanson, Kashyap and Stein, 2011; Juelsrud and Wold, 2020), which shows that increasing banks' capital requirements may come at a cost to the real economy and, specifically, may hamper companies connected to exposed banks. Unlike this literature, which studies the real effect on companies through

[14]Following previous research, where the year of incorporation of the investor is before 1970, we set the year to 1970.

[15]In unreported regressions we obtain results using the 2-year growth rate in investment, total assets and employment. We find that our results, which are available upon request, remain robust to this modification.

© 2022 The Authors. *British Journal of Management* published by John Wiley & Sons Ltd on behalf of British Academy of Management.

14678551, 2023, 1, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/1467-8551.12593 by University Of Glasgow, Wiley Online Library on [09/01/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

banks' commercial lending arms, we examine the effect through banks' PE investment arms. We also relate to studies that shed light on bank-affiliated PE investors. Fang, Ivashina and Lerner (2013) find that bank-affiliated PE deals are associated with poorer financing terms and ex-post outcomes, and Wang (2017) concludes that bank-affiliated PE buyouts, on average, fail to create profitability gains. Johan and Murtinu (2018) note scant evidence of gains to firm-level performance. Similarly, Bottazzi, Da Rin and Hellmann (2008) show that banks are less active investors and spend less time supporting their portfolio companies relative to independent investors. We find evidence that the PE portfolio companies of banks are not immune to exogenous shocks affecting their parent banks. An exogenous shock to the parent bank may have negative consequences for a bank's PE arm and the companies in which it invests, relative to the portfolio companies of less exposed banks' PE arms.

### *Robustness*

*Matching firms.* Although Tables 1–3, and Figure 3 show that the samples of PE portfolio companies of exposed and non-exposed banks are similar in nature across several dimensions, including their operating industry, financial characteristics and pre-EBA shock growth trends, we look to strengthen the identification strategy underpinning the difference-in-differences model. To do so, we run an algorithm to match firms between our two sub-samples. We include only firms that meet certain matching criteria, therefore ensuring both samples of firms are similar. In particular, we match each firm from our smaller sample of portfolio companies of less affected banks to companies linked to exposed banks. Each matched company's growth in sales and investment in the pre-EBA year (2010) is within a 50% bracket of the matched firm.[16] Using this procedure, we match up to three EBA-exposed firms for as many non-exposed firms as possible. Where a less affected firm generates more than three matches, we retain the three closest matches as measured by the sum of the squares of the differences between the firms' investment. The obvious downside is that this process further reduces our sample size to 111 EBA-exposed firms alongside the 57 non-exposed firms. However, it provides an important robustness measure to our identification strategy and to our difference-in-differences model, as it ensures similarity across our two samples of firms. The results of this exercise are in Table 5. We continue to find that companies connected to the PE arms of exposed banks suffer weaker investment and asset growth in the aftermath of the EBA exercise. Overall, we conclude that our main results are robust to a matched sample of firms.

*Attrition bias.* In order to account for any potential attrition bias from firms exiting via acquisition or bankruptcy, we narrow our sample to only include firms that do not exit the sample. The results are presented in Table 6. The magnitudes of the interaction terms are not dissimilar from those in our baseline model, albeit the statistical significance is, in one out of eight specifications, reduced to the 10% level. Hence, our main findings are not due to attrition bias.

*Controlling for the PE investor's source of capital.* Although the literature widely accepts that the parent bank is the main provider of capital to its PE arm (Barry, 1994; Croce, D'Adda and Ughetto, 2015; Tykvova, 2006), we carry out a test to alleviate any concerns that the presence of any other non-bank LPs (e.g. other institutions providing capital to PE investors, other than the parent bank) may affect our findings. Specifically, we hand-collect investors' financial statements and check investors' websites to identify explicit mentions that investment capital comes solely from the parent bank. In doing so, we create a new sample of buyouts by the PE arms of banks that specifically note they receive all of their investment funding from their parent bank. The results are reported in Table 7. With this reduced sample of firms connected to PE investors who receive all of their investment capital from their parent bank, the main results are robust to this modification.

*The role of financial constraints.* In this section we focus on the financial constraints linked to firms' size, cash holdings and country of operation compared to the whole distribution of firms in order to identify firms that are likely constrained. We present the results in Table 8. In panel A, we identify firms in the GIIPS countries, for whom the impact of the sovereign debt crisis, which

[16]Given our sample size, we are restricted in our ability to add more matching variables and narrow our matching bandwidths. There is a trade-off between doing so and obtaining more closely matched firms, as well as obtaining a sample large enough to pursue meaningful estimates.

© 2022 The Authors. *British Journal of Management* published by John Wiley & Sons Ltd on behalf of British Academy of Management.

14678551, 2023, 1, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/1467-8551.12593 by University Of Glasgow, Wiley Online Library on [09/01/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

*Table 5. Robustness: matching firms*

| | Investment | | Asset growth | | Employment growth | | ROA | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Exposed∗Post | −0.042** | −0.076*** | −0.061** | −0.083** | −0.027** | −0.022* | −0.024** | −0.017* |
| | (0.19) | (0.022) | (0.026) | (0.041) | (0.011) | (0.013) | (0.010) | (0.011) |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country*Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 866 | 866 | 973 | 973 | 651 | 651 | 930 | 930 |

*Source*: The table reports the estimates of a difference-in-differences fixed effects model, on a reduced sample of matched firms, where exposed and non-exposed firms are matched based on their sales growth and investment in the pre-EBA year. In columns 1 and 2 the dependent variable is investment scaled by assets; in columns 3 and 4 it is the 1-year growth in assets; in columns 5 and 6 it is the 1-year growth in employment; and in columns 7 and 8 it is the ROA (net income scaled by assets). The main parameter of interest is the interaction between $Post_t$, which equals 1 for years after 2011, and $Exposed_i$, which equals 1 if the PE arm of an EBA-exposed bank backs the company. Even-numbered columns augment the baseline model with a set of firm-level controls measured before the EBA exercise in 2010 and interacted with $Post_t$. These variables include firm size (log of revenue), cash flow over assets, ROA, leverage (total debt divided by total assets) and the 1-year growth in sales. Standard errors, reported in parentheses, are clustered at the firm level. We include fixed effects as noted in the lower part of the table to control for different levels of unobserved heterogeneity. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

*Table 6. Robustness: controlling for attrition bias*

| | Investment | | Asset growth | | Employment growth | | ROA | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Exposed∗Post | −0.050*** | −0.066*** | −0.043** | −0.032** | −0.048** | −0.040** | −0.018** | −0.015* |
| | (0.014) | (0.018) | (0.017) | (0.018) | (0.020) | (0.024) | (0.007) | (0.008) |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country*Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 1,338 | 1,338 | 1,562 | 1,562 | 895 | 895 | 1,471 | 1,471 |

*Source*: The table reports the estimates of a difference-in-differences fixed effects model, where we narrow our sample to only include firms that do not exit the sample. In columns 1 and 2 the dependent variable is investment scaled by assets; in columns 3 and 4 it is the 1-year growth in assets; in columns 5 and 6 it is the 1-year growth in employment; and in columns 7 and 8 it is the ROA (net income scaled by assets). The main parameter of interest is the interaction between $Post_t$, which equals 1 for years after 2011, and $Exposed_i$, which equals 1 if the PE arm of an EBA-exposed bank backs the company. Even-numbered columns augment the baseline model with a set of firm-level controls measured before the EBA exercise in 2010 and interacted with the $Post_t$ dummy. These variables include firm size (log of revenue), cash flow over assets, ROA, leverage (total debt divided by total assets) and the 1-year growth in sales. Standard errors, reported in parentheses, are clustered at the firm level. We include fixed effects as noted in the lower part of the table to control for different levels of unobserved heterogeneity. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

occurred at the same time as the EBA capital exercise, was more potent. The coefficients on the triple-interaction term suggest that portfolio companies of EBA-exposed banks, which are in the GIIPS countries, are worse off relative to those elsewhere in Europe. The coefficients are statistically significant for investment, asset growth and ROA. In particular, they suggest that portfolio companies of EBA-exposed banks in the GIIPS countries suffer a 6% greater decline in asset growth and a 3% greater decline in profitability following the EBA shock, relative to those in other European countries. Similarly, their investment fell by between 8% and 9% more. The European sovereign debt crisis affected the GIIPS countries considerably; the countries experienced a significant reduction in the supply of credit available to firms, and loan interest rates rose relative to other countries in Europe (De Marco, 2019; Popov and Van Horen, 2014). Prior research shows that firms borrowing from GIIPS banks suffer greater declines in investment and sales growth relative to other firms (Acharya *et al*., 2018). We complement this finding by showing that PE portfolio

© 2022 The Authors. *British Journal of Management* published by John Wiley & Sons Ltd on behalf of British Academy of Management.

14678551, 2023, 1, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/1467-8551.12593 by University Of Glasgow, Wiley Online Library on [09/01/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

*Table 7. Robustness: controlling for the PE investor's source of capital*

| | Investment | | Asset growth | | Employment growth | | ROA | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Exposed∗Post | −0.031** | −0.033* | −0.024** | −0.027** | −0.033* | −0.031* | −0.030** | −0.029** |
| | (0.011) | (0.018) | (0.010) | (0.12) | (0.021) | (0.022) | (0.012) | (0.012) |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country*Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 921 | 921 | 1,062 | 1,062 | 661 | 661 | 1,010 | 1,010 |

*Source*: The table reports the estimates of a difference-in-differences fixed effects model, where we narrow our sample to only include firms connected to the PE arms of banks where we can categorically confirm that the bank is the sole provider of capital to the PE arm. We do so by hand-collecting data where they explicitly mention that all investment capital is provided by the bank. In columns 1 and 2 the dependent variable is investment scaled by assets; in columns 3 and 4 it is the 1-year growth in assets; in columns 5 and 6 it is the 1-year growth in employment; and in columns 7 and 8 it is the ROA (net income scaled by assets). The main parameter of interest is the interaction between $Post_t$, which equals 1 for years after 2011, and $Exposed_i$, which equals 1 if the PE arm of an EBA-exposed bank backs the company. Even-numbered columns augment the baseline model with a set of firm-level controls measured before the EBA exercise in 2010 and interacted with the $Post_t$ dummy. These variables include firm size (log of revenue), cash flow over assets, ROA, leverage (total debt divided by total assets) and the 1-year growth in sales. Standard errors, reported in the parentheses, are clustered at the firm level. We include fixed effects as noted in the lower part of the table to control for different levels of unobserved heterogeneity. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

companies of the EBA shock-affected banks in the GIIPS countries experience a greater reduction in both asset and employment growth following the shock, compared to those elsewhere in Europe.

Moving to panel B, we partition the sample on the basis of firms' size in the pre-shock period (2010). Again, we find that financially constrained firms suffer larger losses in investment, asset growth and ROA. The economic magnitude of the effect on firms' growth is not dissimilar to the results in panel A. Investment falls by between 5% and 7% more, and asset growth falls by around 8% more, in EBA-sponsored firms that are more likely financially constrained relative to firms less likely to be constrained. Similarly, ROA falls by around 2–3% more. Last, in panel C, we split the sample according to cash holdings in the pre-shock period, defined as their ratio of cash to total assets. Consistent with the previous tests, we find that firms with the lowest cash holdings in the pre-shock period suffer the most in terms of post-shock growth and investment. Investment is around 6% lower for firms holding less cash, and asset growth is approximately 5% lower. The coefficient on ROA is negative but statistically insignificant; however, employment growth is approximately 3% lower. Taken together, the results imply that although the portfolio companies of EBA-exposed banks suffer after the shock relative to portfolio companies of non-exposed banks, the effect is not standardized across all types of companies. Instead, we find that the negative effect on company performance is stronger for firms that are more likely financially constrained.

*PE investor experience.* We now turn our attention to the impact of PE investor reputation and experience at the time the buyout occurs. Table 9 shows the results from the estimation of Equation (4). We proxy for investor reputation by the number of previous investments (panel A) and the age of the PE investor (panel B). Our results are remarkably consistent across these two categories. The point estimates suggest that the negative effect of the EBA shock on firms' investment and growth is weaker for firms backed by more experienced investors. That is, we find that investors with more experience dampen the effects of the shock on their portfolio companies. Specifically, the coefficients in panel A imply that the investment levels of firms backed by more experienced investors increase by around 7–9% relative to companies sponsored by less experienced investors. Similarly, the negative effect on asset growth is muted by around 5% when the investor is more experienced. The coefficients on employment growth are positive but insignificant, but the coefficients on ROA suggest the negative effect on profitability is muted by around 3%. Together, the results imply that more experienced investors attenuate the negative implications of the banking shock. In panel B, where we partition the sample on the basis of the investor's age, the

© 2022 The Authors. *British Journal of Management* published by John Wiley & Sons Ltd on behalf of British Academy of Management.

14678551, 2023, 1, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/1467-8551.12593 by University Of Glasgow, Wiley Online Library on [09/01/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

*Table 8. Portfolio companies and financial constraints*

| | Investment | | Asset growth | | Employment growth | | ROA | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Panel A: GIIPS | | | | | | | | |
| Exposed∗Post∗Constrained | −0.084** | −0.090** | −0.062** | −0.055* | −0.039** | −0.037** | −0.030** | −0.027* |
| | (0.033) | (0.036) | (0.033) | (0.036) | (0.019) | (0.020) | (0.013) | (0.018) |
| Constrained*Post | 0.017 | 0.022 | 0.018 | 0.022 | 0.044 | 0.049 | 0.022 | 0.025 |
| | (0.034) | (0.036) | (0.041) | (0.046) | (0.191) | (0.194) | (0.020) | (0.023) |
| Exposed*Post | −0.020 | −0.021 | −0.044* | −0.037 | −0.030 | −0.036 | −0.014** | −0.009 |
| | (0.014) | (0.015) | (0.031) | (0.034) | (0.059) | (0.061) | (0.005) | (0.007) |
| Observations | 1,750 | 1,750 | 2,039 | 2,039 | 1,187 | 1,187 | 1,914 | 1,914 |
| Panel B: Size | | | | | | | | |
| Exposed*Post*Constrained | −0.062*** | −0.058** | −0.091** | −0.073** | −0.078** | −0.061** | −0.027** | −0.020* |
| | (0.027) | (0.032) | (0.050) | (0.052 ) | (0.032) | (0.033) | (0.013) | (0.011) |
| Constrained*Post | −0.016 | −0.021 | −0.153 | −0.135 | 0.046 | −0.052 | 0.011 | 0.008 |
| | (0.017) | (0.020) | (0.032) | (0.052) | (0.036) | (0.045) | (0.011) | (0.014) |
| Exposed*Post | −0.011 | −0.015* | −0.031* | −0.034* | 0.024 | −0.017 | −0.012 | −0.007 |
| | (0.008) | (0.009) | (0.022) | (0.025) | (0.025) | (0.028) | (0.010) | (0.009) |
| Observations | 1,730 | 1,726 | 2,016 | 2,016 | 1,176 | 1,176 | 1,878 | 1,878 |
| Panel C: Cash/Assets | | | | | | | | |
| Exposed*Post*Constrained | −0.068** | −0.061* | −0.055** | −0.049** | −0.042** | −0.027* | −0.016 | −0.012 |
| | (0.034) | (0.039) | (0.014) | (0.017) | (0.015) | (0.016) | (0.014) | (0.015) |
| Constrained*Post | 0.017 | 0.020 | 0.027 | 0.029 | 0.006 | 0.005 | −0.003 | −0.005 |
| | (0.013) | (0.015) | (0.028) | (0.031) | (0.019) | (0.020) | (0.008) | (0.009) |
| Exposed*Post | −0.032* | −0.038* | −0.008 | −0.010 | −0.041 | −0.034 | −0.031*** | −0.028** |
| | (0.017) | (0.021) | (0.009) | (0.010) | (0.037) | 0.040) | (0.008) | (0.012) |
| Observations | 1,730 | 1,730 | 2,016 | 2,016 | 1,176 | 1,176 | 1,891 | 1,891 |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country*Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm controls | No | Yes | No | Yes | No | Yes | No | Yes |

*Source*: The table reports the estimates of a difference-in-differences fixed effects model. In columns 1 and 2 the dependent variable is investment scaled by assets; in columns 3 and 4 it is the 1-year growth in assets; in columns 5 and 6 it is the 1-year growth in employment; and in columns 7 and 8 it is the ROA (net income scaled by assets). In panel A, we explore the impact of the sovereign debt crisis. Here, Constrained equals 1 if the target company is located in a GIIPS country (Greece, Ireland, Italy, Portugal and Spain). In panel B, Constrained equals 1 if the company is below the median size, as measured by total sales, in 2010. In panel C, Constrained equals 1 if the company has a below-median cash-to-assets ratio in 2010. Even-numbered columns augment the baseline model with a set of firm-level controls measured before the EBA exercise in 2010 and interacted with $Post_t$. These variables include firm size (log of revenue), cash flow over assets, ROA, leverage (total debt divided by total assets) and the 1-year growth in sales. Standard errors, reported in parentheses, are clustered at the firm level. We include fixed effects as noted in the lower part of the table to control for different levels of unobserved heterogeneity. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

results are not dissimilar to those in panel A. In each instance, the coefficient on the triple-interaction term is positive and significant, with the exception of firm investment.

In summary, the results reveal heterogeneity at the investor level that the estimates for the full sample do not show. We document that portfolio companies of EBA-exposed banks sponsored by less experienced investors are more susceptible to a drop in performance after the bank shock. Our results somewhat echo Hotchkiss, Strömberg and Smith (2014), who find that companies backed by less experienced PE investors are more likely to default than those backed by experienced investors. We find evidence that PE investors with more experience and reputational capital help their portfolio companies sustain performance when external shocks hit their parent banks. Their portfolio companies suffer a smaller relative fall in investment and growth.

© 2022 The Authors. *British Journal of Management* published by John Wiley & Sons Ltd on behalf of British Academy of Management.

14678551, 2023, 1, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/1467-8551.12593 by University Of Glasgow, Wiley Online Library on [09/01/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

*Table 9. PE group experience*

| | Investment | | Asset growth | | Employment growth | | ROA | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Panel A: Prior number of deals made | | | | | | | | |
| Exposed∗Post∗Experience | 0.077** | 0.091** | 0.055** | 0.051* | 0.028** | 0.022* | 0.030** | 0.026** |
| | (0.039) | (0.040) | (0.029) | (0.036) | (0.010) | (0.012) | (0.012) | (0.014) |
| Experience*Post | 0.074 | 0.077 | −0.020 | −0.023 | 0.088 | 0.074 | 0.066 | 0.058 |
| | (0.080) | (0.089) | (0.047) | (0.055) | (0.093) | (0.101) | (0.068) | (0.069) |
| Exposed*Post | −0.041* | −0.033 | −0.012 | −0.010 | −0.038* | −0.035 | −0.016 | −0.014 |
| | (0.027) | (0.028) | (0.009) | (0.011) | (0.024) | (0.027) | (0.013) | (0.013) |
| Observations | 1,315 | 1,315 | 1,512 | 1,512 | 1,001 | 1,001 | 1,522 | 1,522 |
| Panel B: PE investor age | | | | | | | | |
| Exposed*Post*Experience | 0.008 | 0.009 | 0.062** | 0.060** | 0.055** | 0.049* | 0.026** | 0.025** |
| | (0.024) | (0.027) | (0.031) | (0.031) | (0.022) | (0.027) | (0.010) | (0.011) |
| Experience*Post | 0.032 | 0.027 | −0.044 | −0.043 | −0.032 | −0.030 | −0.010 | −0.014 |
| | (0.029) | (0.030) | (0.066) | (0.068) | (0.027) | (0.029) | (0.012) | (0.014) |
| Exposed*Post | −0.011* | −0.013* | −0.028** | −0.024* | −0.013 | −0.011 | −0.007* | −0.008 |
| | (0.007) | (0.008) | (0.013) | (0.015) | (0.0.12) | (0.014) | (0.003) | (0.006) |
| Observations | 1,670 | 1,670 | 1,923 | 1,923 | 1,229 | 1,229 | 1,824 | 1,824 |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country*Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm controls | No | Yes | No | Yes | No | Yes | No | Yes |

*Source*: The table reports the estimates of a difference-in-differences fixed effects model. In columns 1 and 2 the dependent variable is investment scaled by assets; in columns 3 and 4 it is the one-year growth in assets; in columns 5 and 6 it is the one-year growth in employment. In columns 7 and 8 it is ROA (net income scaled by assets). In panel A, Experience is the number of deals the investor made prior to entry. It equals 1 if this is above the sample median and the PE firm is more likely to be more experienced and have more reputational capital. In panel B, Experience is the PE investor's age. It equals 1 if the investor's age is above the sample median. Even-numbered columns augment the baseline model with a set of firm-level controls measured before the EBA exercise in 2010 and interacted with $Post_t$. These variables include firm size (log of revenue), cash flow over assets, ROA, leverage (total debt divided by total assets), the ratio of cash to assets, and the one-year growth in sales. Standard errors, reported in the parentheses, are clustered at the firm level. We include fixed effects as noted in the lower part of the table to control for different levels of unobserved heterogeneity. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

## Conclusion

A number of recent studies show that increasing capital requirements for banks may come at a cost to the real economy. Researchers pay considerably less attention to the effects of an exogenous shock to a bank, as well as the consequent impact on its PE arm and the portfolio companies in which it invests. This is somewhat surprising given how important banks are in PE markets. Our paper builds on these foundations but examines how the growth, investment and profitability of bank-affiliated PE backed companies evolve after the EBA's 2011 increase in capital requirements for parent banks. We find that portfolio companies connected to exposed banks reduce their level of investment and experience weaker asset growth, employment growth and profitability following the shock, relative to the portfolio companies of unexposed banks.

At the next stage, we explore whether the effect of capital exercise on firm performance depends upon firm characteristics such as size, cash reserves and location. When we split our firms according to those criteria, we uncover significant firm-level heterogeneity. In particular, the negative effect of the capital exercise is stronger for smaller firms, firms with a lower cash-to-assets ratio and firms in the periphery of Europe. This implies that bank shocks do not affect all firms equally, reflecting the higher risk characteristics associated with firms that are financially constrained and subject to greater information asymmetries. Finally, we consider whether investor experience potentially

© 2022 The Authors. *British Journal of Management* published by John Wiley & Sons Ltd on behalf of British Academy of Management.

14678551, 2023, 1, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/1467-8551.12593 by University Of Glasgow, Wiley Online Library on [09/01/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

mitigates these negative effects. Our findings indicate that the negative effect of the capital exercise is muted when the PE sponsor is more experienced.

The existing empirical literature finds little evidence of gains to the operating performance of bank-affiliated PE and VC portfolio companies (Johan and Murtinu, 2018; Wang, 2017), leading some commentators to question the motives of bank-affiliated PE investors. Along similar lines, our results suggest that banking sector shocks can have adverse effects on the performance of companies linked to exposed banks. Taken together, in the interest of policymakers and regulators, the findings suggest that PE investment may be better handled by independent PE investors. This may help to alleviate concerns regarding financial stability stemming from private investment in a global economy.

The conclusions discussed above provide fertile ground for future work in the broad area of bank-affiliated PE investors and external shocks. In our empirical analysis, while we are able to control for various firm-level characteristics and fixed effects; we do not observe firms' specific board structures or indeed their management practices in our data. It may be that our sample of exposed firms receive less attention and guidance during the sample period and their investors are less active in their role. To this end, an interesting avenue for future studies would be to better understand how bank-affiliated PE-backed companies are governed, and to gain a deeper insight into the influence exerted on the companies by the parent bank and their PE investment arm. While previous research finds PE-backed companies to exhibit better management practices (Bloom, 2015), a clearer understanding with respect to bank-affiliated PE-backed companies may help to shed more light on the impact of this specific type of investment on firms, and its potential implications for how portfolio companies make decisions. This has significant implications for PE firms' wider management and governance.

## References


Acharya, V. V., T. Eisert, C. Eufinger and C. Hirsch (2018). 'Real effects of the sovereign debt crisis in Europe: evidence from syndicated loans', *The Review of Financial Studies*, **31**, pp. 2855–2896.

Aiyar, S., C. W. Calomiris, J. Hooley, Y. Korniyenko and T. Wieladek (2014). 'The international transmission of bank capital requirements: evidence from the UK', *Journal of Financial Economics*, **113**, pp. 368–382.

Almeida, H. and M. Campello (2010). 'Financing frictions and the substitution between internal and external funds', *Journal of Financial and Quantitative Analysis*, **45**, pp. 589–622.

Almeida, H., M. Campello and M. Weisbach (2004). 'The cash flow sensitivity of cash', *The Journal of Finance*, **59**, pp. 1777–1804.

Amess, K., J. Stiebale and M. Wright (2016). 'The impact of private equity on firms' patenting activity', *European Economic Review*, **86**, pp. 147–160.

Andrieu, G. and A. P. Groh (2012). 'Entrepreneurs' financing choice between independent and bank-affiliated venture capital firms', *Journal of Corporate Finance*, **18**, pp. 1143–1167.

Barber, B. M. and A. Yasuda (2017). 'Interim fund performance and fundraising in private equity', *Journal of Financial Economics*, **124**, pp. 172–194.

Barry, C. B. (1994). 'New directions in research on venture capital finance', *Financial Management*, **23**, pp. 3–15.

Berger, A., P. Molyneux and J. Wilson (2020). 'Banks and the real economy: an assessment of the research', *Journal of Corporate Finance*, **62**, art. 101513.

Bernstein, S., J. Lerner and F. Mezzanotti (2019). 'Private equity and financial fragility during the crisis', *The Review of Financial Studies*, **32**, pp. 1309–1373.

Bernstein, S. and A. Sheen (2016). 'The operational consequences of private equity buyouts: evidence from the restaurant industry', *The Review of Financial Studies*, **29**, pp. 2387–2418.

Blattner, L., L. Farinha and F. Rebelo (2021). 'When losses turn into loans: the cost of undercapitalized banks', *American Economic Review*, forthcoming.

Bloom, N. (2015). 'Do private equity owned firms have better management practices?', *American Economic Review*, **105**, pp. 442–446.

Bottazzi, L., M. Da Rin and T. Hellmann (2008). 'Who are the active investors? Evidence from venture capital', *Journal of Financial Economics*, **89**, pp. 488–512.

Bottero, M., S. Lenzu and F. Mezzanotti (2020). 'Sovereign debt exposure and the bank lending channel: impact on credit supply and the real economy', *Journal of International Economics*, **126**, art. 103328.

Boucly, Q., D. Sraer and D. Thesmar (2011). 'Growth LBOs', *Journal of Financial Economics*, **102**, pp. 432–453.

Cohn, J. B., E. S. Hotchkiss and E. Towery (2021). 'Sources of value creation in private equity buyouts of private firms', *Review of Finance*, forthcoming.

Croce, A., D. D'Adda and E. Ughetto (2015). 'Venture capital financing and the financial distress risk of portfolio firms: how independent and bank-affiliated investors differ', *Small Business Economics*, **44**, pp. 189–206.

Cumming, D. and S. Johan (2007). 'Regulatory harmonization and the development of private equity markets', *Journal of Banking and Finance*, **31**, pp. 3218–3250.

Cumming, D., R. Peter and M. Tarsalewska (2020). 'Public-to-private buyouts and innovation', *British Journal of Management*, **31**, pp. 811–829.

Davis, S. J., J. Haltiwanger, K. Handley, R. Jarmin, J. Lerner and J. Miranda (2014). 'Private equity, jobs, and productivity'. *American Economic Review*, **104**, pp. 3956–3990.

De Jonghe, O., H. Dewachter and S. Ongena (2020). 'Bank capital requirements and credit supply: evidence from pillar 2 decisions', *Journal of Corporate Finance*, **60**, art. 101518.


© 2022 The Authors. *British Journal of Management* published by John Wiley & Sons Ltd on behalf of British Academy of Management.

14678551, 2023, 1, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/1467-8551.12593 by University Of Glasgow, Wiley Online Library on [09/01/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

De Marco, F. (2019). 'Bank lending and the European sovereign debt crisis', *Journal of Financial and Quantitative Analysis*, **54**, pp. 155–182.
De Marco, F. and T. Wieladek (2015). 'The real effects of capital requirements and monetary policy: evidence from the United Kingdom', Bank of England Working Paper 573.
Demiroglu, C. and C. M. James (2010). 'The role of private equity group reputation in LBO financing', *Journal of Financial Economics*, **96**, pp. 306–330.
Faccio, M. and C. H. Hsu (2017). 'Politically connected private equity and employment', *The Journal of Finance*, **72**, pp. 539–574.
Fang, L., V. Ivashina and J. Lerner (2013). 'Combining banking with private equity investing', *The Review of Financial Studies*, **26**, pp. 2139–2173.
Farinha, L., M. E. Spaliara and S. Tsoukas (2019). 'Bank shocks and firm performance: new evidence from the sovereign debt crisis', *Journal of Financial Intermediation*, **40**, pp. 100818.
Fraisse, H., M. Lé and D. Thesmar (2020). 'The real effects of bank capital requirements', *Management Science*, **66**, pp. 5–23.
Gertler, M. and S. Gilchrist (1994). 'Monetary policy, business cycles, and the behavior of small manufacturing firms', *Quarterly Journal of Economics*, **109**, pp. 309–40.
Gompers, P., S. N. Kaplan and V. Mukharlyamov (2016). 'What do private equity firms say they do?', *Journal of Financial Economics*, **121**, pp. 449–476.
Gompers, P. A., S. N. Kaplan and V. Mukharlyamov (2020). 'Private equity and COVID-19', NBER Working Paper 27889.
Gormley, T. A. and D. A. Matsa (2013). 'Common errors: How to (and not to) control for unobserved heterogeneity', *The Review of Financial Studies*, **27**, pp. 617–661.
Gropp, R., T. Mosk, S. Ongena and C. Wix (2019). 'Banks response to higher capital requirements: Evidence from a quasi-natural experiment', *The Review of Financial Studies*, **32**, pp. 266–299.
Gueller, T., M. Mariathasan, K. Mullier and N. Okatan (2021). 'The real effects of banks' corporate credit supply: A literature review', *Economic Inquiry*, **59**, pp. 1252–1285.
Hanson, S. G., A. K. Kashyap and J. C. Stein (2011). 'A macroprudential approach to financial regulation', *Journal of Economic Perspectives*, **25**, pp. 3–28.
Hellmann, T. (2002). 'A theory of strategic venture investing', *Journal of Financial Economics*, **64**, pp. 285–314.
Hellmann, T., L. Lindsey and M. Puri (2007). 'Building relationships early: banks in venture capital', *The Review of Financial Studies*, **21**, pp. 513–541.
Hotchkiss, E. S., P. Strömberg and D. C. Smith (2021). 'Private equity and the resolution of financial distress', *The Review of Corporate Finance Studies*, **10**, pp. 694–747.
Hsu, D. H. (2004). 'What do entrepreneurs pay for venture capital affiliation?', *The Journal of Finance*, **59**, pp. 1805–1844.
Ivashina, V. and A. Kovner (2011). 'The private equity advantage: leveraged buyout firms and relationship banking', *The Review of Financial Studies*, **24**, pp. 2462–2498.
Jenkins, P., R. Atkins and P. Spiegel (2011). 'Europe's banks face 9% capital rule', *Financial Times*, 11 October.
Jenkinson, T. and M. Sousa (2015). 'What determines the exit decision for leveraged buyouts?', *Journal of Banking & Finance*, **59**, pp. 399–408.
Johan, S. and S. Murtinu (2018). 'Banks joining venture capital investments: portfolio selection, strategic objectives, performance and exit', TILEC Discussion Paper 2018-039
Juelsrud, R. E. and E. G. Wold (2020). 'Risk-weighted capital requirements and portfolio rebalancing', *Journal of Financial Intermediation*, **41**, art. 100806.
Kellard, N., A. Kontonikas, M. Lamla and S. Maiani (2021). 'Deal or no deal? Modelling the impact of Brexit uncertainty on UK private equity activity', *British Journal of Management*, **33**, pp. 46–68.
Krishnan, C., V. I. Ivanov, R. W. Masulis and A. K. Singh (2011). 'Venture capital reputation, post-IPO performance, and corporate governance', *Journal of Financial and Quantitative Analysis*, **46**, pp. 1295–1333.
Lerner, J., A. Schoar and W. Wongsunwai (2007). 'Smart institutions, foolish choices: the limited partner performance puzzle', *The Journal of Finance*, **62**, pp. 731–764.
Mayer, C., K. Schoors and Y. Yafeh (2005). 'Sources of funds and investment activities of venture capital funds: evidence from Germany, Israel, Japan and the United Kingdom', *Journal of Corporate Finance*, **11**, pp. 586–608.
Michaely, R. and R. M. Roberts (2011). 'Corporate dividend policies: lessons from private firms', *The Review of Financial Studies*, **25**, pp. 711–746.
Nahata, R. (2008). 'Venture capital reputation and investment performance', *Journal of Financial Economics*, **90**, pp. 127–151.
Opler, T., L. Pinkowitz, R. Stulz and R. Williamson (1999). 'The determinants and implications of corporate cash holdings', *Journal of Financial Economics*, **52**, pp. 3–46.
Popov, A. and N. Van Horen (2014). 'Exporting sovereign stress: evidence from syndicated bank lending during the euro area sovereign debt crisis', *Review of Finance*, **19**, pp. 1825–1866.
Sørensen, M. (2007). 'How smart is smart money? A two-sided matching model of venture capital', *The Journal of Finance*, **62**, pp. 2725–2762.
Tykvova, T. (2006). 'How do investment patterns of independent and captive private equity funds differ? Evidence from Germany', *Financial Markets and Portfolio Management*, **20**, pp. 399–418.
Tykvová, T. and M. Borell (2012). 'Do private equity owners increase risk of financial distress and bankruptcy?', *Journal of Corporate Finance*, **18**, pp. 138–150.
Wang, Y. (2017). 'Bank affiliation in private equity firms: distortions in investment selection'. Available at SSRN 2189644.
Wilson, N., S. Amini and M. Wright (2021). 'Determining the characteristics of the private equity targets: UK evidence', *British Journal of Management*, **33**, pp. 138–159.

Paul Lavery is an Assistant Professor in Finance at the Adam Smith Business School, University of Glasgow. His research interests span private equity, management buyouts and empirical corporate finance. His research to date has appeared in the *Bank for International Settlements Working Paper Series*.

© 2022 The Authors. *British Journal of Management* published by John Wiley & Sons Ltd on behalf of British Academy of Management.

14678551, 2023, 1, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/1467-8551.12593 by University Of Glasgow, Wiley Online Library on [09/01/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Marina-Eliza Spaliara is a Professor in Economics at the Adam Smith Business School, University of Glasgow. Her research interests encompass corporate finance, international economics and firm performance. Her research has appeared in the *Journal of Financial Intermediation*, *Bank for International Settlements Working Paper Series*, *Journal of Banking and Finance, Oxford Bulletin of Economics and Statistics* and *Journal of Business Finance and Accounting*.

Serafeim Tsoukas is Professor of Corporate Finance and Banking at the Adam Smith Business School, University of Glasgow. His research interests span corporate finance, bank lending and firm performance. He has published several papers in international journals, such as *Review of Finance*, *Journal of Financial Intermediation* and *Journal of Corporate Finance*.

## Supporting Information

Additional supporting information may be found online in the Supporting Information section at the end of the article.

© 2022 The Authors. *British Journal of Management* published by John Wiley & Sons Ltd on behalf of British Academy of Management.

14678551, 2023, 1, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/1467-8551.12593 by University Of Glasgow, Wiley Online Library on [09/01/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License