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Exploring a low SME equity equilibrium in Wales

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Abstract: Previous research has examined geographical variations in SME access to external finance, especially bank loans. Rather less attention has been paid to how far SME equity access difficulties in more peripheral regions, and cities within these regions, is a demand or supply side issue, and how far equity investments are concentrated in specific urban areas in peripheral regions. This paper examines these topics through an analysis of small firm equity deals across the UK regions, before focusing on the case of the Welsh economy. In the case analysis a low equilibrium for small business equity investment in Wales is identified, with low demand and poor supply of equity, but with a relatively high concentration of equity deals in the Cardiff urban area. The paper examines the potential implications of a low equity equilibrium and provides a challenge for further research in the area.

Keywords

Financial geography; Regional equity finance: Low equity equilibrium, SMEs, Wales,

Words 8925

Introduction

The study of SME equity investments in peripheral regions provides valuable insights into the extent to which regional differences in supply and demand for equity finance give rise to ‘funding gaps’ or differences in equity market equilibria. A linked issue is the need to better understand the co-evolution of regional industrial structures and capital (equity) markets. Indeed, the general issue of investor-firm matching has received less attention in economic geography debates compared to the issue of inter-firm knowledge matching in innovation networks and labour markets. Ultimately strong regional markets for equity can be connected to regional growth prospects, since firms receiving equity funding demonstrate faster turnover and employment growth and with equity finance connected to an increase in the efficiency of firm innovation processes (Mason and Harrison, 2002; Wójcik, 2009).

There is existing research interest in the geography of equity finance (Mason and Harrison, 2002; Dupuy et al., 2010), and particularly the importance of geographical proximity between investor and firm in facilitating the number and quality of equity deals (Stotz, 2011; Golombo et al., 2019). While research has focused on larger firms, there is an emerging literature on the demand and supply side around equity provision for smaller firms seen to be characterised by more restricted ‘financial reach’. This also connects to debates on the importance of decentralised financial systems to serve diverse business needs in peripheral regions, which themselves might also be characterised by more limited ‘reach’ (see for example, Klagge and Martin, 2005). Research (see for example, Loughran and Schultz, 2005; Lee and Drever, 2014; Zhao and Jones-Evans, 2017) has focused on core financial tools, such as loans, and the geography of banking. Context here is given by a geographically concentrated financial system in the UK. This is deemed to be leaving small and medium-sized enterprises (SMEs) in more peripheral regions with significant funding gaps. However, less attention has been paid to

differences in small firm access to equity funding in peripheral areas (Christensen and Hain, 2018).

The conceptualisation and determinants of regional equity flows is also important because of the distinct features of *externally raised equity* compared to other forms of external finance - particularly debt. Equity is a form of risk capital with a unique role in business evolution, facilitating more dynamic business populations (Caselli and Negri, 2018). Equity finance involves raising money by issuing share capital. In comparison to conventional debt capital, where the borrower pays interest, an external equity investor shares in profits. Inevitably raising external equity investment can involve some dilution of ownership.

This paper responds to calls for more studies on the suitable geographical scale to examine funding gaps (Lee and Drever, 2014; Zhao and Jones-Evans, 2017). Specifically, this paper begins the process of considering the conditions contributing to a low regional SME equity equilibrium, the expected consequences and then how the situation might be addressed. The paper also explores intra-regional differences in equity activity within a region. It develops a conceptual framework to explain a low regional equity equilibrium and its determinants, embracing firm features and regional economic characteristics. A model is developed and tested to examine UK regional variations in SME equity deals. While more core regions might be characterised by high supply of, and demand for equity, this paper suggests that a core-periphery division of equity activity can also occur within a region.

The next section of the paper considers the role of equity finance and develops the conceptual framework to examine regional equity conditions, particularly as they relate to SMEs. The third section provides context and examines SME equity finance in the UK and its regional distribution. The fourth section focuses in on the demand and supply-side equity conditions for SMEs in Wales to further illustrate elements of the conceptual framework developed. The final

section concludes, addresses the limitations to the current study and makes a case for further research in this area.

Conceptualising a low regional SME equity equilibrium

Equity can be argued to be a distinct mode of finance, such that there is a need to examine its specific geography alongside other forms of financing. Business development, acquisitions and mergers, management buy-outs and buy-ins are often funded by equity finance. On these grounds, equity as a mode of finance is important for business evolution, constituting a significant finance source for business transfers and facilitating dynamic business populations (Angelini and Generale, 2008). Financial economies of scale entail higher fixed transactions costs of equity. This has particular implications for existing smaller firms seeking expansion using equity, but might be less serious in terms of venture capital provision to start-ups (Martin et al., 2005). Indeed, a recognised pattern in pecking order theory is for small firm owners to cover their financing needs, firstly, by internal funds, secondly, by bank loans, and, finally, by issuing equity (Myers, 1984).

Scale issues in the supply-side of equity finance have arguably become less of a constraint because of financial liberalisation coupled to improvements in information and communications technology (reducing search costs), better on-line information about firms together with advances in investment monitoring with new technologies (Jones and Search, 2009). Similar factors affect the demand side for equity finance. A net result has been a reduction in the cost of equity funding. Indeed, Allayannis and Mozumdar (2004) argue that the growth of equity funds means that investors have increasingly sought opportunities beyond large and well-capitalised companies.

While there may have been improvements in the supply-side of equity finance for SMEs, there are likely to be mismatches between the needs of companies that request equity finance and the supply of this funding. These ‘equity gaps’ vary in intensity across regions

(Christensen, 2007; Pollard, 2003). For example, equity gaps in terms of either demand exceeding supply, or in terms of a paucity of information about supply of equity for SMEs, have been shown to be persistent in various areas, with different social, economic and political contexts (Klagge and Martin, 2005). In this respect, larger agglomerations are likely to increase the number of investors, but also the number high-growth companies (see MacKinnon and Cumbers, 2019), and with these often targeted by equity funds.

A corollary of the above is that some regions and areas within regions will be characterised by a low equity equilibrium (Christensen and Hain, 2018). Such an equilibrium has dynamic qualities in as much as a low equilibrium in one period determines conditions in future periods, and with this explaining, in part, the persistence of problems in respect of SME access to equity in regions. Indeed, geographical issues are important in discussions of equity supply and demand both across regions, and within regions (Christensen and Hain, 2018). The distinction between equity deals and equity flows is important. The latter describes the geographical flow of financial capital from one place to another. Then in framing factors impacting an equity equilibrium in a region, the origin of investment funds to the destination territory should be considered.

Notwithstanding, regions (and likely cities within regions according to their position in the urban hierarchy) differ from one another with respect to their financial structure (Wójcik, 2009) and the strength of both the demand and supply side for equity finance (Mason and Harrison, 2001; Golombo et al., 2019). Geographical factors are seen to add to capital market imperfections including problems associated with asymmetric information. This means that neoclassical approaches that assume rational behaviour of perfectly informed agents and equal capital cost across space are questionable (Pollard, 2003; Klagge and Martin, 2005). Such imperfections when coupled with the geographical constitution of financial markets, typically mean a concentration of equity deals in core regions with a richer supply side of investors

(Mason and Harrison, 2002; Cumming and Dai, 2010) and associated well developed, informed and structured demand from firms. Fund managers in a city are more likely to invest if other investors hold equities in the area, as geographical proximity between investors facilitates information flow among them (Hong et al., 2005). These types of factors can leave more periphery regions with a low equity equilibrium, particularly in respect of SMEs. Indeed Martin et al. (2005) show that financial systems characterised by a more decentralised geography can provide greater opportunity for investments in SMEs due to easier collection of information for the issuers, based on geographical proximity with investors.

Geographical proximity is also important from the demand-side for SME equity. For example, Golombo et al. (2019) have argued that proximity to potential investors may increase the awareness of firms about risk capital opportunities. Tacit knowledge is expected to be an important factor here as close ties and networks based on information sharing are hindered by distance and are better built on face-to-face contacts. Then geographical proximity between investors and investees is important in terms of information flows and transaction costs' reduction (Jones and Search, 2009; Pan et al., 2016). This proximity between investors and investees also means information for equity investors from local media, discussions with managers and employees, and personal ties with business owners is more easily gained (Wójcik, 2009). This proximity is argued to still be important in the presence of ICT advances (Bernstein et al., 2016; Hong et al., 2005).

Geographical variation in equity supply and demand, when combined with other characteristics of more peripheral regions, could work to reinforce patterns of uneven regional development. For example, equity finance has been shown to work to enable business succession processes and facilitate a dynamic and innovative business population (Mason and Harrison, 2002). Moreover, SMEs in receipt of equity funding have been shown to demonstrate faster growth (Beauhurst, 2018), and regions with relatively higher numbers of equity

investments are more likely to see economic growth (Wójcik, 2009). In consequence, a regional low equity equilibrium might reinforce a given developmental path, possibly perpetuating a cumulative evolutionary process entailing weak economic growth (Klagge and Martin, 2005).

This paper is based on the proposition that equity investors geographically follow the highest return and the lowest possible risk when they make decisions for new deals (Dupuy et al., 2010). Therefore, regions with high levels of existing equity activity could be associated with well-developed regional high-technology business clusters and high levels of entrepreneurship, since equity funds target high-technology and high-growth firms (Mason and Harrison, 2001; Christensen, 2007; Wójcik, 2009). The accumulation of equity investors in one place works to reinforce, in future periods, a high level of demand for equity (Golombo et al., 2019). Therefore, companies in core areas and urban zones tend to have a higher number of potential shareholders than firms in peripheral regions and rural locations due to geographical proximity to investors and better access to information (Loughran and Schultz, 2005).

Quite apart from the interregional differentiation of equity activity, supply of, and demand for equity also differs within regions, with the role of cities and the urban hierarchy being crucial. Even within a peripheral region, a sufficiently large urban centre that dominates in terms of economic activity is expected to attract equity funds (Christensen and Hain, 2018). Then relatively large financial centres could occur even in peripheral regions, apart from the well positioned and significantly developed core areas, with a core-periphery division emerging in both core and peripheral regions.

On balance, a strong regional equity equilibrium for SMEs is likely to occur in places with tangible organisational procedures and structures, bringing investors and investees close together. These regions may have dense networks of equity investors. A high regional SME equity equilibrium is then accompanied by high-growth and high-technology companies and characterised by an environment that facilitates business transfers and evolution, while also

supporting the growth of firms, innovation and jobs (Christensen, 2007). Subsequently, the growth of equity deals in a region could signal valuable information about regional growth trajectories, the regional financial context, the presence of high-growth firms, and business evolution.

By contrast, a low level of equity investment is expected to occur in a peripheral region due to specific geographical factors, from both the supply and demand sides. Distant investors face higher costs to access soft information, with mutual fund managers being less likely to invest in a region in the case of a low concentration of equity investors. Peripheral regions are disadvantaged in terms of size of cities, city position in the national urban hierarchy and concentration of high-growth companies, leading to a lower supply of equity, with these issues also related to the demand side. However, even within a peripheral region, equity investments are concentrated in the main urban area due to its features (relatively high number of high-growth firms, large urban market, dense networks of equity investors), with this reproducing a core-periphery division of equity investment within the peripheral region, that could be difficult to change due to the importance of the initial conditions.

In summary in a financially liberalised economy two geographical patterns of equity activity are likely to occur, with them reinforcing uneven regional development. First, between core and peripheral regions, with the former recording high equity equilibrium and the latter low. Second, within peripheral regions, there is an expected division between its urban centres, with strong equity activity, and secondary urban centres and rural areas with a lower concentration of equity investments. The next two sections of the paper seek evidence of these patterns first across the UK regions, and then with a focus on Wales.

SME equity financing in the UK regions

The focus here is restricted to equity deals involving SMEs. There are some difficulties in understanding the scale of such equity activity in the UK. For example, in what follows, use is

made of Beauhurst data reported by British Business Bank - a government-owned development bank seeking to make finance markets work better for smaller firms. Here external equity investment is understood to occur at various stages of firm development and involve seed and start-up financing, early stage and expansion funding, and replacement finance. Equity deals in SMEs then include investments made by private equity funds, angel investors, venture capitalists, and crowdfunding platforms. In their reporting British Business Bank (2020: 9) considers an equity deal as ‘any form of external equity finance, excluding transactions on public equity markets, buyouts and family and friends rounds which do not involve outside investors’. Then it is difficult to identify all the SME equity deals occurring in an economy. British Business Bank (2020) stress that more information is available on publicly announced deals (i.e. through government regulatory organisations, confirmed with the investee or investor or through press releases) but with many deals simply unannounced, for example, deals involving friends and family of the entrepreneur or shares provided to firm employees. The issues around how data availability limits the research are discussed in the conclusions.

The number and size of equity deals in UK SMEs has increased sharply since 2011 (Figure 1). In 2011 British Business Bank (2020) shows that 502 new SME equity investments were made with a value of £1.65bn, while in 2019, this number reached 1,832 with a total value of £8.5bn. The dominant sectors of UK SME equity investments 2011-2019 were technology/IP- and professional and business services based.

Figure 1 here

Despite this growth only small numbers of UK SMEs have been found to use external equity finance (BDRC, 2018a), since equity issuance is still expensive for small firms, and with more use among medium as opposed to small firms (British Business Bank, 2014). According to the British Business Bank (2014) the main reason for SMEs not issuing equity is that sufficient finance was available from other sources.

Regional patterns in equity financing of SMEs

The increase in publicly reported equity deals presents regional differences. The presence of SME risk capital funding gaps in UK peripheral regions and in terms of sectors, has been identified (Mason and Harrison, 2002). The UK economy conforms to the case of a strongly centralised geography of equity investors, with this entailing limited opportunities for investments in SMEs located in peripheral regions (Martin et al., 2005). SMEs in UK regions such as Wales, Scotland, and the North East are expected to have difficulties raising finance from London-based funds, due to the geographical distance and the subsequent information asymmetry issue.

This expectation seems to be confirmed by the data. For 2011-2019 British Business Bank (2020) reported that the majority of equity backed SMEs were in London i.e. in 2016, 47% of all SMEs equity deals, 56% of the equity investment amount, and with 20% of high-growth enterprises¹ located in London. In 2018, London alone achieved 46% of equity deals followed by Scotland (10%), South East (9%) and East of England (6%). London SMEs had 59% of the UK investment value share. British Business Bank (2020) also reveals some relationship between the regional share of SME equity deals and high-growth firms in the UK regions in 2019 (this association is tested later in this section).

From the supply-side, investors are regionally concentrated (Stotz, 2011). IFF Research (2017) revealed that 57% of business angels were located in London and the South East. Scotland's share of UK business angels was 8%, Northern Ireland 4%, and Wales just 2%. Figure 2 shows the relationship between equity deals and the number of venture capitalists per 10,000 SMEs by UK region, revealing marked differences and an expected positive relationship between the number of equity deals and the number of venture capitalists. Wales is the exception; it does not perform well in terms of the number of venture capitalists with the lowest amount (0.13 venture capitalists per 10,000 SMEs), but has a stronger performance in

terms of the number of equity deals (2.9 equity deals per 10,000 SMEs, the third highest number). However, Wales had the lowest amount per SME equity deals among the UK regions in 2018, with £1m per deal (British Business Bank, 2019).

The time series of British Business Bank data provides the opportunity to examine the regional factors influencing the number of reported equity deals in each region. Again, the limitations of the British Business Bank data should be noted as this is restricted to announced equity deals involving SMEs. However, this data has the advantage of being collected in a consistent manner. In what follows a regression model is used to reveal the association between equity activity and different regional features. The dependent variable here refers to reported regional equity deals per 10,000 regional SMEs, and with this construction allowing account to be taken of the different size of regions.

While a regular linear regression, using ordinary least squares, is often employed to explain the relationship between a group of regressors and a dependent variable based on the mean function, it would not be suitable here. This is because the method relies on assumptions, such as linearity, homoscedasticity, and a normal distribution of the dependent variable. Considering the high geographical concentration of SME equity deals and value in London, East and South East of England, the distribution of the dependent variable is not normal (after testing with the Shapiro-Wilk test). Given this issue a quantile regression method is used as this makes no assumptions about the distribution of the dependent variable and residuals. Then, the quantile regression model explores the relationship between a group of regressors and specific quantiles of a dependent variable, in this case the median. Data on the dependent variable was available for the period 2016 to 2019. It is expected that the number of equity deals in year t are influenced by factors in the previous year ($t-1$) requiring a time lag between the explanatory variables and the measurement of their impact. The analysis covered the 12 UK Government Office Regions.

The model takes the following form:

$$Y_{r,t} = a_0 + \sum_{\lambda=1}^n (\alpha_{\lambda} X_{\lambda,r,t-1}) + \varepsilon_r$$

where:

$Y_{r,t}$ is the dependent variable, i.e. equity investments per 10,000 SMEs in each region, in year t

$X_{\lambda,r,t-1}$ is the set of λ independent-explanatory variables for region r under consideration in year $t-1$

α_{λ} is the set of the coefficients of the λ independent variables

a_0 is the value of the dependent variable when the independent variable is zero

ε_r is the error term that accounts for unobserved factors

The earlier review suggested a series of factors that could be associated with the relative level of regional equity deals. It was revealed that equity gaps have been shown to be persistent in various areas, with different social, economic and political contexts (Klagge and Martin, 2005). For example, larger regions with agglomerations are expected to increase the number of investors, and high-growth companies (see MacKinnon and Cumbers, 2019) which might be targeted by equity funds. Moreover, capital market imperfections, when combined with the geographical constitution of financial markets, could lead to more equity deals in core regions with a richer supply side of investors (Mason and Harrison, 2002; Cumming and Dai, 2010) and associated well developed, informed and structured demand from firms. In light of this, regions with high levels of existing equity activity could be associated with well-developed regional high-technology business clusters and high levels of entrepreneurship, considering that equity funds target high-technology and high-growth firms (Christensen, 2007; Wójcik, 2009). In addition, from the demand side, the very proximity of firms to potential investors could raise firm awareness about risk capital opportunities. Therefore, firms in more peripheral regions could receive fewer equity investments because of a lack of awareness about this finance mode stemming from a lack of proximate investors (Golombo et al., 2019). The following text describes a series of variables that are expected to explain these different demand and supply side conditions for equity at a regional level, see also Table 1.

A high number of new equity deals in the London, East and South East of England regions is expected, and the analysis seeks to control for this. A dummy variable is constructed for London, South East and East of England (1=if it is London, South East, East of England, 0=if it is not).

The presence of equity investors based in a region is expected to be positively associated with the number of equity deals, and with the review revealing the potential significance of geographical proximity between investor and potential investee (see for example, Hong et al., 2005; Pollard, 2003). This variable was estimated in terms of the annual number of unique equity investors in each region but excluding government investors. Here data was not available for the 2015-18 period, and figures for 2014-17 were used. This was derived from datasets contained in the Wilson et al. (2019) analysis of regional equity finance.

There is some expectation that the number of new equity deals also reflected local entrepreneurial capital availability conditions. For example, new starts in general are related to capital availability in regions and differences in the availability of such capital are proxied here by variation in house prices, and with this a common form of business collateral. Data here came from the *UK House Price Index* provided by the UK Government (2020). The average house price in each UK region was calculated for the period between 2015 and 2018.

The descriptive data reviewed above reveals that equity deals vary by industry sector. The variable used here then provided a proxy for regional specialisation in industries where equity deals are known to frequently occur. This variable was constructed in terms of the annual number of persons employed in science and technology as a percentage of active population in each region from 2015 to 2018. The underlying regional data for this variable was derived from Eurostat (2020) statistics on human resources in science and technology industries.

There is strong evidence that equity investors have particular interests in high technology firms (Christensen, 2007; Wójcik, 2009) and that regions that have relatively high levels of

R&D investment might also be linked to new equity investment opportunities. This variable was constructed in terms of annual R&D investment per capita in each region from 2015 to 2018. The growth rate of the region potentially links to the strength of demand for equity financing and also to the supply side for equity. It is expected that regions having higher growth rates demonstrate a higher number of equity deals. This variable was measured in terms of regional GVA growth 2015 to 2018.

Finally, there is an expectation that equity deals in part reflect investor opportunity and with this associated with the presence of relatively fast growth firms. The review revealed that equity investors seek the highest yield and lowest risk (Dupuy et al. 2010; Mason and Harrison, 2001) such that equity deals are expected to be positively associated with the dependent variable. This variable was constructed in terms of enterprises exhibiting high growth, assumed here to be an average growth of 20% in employment and turnover annually for a three-year period, and with this expressed as annual number of high-growth firms per 10,000 SMEs in each region from 2015 to 2018. This was derived from ONS (2017).

Table 1 about here

Table 1 reveals the six hierarchical models that were estimated and with control variables added progressively. It is important to recognise that the model is a reduced form equation in that the independent variables will conflate supply and demand factors. The aim here is to build on the main assumption that the presence of equity investors is the key factor that explains regionally uneven equity investment. To avoid biased estimates caused by multicollinearity, the degree of correlation between the parameter estimates was tested. The bivariate correlations (see Appendix) between the independent variables do not give reason for concern. The sample included 12 regions and four years of data (48 observations) and each hierarchical model did not face any limitations regarding the degrees of freedom, despite the presence of up to seven independent variables.

The results confirm the findings from the earlier descriptive review of the data. The number of unique equity investors in a region is found to be positively associated with the number of equity deals per 10,000 SMEs, highlighting the importance of the supply-side issue of the presence of equity investors geographically approximate to potential investees (Hong et al., 2005; Pollard, 2003). Variation in house prices was found to be negatively associated with variations in the dependent variable. The coefficient for housing prices is very small because of the relationship between measure scales for the independent variable and the dependent variable. However, this was a surprising finding given that higher average house prices are typically a proxy indicator of higher levels of capital availability (Mendicino and Punzi, 2014). The features of regional business stock are shown to be an important demand-side issue. The number of persons employed in science and technology as a percentage of active population in each region had a positive association on regional equity activity, with evidence showing that considerable SME equity investment occurs in technology/IP-based business sectors (see British Business Bank 2020), and with high-technology industries sought out for high yielding equity investments (Christensen, 2007; Wójcik, 2009). The R&D investment per capita was found to be weakly associated with equity deals. Finally, the annual regional GVA growth was not statistically associated with the dependent variable, and neither was the variable relating to regional number of high growth firms.

In summary, key findings from the modelled analysis are associations between high numbers of equity deals per 10,000 SMEs in each region and the characteristics of each region in terms of numbers of unique equity investors, and the presence of industries in which equity deals are known to occur. Following from these results the remainder of the paper pursues two avenues. First, is a consideration of whether these variables might also explain why some urban centres do particularly well in terms of SME equity deals. Second, the case study of Wales allows

further exploration of the evolutionary factors affecting the numbers of equity investors serving a region and the structure of demand for such funds.

Figure 2 approximately here

Equity concentration in British urban centres

Turning then from regions to cities, previous authors have highlighted specific UK urban areas with a high equity equilibrium. For example, Klagge and Martin (2005) identified London, Cambridge, Manchester and Edinburgh as significant urban areas in terms of location of risk capital investors. British Business Bank (2019) also reveals concentrations of SME equity deals in particular urban areas outside London (Figure 3). Indeed London is not presented in Figure 3 since it is such a strong outlier. SMEs in London received 2,913 new equity investments from 2015 to 2018. Business and professional services and software are the sectors with most of the deals. The City of London affects the Greater London area with the spatial concentration of financial activity having expected spillover effects in terms of knowledge, technology and human capital.

Figure 3 approximately here

In summary the UK presents a case of core-periphery division of equity activity, on the grounds of major geographical factors, such as proximity between investors and investees (Christensen, 2007; Jones and Search, 2009; Pan et al., 2016). The dominance of the London area is undisputable (Hall and Wojcik, 2018) with this leaving peripheral regions with less opportunities to attract equity capital, and with geographical factors and asymmetric information problems creating capital market imperfections. In the next section the focus is on one region, Wales, to investigate local SME equity conditions in more detail.

Case: SME equity conditions in Wales

Equity supply and demand

Key components of the equity finance supply-side in Wales are summarised in Figure 4. Inevitably, private and public support are intertwined in practice. In terms of the supply of equity finance, the publicly owned Development Bank of Wales is a new agent. Among UK regions and devolved nations, Wales had the second highest rate of equity deals involving government bodies (39%) in the period 2011-17 (Wilson et al., 2019). The Development Bank plays a significant information brokerage role in bringing together SMEs and equity investors. For instance, Angels Invest Wales is a prominent angel investors' network, facilitated by the Development Bank, seeking to bring together syndicates and increase investment across Wales. More recently the Wales Angel Co-investment Fund was established by the Welsh Government in 2018, and managed by the Development Bank to match the needs of Welsh companies with regards to investment from angel investors. UK Government schemes, such as the Enterprise Investment Scheme (EIS) and the Seed Enterprise Investment Scheme (SEIS) have also formed part of the equity supply side in Wales.

Figure 4 around here

In spite of the above, IFF Research (2017) revealed that just 2% of UK business angels were located in Wales. Additionally, Wales had the lowest number of venture capitalists per 10,000 SMEs among the UK regions in 2017 and had the fourth lowest provision of equity finance from the private sector among the UK regions between 2011 and 2017, while attracting a small portion of overseas equity investments (1% of total UK overseas investments, the third lowest in the UK) (Wilson et al., 2019). This suggests potential for a path dependent process affecting the regional equity equilibrium with the initial conditions affecting future trajectories, not least with the concentration of equity investors in one place facilitating the future level of equity

activity (Golombo et al., 2019). In this respect the current characteristics of the equity supply-side in Wales owe much to activity in the 1990s. During the 1990s, several regional offices of equity investors were located in Cardiff. However, many of these left the area choosing to focus resources on high-growth firms and bigger deals, primarily found in areas outside of Wales. For example, the 3i group had a regional office in Cardiff, but it closed in the 2000s due to a shortage of suitable investment opportunities (The Times, 2005). Another example was N M Rothschild & Sons Limited investment bank that used to have a regional office in Cardiff. This office closed in 1995 due to the lack of deal flow. The fund retained offices in London, Birmingham, and Manchester.

New SME announced equity deals in Wales have increased from 19 in 2011 to 73 in 2019 (Figure 5, see British Business Bank, 2020). This rise becomes more important when accounting for the equity deal trend in the previous decade when the annual average figure was just 12 (Mason and Pierrakis, 2013). Given the lack of equity investors in Wales, it is likely that ICT improvements and financial liberalisation, coupled with better on-line information about firms and advances in investment monitoring could have influenced the growth of equity deals, by reducing search costs, and facilitating investments from geographically distant fund managers (Jones and Search, 2009). SME equity deals completed in Wales represented 4% of UK equity investments in 2019 (Scotland recorded 12% and Northern Ireland 1%). Here, the Welsh share of publicly announced equity deals is close to the Welsh share of the UK SME stock (i.e. around 4%). Wales, as seen previously, had the lowest amount per SME equity deal among the UK regions. The value of new SME equity deals in Wales rose from £41m in 2015 to £85m in 2019, representing only 1% of the total value of UK investments. Recent analysis has revealed that the deal values in Wales are 20% lower on average than the ones in London (Wilson et al., 2019).

The evolution of equity deals appears to be affected by persistently low trajectories of equity demand and supply in Wales, with Wales seemingly locked in a low equity equilibrium. This suggests a path dependent procedure, with a low equity equilibrium in one period affecting future conditions (see for example, Martin and Sunley, 2006; Essletzbichler and Rigby, 2007).

Figure 5 approximately here

Equity deals in the Cardiff area

There is some difference in estimates of the number of Welsh equity deals depending on source. A key issue here is that some sources only cite completely new SME deals, and others include second and third rounds of equity funding. For instance, the number of Development Bank of Wales investments alone was 77, i.e. 6 more than the number of deals in Wales as a whole in 2018, as reported by the British Business Bank (Figure 5 reports all the SME equity deals in Wales).

The Development Bank (according to Beauhurst, 2019) made 62 equity investments in 2017, at a value of £14m, and 77 in 2018, at a value of £23m. Around 70% of Development Bank equity investments in the period 2002-2018 were made to SMEs in South East Wales. SMEs located in Cardiff received 27% of the value of Development Bank equity investments (187 investments, with a total value of over £42m in this period). In the shorter period 2015-18, 90 out of the 205 new SME equity deals in Wales were made in Cardiff. In 2018 alone, Cardiff attracted an estimated 42% of Welsh SME equity deals, while having just 17% of Welsh employment. In terms of industries, business and professional services and ICT saw the majority of deals in Cardiff (British Business Bank, 2019), and with the city having some employment specialisation in these sectors relative to other parts of Wales.

Welsh local authority areas away from Cardiff tend to receive a much lower share of equity investments in value terms reflecting in part how towns and cities in these local authority areas sit within the urban hierarchy. The seven Welsh local authority areas of Wrexham, Flintshire,

Neath Port Talbot, Merthyr Tydfil, Anglesey, Carmarthen, and Ceredigion, making up around one quarter of Welsh employment, received in total just 12% of the value of Development Bank equity investments between 2002 and 2018.

The dominance of Cardiff reveals a core-periphery division of equity activity within Wales, with the core area demonstrating a relatively high equity equilibrium compared to other rural and industrial parts of Wales (see also Christensen and Hain, 2018). Cardiff tends to have a higher number of investors and high-growth companies leading to a rise in equity deals (Figure 3). As revealed earlier it is possible that risk capital investors in an urban area are more likely to invest if other fund managers hold equities in the area with this again illustrating a path dependent evolution of the regional equity market. Data from the ONS suggests that 20% of high-growth firms in Wales were located in the Cardiff area in 2016, with equity funds targeting these businesses (ONS, 2017). Moreover, in 2016, 0.75% of UK high-growth companies were in Cardiff, compared to 21% in London, 1.35% in Leeds, 1.2% in Manchester, 1.2% in Birmingham, 1% in Glasgow, and 0.8% in Edinburgh – but with Cardiff far smaller than these cities.

Apart from the concentration of high-growth firms and equity suppliers, the city has a strong specialisation in financial services, with many firms, according to Beauhurst (2018), benefiting from publicly and/or EU funded business accelerator programmes (152 in 2017). These ‘accelerated’ companies have been backed by either financial support or training that assist in growth and scale-up.

A low SME equity equilibrium in Wales

Wales is characterised by a smaller amount of equity funds available, and the lack of a sufficiently large local network of angel investors and crowd funders. In this Wales is similar to many regions in the UK apart from the Greater London and South East area (Martin et al., 2005). The high number of investors located in South East England and internationally will

have difficulty observing new opportunities among SMEs and new starts in regions far from the South East.

The distance, real or perceived, between investor and investee is crucial. Indeed, Wilson et al. (2019) revealed the strong geographical interactions between equity suppliers and investees. They reveal that Wales had the third highest tendency among UK regions in respect of equity suppliers investing most of their funds in their home region - some 66% of Welsh suppliers invested their funds in Wales between 2011 and 2017. This tightness of geographic interactions is intensified due to the limited presence of funds in Wales. Prior research has shown that equity investors are more likely to invest in an area if other fund managers hold equities in the same region (Hong et al., 2005). Moreover, in Wales government schemes established to boost the supply of SME risk capital have been under-utilised. The share of UK companies located in Wales that have used either the EIS or the SEIS was only 1.9% on average from 2014-15 to 2016-17, while London recorded a 45.2%, South East 16.1%, and Scotland 4.3% (HMRC, 2018).

There are links to the above and to the earlier modelling of the regional distribution of equity deals. Then insufficient supply of equity funds in Wales might be associated with low demands, that is, smaller numbers of high-technology businesses, and with Wales previously identified as a UK region with higher employment location quotients in sectors where global productivity growth has been low. Risk capital funds are unlikely to be attracted by enterprises in such sectors (Mason and Harrison, 2001; Stotz, 2011). Equity investors will tend to invest in regions where high-technology businesses are located, following potential higher returns (Dupuy et al., 2010). Unfortunately, Wales reveals itself to have the lowest share of UK scale-up firms² (3%) among the UK regions in 2018 (Beauhurst, 2018). According to the UK Innovation Survey (BEIS, 2017), Wales had the fourth lowest proportion of companies perceived as innovation-active among the UK regions.

The lack of high-tech firms is closely related to the chronic Welsh productivity problem (Economic Intelligence Wales, 2019). The relatively low number of SMEs identified as having high growth prospects is clearly interlinked. A low equity equilibrium in Wales then may link through to business evolutionary paths, since equity is a significant mode of risk capital for business evolution and a crucial finance source for companies' transfers, facilitating a dynamic business population. In this respect, medium-sized enterprises in Wales have been characterised by relatively low rates of growth in enterprise count and share in the 2010s, with this entailing low rates of business evolution from small into medium-sized firms (Economic Intelligence Wales, 2019). This potential symptom of a low equity equilibrium is possibly coupled to SMEs in Wales having a low appetite for external finance, and a reluctance to service debt. Poor credit availability coupled to relatively high costs of financial capital are known to pose barriers to small firm growth and evolution.

Other demand-side issues include the difficulties SMEs have in approaching investors and low entrepreneurial awareness of equity funding, the schemes available and the equity investors in the area (see British Business Bank, 2018). The 2017 Business Finance Survey for SMEs, provided some evidence of increasing awareness of angel investments, crowdfunding, and venture capital opportunities in the UK between 2012 to 2017 (British Business Bank, 2017). However, 68% of SME owners in Wales were not aware of equity finance opportunities in a survey conducted during the second half of 2018 (see BDRC, 2018b). Subsequently, alongside limits to equity supply, the demand for equity is low in Wales. The low equity equilibrium for Welsh SMEs may then impact the regional growth trajectory connecting to patterns of firm size evolution and succession processes.

Conclusions

This paper examined regional variation in the availability of equity finance in UK regions and considered the case of a low equity equilibrium existing in Wales together with the conditions

leading to this situation. In the Welsh economy case, an array of supply and demand-side factors lead to an identified low equity equilibrium.

Some care is required in generalising from this analysis. Much of the analysis in this paper is based on a limited dataset compiled from British Business Bank annual reports. This data is restricted to a set of publicly announced equity deals. In this respect the conclusions on factors affecting the regional distribution of equity deals should be treated with caution, and with limited information available on other features of reported equity deals. There is potential in further research to combine information on equity deals from other commercially available databases, and to also consider how far the distribution of unannounced equity deals, for example, is similar to the distribution announced deals, and to widen analysis to explore the different characteristics of those seeking equity and its providers.

There is also scope for further analysis to explore whether tentative conclusions made at the inter-regional level can be empirically tested for in terms of equity deals occurring within regions. In this respect this paper has sought to move from the general case of all UK regions, and then focused on Wales, but then with more research needed to confirm whether conclusions from Wales can be generalised to other periphery regions of the UK.

Notwithstanding the above research limitations, the paper has attempted to reveal the significance of a low equity equilibrium, its potential dynamic qualities, and how this could be connected to the persistence of problems in respect of SME access to equity in regions. The interplay of regional supply and demand for equity was revealed as a complex, interlinked and path dependent procedure, with the accumulation of low equity deals in one period reinforcing weak equity activity in the future. Wales has been locked in a low equity equilibrium and this contributes in part to cumulative path dependent process that entails weak economic growth.

The paper also highlights that research on the supply and demand conditions around regional SME equity connects to work on the importance of decentralised financial systems and research

that seeks to explore the co-evolution of regional industrial structures and capital (equity) markets. A central tenet of the paper is that issues of investor-firm matching are worthy of more attention in economic geography debates alongside the issue of inter-firm knowledge matching in innovation networks and labour markets. Indeed, the paper suggests that the characteristics of regional markets for equity are linked to regional growth prospects and the efficiency of firm innovation processes. This is a further area where more work is required. Seemingly regional variation in equity supply and demand, once integrated with other characteristics of more peripheral regions, could work to reinforce patterns of uneven regional development.

Given the limits on the analysis undertaken, any policy implications are tentative. However, in the Welsh case there seems to be some challenges to improve simultaneously conditions around equity supply and demands for equity in different parts of the region. Creating local institutional networks to enable learning about equity funding possibilities is important, as is improving knowledge about existing state equity schemes. To conclude, the Welsh case indicates that addressing a low equity equilibrium is not merely a supply-side issue and with much work to do to engage SMEs in developing their demands. A low SME equity equilibrium signals that Wales lacks a critical financial tool that could help support economic growth, employment, and innovation, and facilitate a more dynamic business population.

Notes

¹ According to the Office for National Statistics, high-growth companies are the firms exhibiting an average of 20% growth over three years in terms of employment and turnover.

² According to Beauhurst (2018), scale-ups are start-ups with revenue of below £0.5m that grow to over £1m in revenues after 3 years.

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Table 1: Results of median quantile regressions

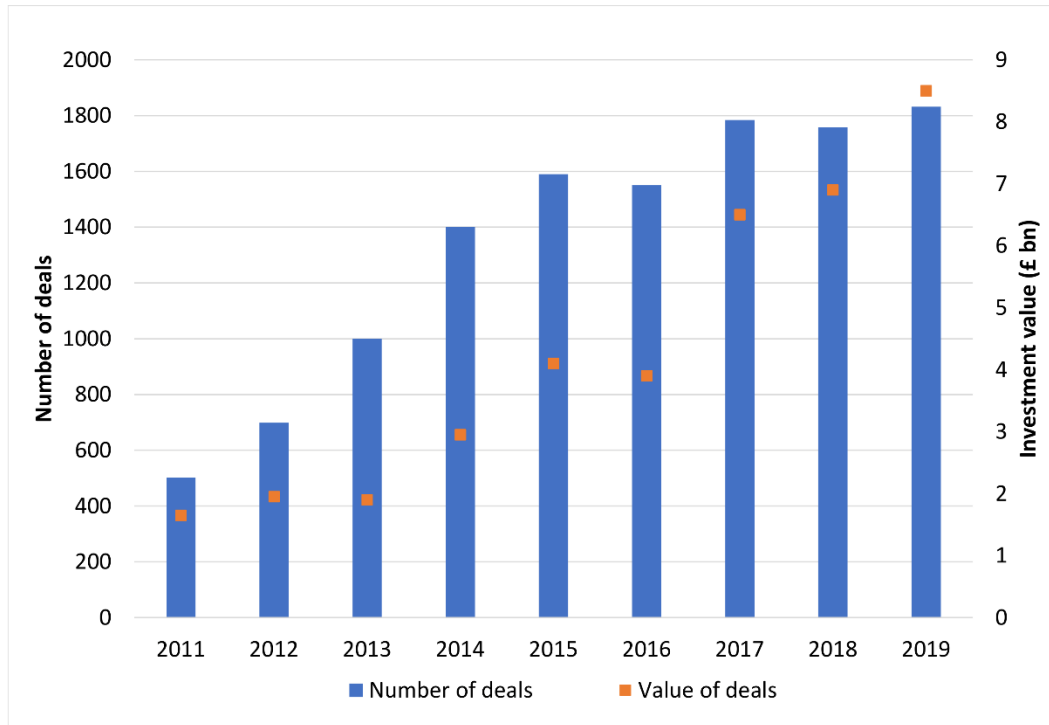
Variables	Construction source and	(1)	(2)	(3)	(4)	(5)	(6)
Equity _{r,t}	Reported regional equity deals (£m) per 10,000 SMEs from 2016-19. British Business Bank						
LSE	Dummy variable for the regions London-Southeast-East of England	-0.006 (0.988)	1.190* (0.097)	0.954 (0.131)	1.349* (0.058)	1.445* (0.060)	0.980 (0.176)
EQINV _{r,t-2}	Unique equity investors in each region from 2014-17 ex government investors. Wilson et al. (2019)	0.029*** (0.000)	0.036*** (0.000)	0.026*** (0.000)	0.023*** (0.000)	0.022*** (0.001)	0.024*** (0.001)
HPRI _{r,t-1}	Average house price in each region from 2015-18. UK Government (2020)		-8.87E-6* (0.059)	-1.39E-5*** (0.001)	-9.10E-6** (0.022)	-9.09E-6** (0.032)	-9.27E-6** (0.027)
S&T _{r,t-1}	Persons employed in science & technology as % regional active pop 2015-18. EUROSTAT, (2020)			0.198*** (0.001)	0.181*** (0.002)	0.188*** (0.005)	0.193*** (0.003)
R&D _{r,t-1}	R&D investment per capita in each region from 2015-18. ONS (2020a)				-0.0003* (0.062)	-0.0003* (0.077)	-0.0002 (0.155)
GVAG _{r,t-1}	Regional GVA growth from 2015-18. ONS (2020b)					0.061 (0.586)	-0.013 (0.902)
HGF _{r,t-1}	High-growth firms per 10,000 SMEs in each region from 2015-2018 ONS (2017)						-0.039 (0.625)
Intercept		1.347 (0.000)	2.690 (0.000)	-5.950 (0.037)	-5.268 (0.048)	-5.900 (0.066)	-5.477 (0.114)
Pseudo R ²		0.443	0.481	0.547	0.572	0.572	0.573
Obs		48	48	48	48	48	48

***Statistically significant in 1%

**Statistically significant in 5%

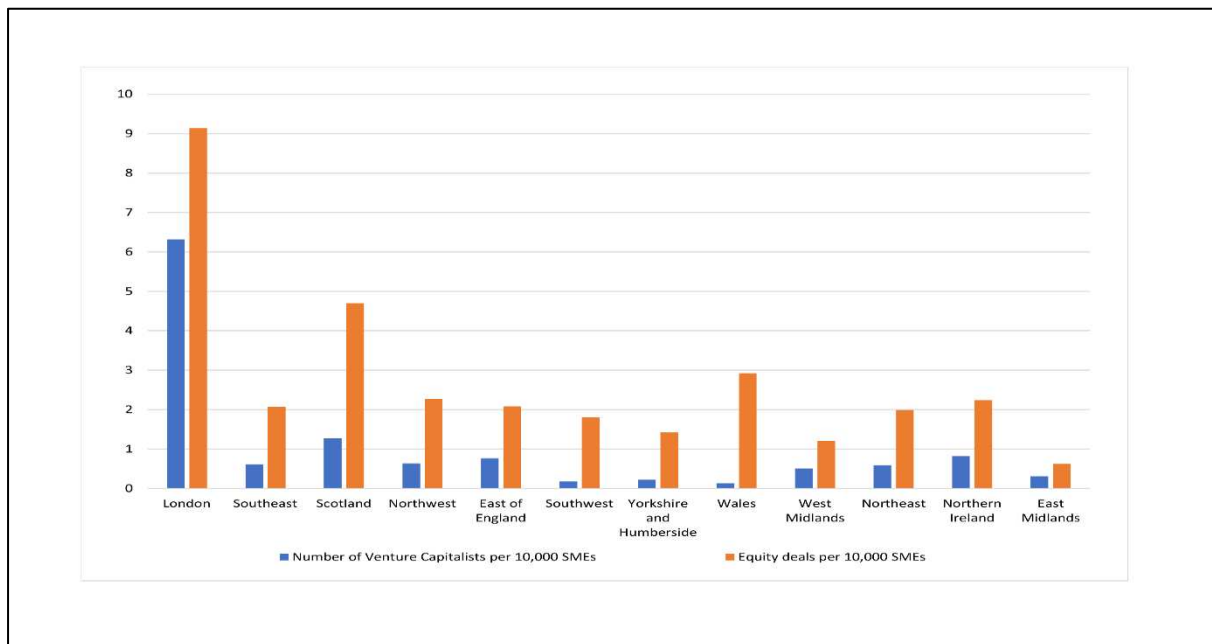
*Statistically significant in 10%

Figure 1. Equity investments in UK SMEs.



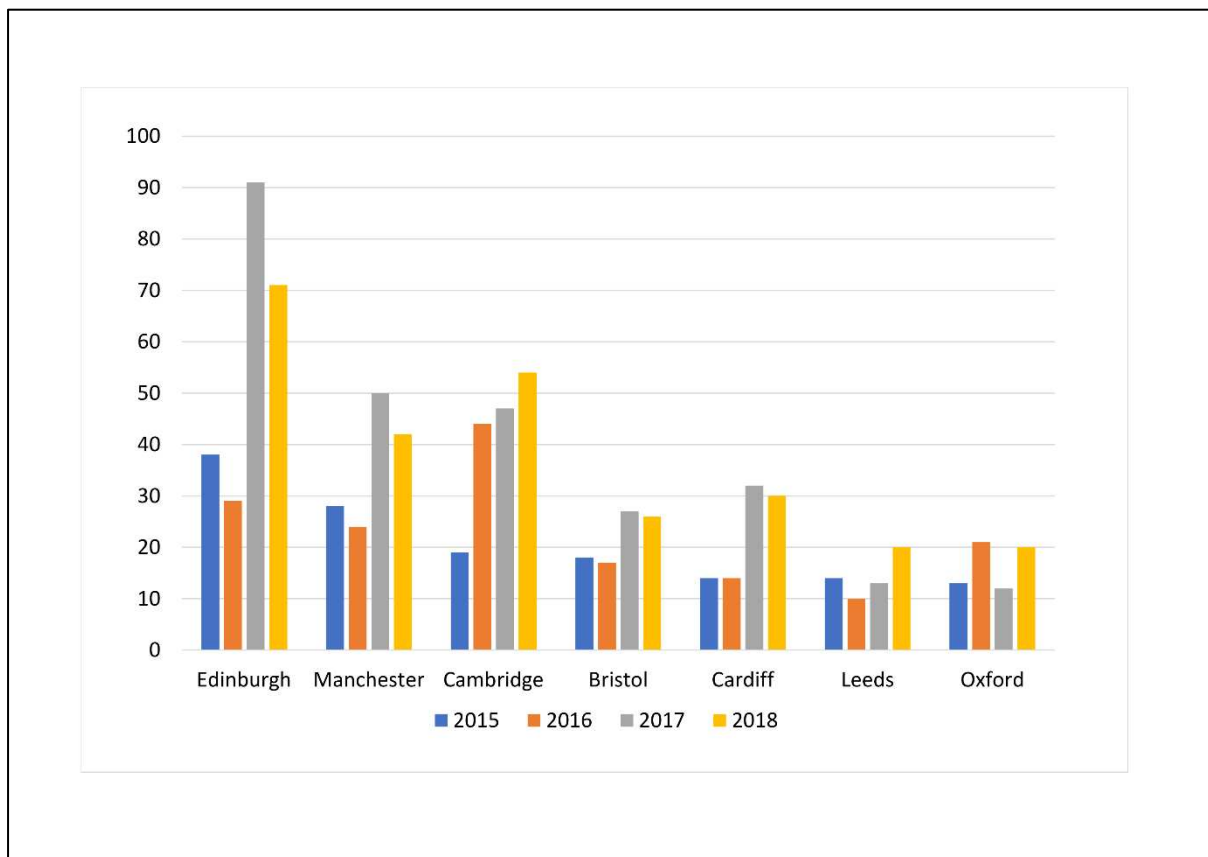
Source: British Business Bank (annual reports)

Figure 2. Equity deals and number of venture capitalists per 10,000 SMEs by UK region.



Source: IFF Research (2017)

Figure 3. Number of SME equity deals in selected UK cities (excludes London).



Source: British Business Bank (annual reports)

Figure 4. Main elements of the equity supply side in Wales

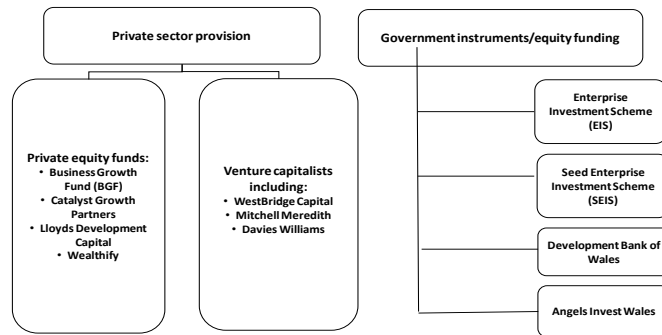
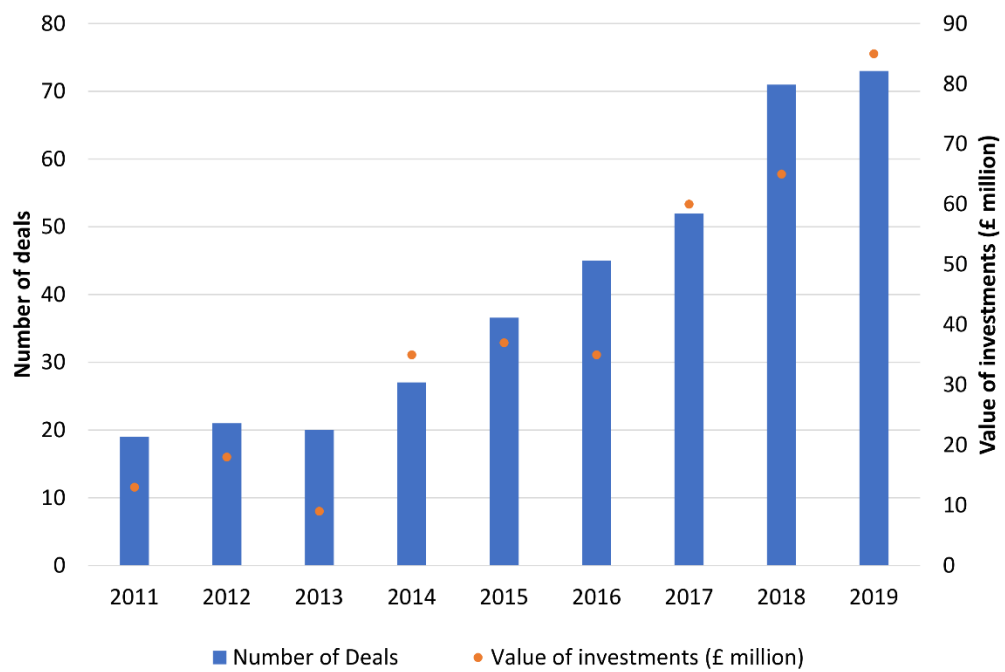


Figure 5. Number of new SME equity deals in Wales.



Source: British Business Bank (annual reports)

Appendix: Correlation Matrix

Correlations of Parameter Estimates (q=0.5)^a

	(Intercept)	<i>LSE</i>	EQINV _{r,t-1}	<i>GVAG</i> _{r,t-1}	<i>HPRI</i> _{r,t-1}	<i>S&Tr</i> _{r,t-1}	<i>HGF</i> _{r,t-1}	<i>R&Dr</i> _{r,t-1}
(Intercept)	1	0.078	0.842	-0.474	-0.240	-0.926	-0.493	0.366
<i>LSE</i>	0.078	1	0.030	-0.049	-0.298	-0.016	0.135	-0.589
EQINV _{r,t-2}	0.842	0.030	1	-0.328	-0.577	-0.721	-0.455	0.508
<i>GVAG</i> _{r,t-1}	-0.474	-0.049	-0.328	1	0.044	0.373	0.174	-0.139
<i>HPRI</i> _{r,t-1}	-0.240	-0.298	-0.577	0.044	1	0.016	0.268	-0.395
<i>S&Tr</i> _{r,t-1}	-0.926	-0.016	-0.721	0.373	0.016	1	0.187	-0.341
<i>HGF</i> _{r,t-1}	-0.493	0.135	-0.455	0.174	0.268	0.187	1	-0.258
<i>R&Dr</i> _{r,t-1}	0.366	-0.589	0.508	-0.139	-0.395	-0.341	-0.258	1

a. Dependent Variable: Equity_{r,t}