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BUSINESS ANGEL INVESTING DURING THE COVID-19 ECONOMIC CRISIS: EVIDENCE FROM SCOTLAND

Report prepared by:
Colin Mason [1] and Tiago Botelho [2]

[1] Adam Smith Business School, University of Glasgow, colin.mason@glasgow.ac.uk
[2] Norwich Business School, University of East Anglia, T.Dos-Santos-Botelho@uea.ac.uk

www.productivityinsightsnetwork.co.uk

UKRI Economic and Social Research Council

Abstract

An entrepreneur-led economic recovery from the coronavirus pandemic will be compromised if there is a decline in the availability of risk capital. Business angels play a critical role in financing the start of the entrepreneurial pipeline hence any decline in their investment activity will have a negative effect on the ability of entrepreneurs to start and commence the scaling process. This paper draws on two unique data sources on investments made by business angels in Scotland before and since the onset of the pandemic. It shows that business angels have continued to invest since the onset of the crisis. However, their investment activity declined sharply between Q2 and Q3 2020 before stabilising in Q4. Angels have increased their emphasis on follow-on investments and in businesses that have raised one or more previous rounds of funding These trends highlight an emerging problem for entrepreneurs seeking to raise their first round of angel funding that policy-makers need to address.

Key words: Covid-19 pandemic; business angels; economic crisis; entrepreneurs; start-ups, scaleups

About PIN

The Productivity Insights Network was established in January 2018 and is funded by the Economic and Social Research Council. As a multi-disciplinary network of social science researchers engaged with public, private, and third sector partners, our aim is to change the tone of the productivity debate in theory and practice. It is led by the University of Sheffield, with co-investigators at Cambridge Econometrics, Cardiff University, Durham University, University of Sunderland, SQW, University of Cambridge, University of Essex, University of Glasgow, University of Leeds and University of Stirling. The support of the funder is acknowledged. The views expressed in this report are those of the authors and do not necessarily represent those of the funders.

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1. INTRODUCTION

It is widely accepted that ambitious, innovative start-ups that scale will play a key role in the road to economic recovery from the crisis created by the coronavirus pandemic (ScaleUp Institute, 2020; Moules, 2021). These types of businesses are recognized as key sources of employment (especially high skilled jobs), innovation and productivity growth. As we have seen in previous recessions, the disruptions that economic crises cause to established markets create opportunities for alert entrepreneurs to launch innovative businesses based on new products, services and business models. Risk capital is a key enabler for many innovative companies both to start and to scale (ScaleUp Institute, 2020), prompting concerns that the strength and speed of the economic recovery will be put at risk if, as a consequence of the Covid crisis, there is a decline in investing by venture capital funds and business angels.

Business angels - high net worth individuals who invest on their own or with others in unquoted companies in which they have no family connection (Mason and Botelho, 2018) – are fundamental to the entrepreneurial ecosystem, funding the start of the 'entrepreneurial pipeline'. Angel investors typically follow '3F' and grant money, funding the seed, start-up and initial growth stages, with venture capital funds making larger investments to fund the scale-up stage ('acceleration money') in a process that has described as being analogous to a relay race (Benjamin and Margulis, 2000). With angels increasingly organizing themselves into managed groups with anywhere from 10 to upwards of 100 members rather than investing informally on their own (Mason et al, 2016) they now have the financial resources not only to make larger initial investments but also to participate in follow-on rounds to finance the initial scale-up of their investee businesses (British Business Bank, 2020). Angel groups also have the credibility and professionalism to co-invest with both institutional and government seed and venture funds in larger syndicated deals (Mason et al., 2013; Mason, 2018). Many angel investments are not publicly disclosed, particularly those made by business angels who are not part of a recognised network or syndicate. However, it is estimated that business angels

account for 60% of European early-stage investment activity in terms of amount invested, with venture capital accounting for 34% and equity crowdfunding 6% (EBAN, 2019) and are estimated to make up around 18 times more investments than venture capital at the early stage (ACA, 2021). The importance of business angels in the entrepreneurial ecosystem is further underlined by the UK's ScaleUp Institute (2020) which reported that 63% of scale-ups received investment from business angels to fund their early growth.

The implications of a decline in angel investing during the COVID pandemic have been highlighted by several key stakeholders. For example, Luigi Amati, president of Business Angels Europe, has remarked that "it would have a massive impact on the start-up economy in Europe. Indeed, if angel investing breaks down, you break down the whole pipeline of development" (Sifted, 2020a). In similar vein, Jenny Tooth, chief executive of the UK Business Angels Association (UKBAA) has commented that "angels are where VCs find deals so a contraction in angel investing will create a massive hole in the ecosystem going forward" (Sifted, 2020a). The consequence would be 'a lost generation' of entrepreneurs (CityAM, 2020).

These concerns were raised in the early months of the pandemic. However, it is unclear the extent to which this scenario has occurred. The evidence on the impact of the pandemic on angel investing is limited to some surveys of business angels along with commentary and other anecdotal sources, Moreover, much of this evidence relates to the early stages of the pandemic. Deal specific information on angel investments is limited. Whereas venture capital funds, whose investments are captured by various commercial organisations (e.g. Pitchbook, Crunchbase, Beauhurst) and by industry associations, the coverage of investments by business angels in such databases is restricted to larger, more formally organised angel groups. Moreover, the coverage of their deals is incomplete (Mason et al, 2019). Hence, whereas there is considerable evidence on venture capital investing during COVID-19 (e.g.

Mason; 2020; Arundale and Mason, 2020; Brown et al, 2020; Pitchbook, 2021) this is not the case for business angel investing.

Our objective in this paper is to provide greater clarity on how the pandemic has impacted on angel investment activity in 2020 and to assess the implications for economic recovery. We overcome the data limitations discussed above by drawing upon two unique data sources on investments made by business angels in Scotland before and since the onset of the pandemic. Scotland has a long-established business angel market, including the oldest angel group in the world (Kemp et al, 2017), that is recognised as one of the most developed in Europe. The OECD (2011) has noted that "the United Kingdom has been the most active angel market in Europe with Scotland being particularly active." Government has played a significant role in stimulating angel investment in Scotland, notably through the creation of the Scottish Co-Investment Fund in 2003 (Harrison, 2018) and the establishment of LINC Scotland – the national association for business angels in Scotland – whose membership comprises over twenty structured angel groups with a collective membership of at least sixteen hundred angels plus over one hundred investors who operate individually. In 2019-20 LINC members invested £103m in 114 deals involving 87 companies (some of which completed more than one funding round in the year) (LINC Scotland, 2020a). Emphasising the significance of business angels in financing entrepreneurial activity, venture capital funds invested just £19m in 32 businesses in 2019 (BVCA, 2020).

2. COVID-19 AND THE CREATION OF UNCERTAINTY FOR BUSINESS ANGELS

Angel investing is high risk, with more than half of all investments failing and returns highly skewed (Botelho et al, 2019; Mason and Harrison, 2002; Wiltbank and Boeker, 2007; Wiltbank, 2009). Indeed, it has been suggested that portfolios with more than 50 investments are required to significantly minimize the risk of poor returns and maximize returns potential (Gregson et al, 2017). However, most business angels have much smaller portfolios. These risks have been magnified by the uncertainties that have arisen from the lockdowns that governments have implemented since March 2020 to control the COVID pandemic.

The first source of uncertainty for business angels has been the potential impact of the Covid crisis on their personal wealth. The UK's FTSE All-Share Index fell 33% between 11 January and 14 March 2002 and although some of these losses were subsequently made up it had not fully recovered by the start of 2021 (O'Neill, 2021). The US markets (S&P, NASDAQ) also recorded steep declines in March 2020 but subsequently recovered, ending 2020 higher than at the start of the year. Given the discretionary nature of investing in new and early-stage entrepreneurial businesses (with business angels investing between 5 and 15% of their financial assets to this asset class) the decline in the stock market, along with the uncertainty about the impact on the pandemic on their other financial assets (e.g. property) prompted angels to pause their investment activity. A survey by the British Business Bank (2020) in the autumn of 2020 noted the impact of the economic uncertainty on angels' own personal investment capacity was a key reason for reducing their investment activity.

Evidence from surveys of business angels, webinars and commentaries, mainly reflecting developments in the immediate aftermath of the initial lockdown in late March 2020, indicated that business angels continued to invest during the early stage of COVID-19 and would continue to invest. A survey by Activate our Angels (2020), undertaken in the first half of May 2020 that attracted responses from over 250 UK angels reported that only one-third of UK

angels were not investing during the lockdown period, with, 71% of these angels continuing to review deals but adopting a 'wait and see' stance and only 29% of were not planning to invest at all. Almost half (48%) of the latter group said that they were only going to invest again when they felt confident that the Covid-19 crisis was over.[1] Those angels who were continuing to invest were making fewer investments, with respondents to the Activate Our Angels survey completing an average of just 1.81 deals during the early lockdown period compared with 3.24 deals in 2019. Moreover, just over half (51%) expected to invest less in 2020 than in 2019; only 19% anticipated investing more. Evidence from a British Business Bank (BBB) online survey of the UK business angel market undertaken in July 2020[2] also found that angels had continued to invest but the value of both their initial and follow-on investments were lower than in the previous year. Looking forward, most respondents planned to continue to invest but anticipated that the proportion of their investable assets that they would allocate to angel investing in the remainder of 2020/21 would be slightly lower than their allocation in 2019/20. Nevertheless, most of the angels surveyed were generally confident about the future growth in value of their portfolio over the next 12 months and close to half were open to building their portfolio in the remainder of the 2020/21 fiscal year, while only 12% said they intended to make no further investments (British Business Bank, 2020). This is consistent with evidence from Seedlegals (2020) – a legal platform for investors and entrepreneurs - covering the period from late March to late July 2020, which indicated that deal activity was down slightly, having bounced back from an initial decline, but that evidence from leading indicators[3] suggested that investor confidence appeared to be recovering. It is also consistent with evidence from the USA: the Angel Capital Association (ACA) reported that interest amongst angel groups in investing had remained strong, with the willingness to invest higher in September 2020 compared with April 2020 (ACA, 2020).

[1] Some of those that have dropped out of the market have been disparagingly described as 'tourists': "the classic 'rich individual' who sometimes dabbles in investing in tech start-ups" (Sifted, 2020a).
[2] Undertaken in conjunction with the UK Business Angels Association. The survey collected responses between 15th July and the 2nd and August 2020.
[3] SEIS and EIS Advanced Assurance applications, shareholder agreement signatures and term sheet signatures

A further source of uncertainty for angels has been the effect on the crisis on their existing investments. This has a number of dimensions. First is the risk that their investee companies would run out of finance and therefore be unable to fund their ongoing operations. Typically, investments are staged, giving businesses 12 to 18 months of cash, at which point they will raise a further funding round at a new valuation. The portfolios of business angels were therefore likely to have included some businesses whose previous funding round was more than a year ago and were therefore reaching the end of their financial runway. The coronavirus crisis worsened the cash flow position of many of these companies as a result of the deterioration in their sales revenue prospects (Greene and Rosiello, 2020). One survey undertaken in May 2020 reported that 49% of start-ups had six months or less of runway, with the smallest companies (10 or fewer employees) – those at the start of the scaling process - in the most vulnerable category (Slush, 2020a). A follow-up survey in October 2020 reported that the situation had worsened, with 55% of respondents reporting having less than six months runway (Slush, 2020b). In another small-scale survey of mostly tech companies that had previously raised finance, 77% reported that without raising funding they would not be able to survive no more than six months (EISA, 2020). Many business angels therefore had to decide which portfolio companies to support with follow-on funding. This may involve focusing on companies that are further along their development, particularly those that have reached the revenue generation stage, and on certain business models (particularly recurring revenue business models) and sectors (Activate Our Angels, 2020). Moreover, unlike previous recessions in which all sectors were adversely affect, Covid has created both winners and losers, hence many angels will have had some companies in their portfolios whose market has increased as a result of opportunities that have been created by the crisis that they will have wanted to support with further funding. The British Business Bank survey noted that angels have been engaging more selectively with their portfolio companies since the onset of COVID-19, primarily supporting those that needed support to achieve their growth milestones, but in

some cases those that needed help to survive (British Business Bank, 2020). These considerations will likely have taken precedent over making new investments during the crisis.

A related consideration for business angels is future funding risk - the risk for those business angels who have investee businesses that plan to raise follow on finance from venture capital funds (VCFs) that this might not be possible. A related concern is the potential downward pressure on valuations, particularly at later rounds, creating the risk of down-rounds, which reduces the value of their shareholding. This raises the possibility of a re-run of the post-2000 dotcom crash in which many business angels saw their investments wiped out by the predatory behaviour of venture capitalists, driving many of them out of the market. The reality of this risk was underscored by Beauhurst (2020) which reported a significant decline in UK deal numbers in Q3 2020. VCFs have also been conserving their cash to support their own portfolios (Sifted, 2020b; Arundale and Mason, 2020). Business angels have therefore needed to be aware that those businesses in their portfolios that are, or will be, seeking to raise a funding round from a venture capital fund to scale-up may not be able to do so. This is a further consideration that will also have encouraged business angels to focus on their existing portfolios. Although the fear in the early months of the pandemic that the associated economic uncertainty would result in a collapse in venture capital investing did not materialise, their investment activity has been driven by larger, later stage and follow-on deals and there has been a decline in the number of first-time investments (Beauhurst, 2021; Robot Mascot, 2021; Pitchbook, 2021).

Reinforcing these concerns was the associated fear amongst business angels that there would be fewer opportunities to exit in the immediate future and companies may need to have hit more milestones than in the past in order to become an attractive acquisition by a large corporate. Seeking an exit from a position of relative weakness is likely to generate sub-optimal returns. Both situations require angels to continue to support their investee companies

for longer. Moreover, because angels were spending more time supporting the companies in their portfolios to navigate the crisis, they had less bandwidth to consider new investments.

The expectation is that business angels will have responded to these sources of risk by preserving their capital to be in a position to support their portfolio companies rather than making new investments. This would mean fewer seed and start-up investments. Although the Activate Our Angels (2020) survey found that 51% of respondents were investing in new deals and only 16% were exclusively investing in their existing portfolio, much of the other evidence indicated that the majority of angels were focusing on their existing portfolios, preserving their cash to make follow-on investments rather than making new investments. This shift to follow-on investing is supported by the Plexal (2020) start-up tracker of 30,000 start-ups and fast growth firms which reported a 29% decline in the number of companies raising finance for the first time compared with the same period a year earlier and a 52% decline in the amount of funding that such companies raised. US angel groups also reported an increase in the proportion of follow-on investments (ACA, 2020). Follow-on investing also dominated the aftermath of the post-2000 dotcom crash and the 2008-9 global financial crisis (Mason and Harrison, 2015; Sohl et al, 2020).

A further source of risk associated with making new investments that has been created by the Covid pandemic has been the shift in the investment process from face-to-face meetings to online meetings with the consequent adverse consequences for the development of trust between investors and entrepreneurs. The shift by angel groups and other intermediaries from in-person to online pitching events has ensured that businesses angels have continued to have access to deal flow. However, because angels are “investing on the jockey rather than the horse” (Harrison and Mason, 2017), investing in an unfamiliar entrepreneur is seen to increase risk. One prominent UK angel commented that “angels invest in people. We have got to get to know the people … to build trust and relationship. It is a two-way relationship. It is

difficult to see how this can be overcome [in the current circumstances]" (Cowley[4], 2020). Another angel has remarked that "taking pitches over a zoom call doesn't really replace that face-to-face contact. As good as the technology is, I don't believe that it replaces face-to-face contact particularly when you're meeting someone and building a relationship" (Dobbin[5], 2021). Angels might therefore be expected to mitigate these risks by concentrating their investments in situations where there is an existing relationship,[6] first, in their existing investee businesses, second, alongside other investors investing in businesses that these investors have relationship with, and third, investing in businesses where a trusted intermediary is involved (e.g. advisor). A further way in which they might seek to mitigate this risk is to invest in companies that have previously raised finance from other investors. There is evidence from the Activate Our Angels (2020) survey that some investors will now only invest alongside other investors.

Finally, there is evidence that the Covid crisis has impacted on the investment criteria of business angels, with both the Activate our Angels (2020) survey and Seedlegals (2020) reporting increased interest in Fintech, Remote Education and Health/Med Tech. However, the British Business Bank (2020) survey reported no significant change in the dominant sectors that angels will invest in. The Covid-19 crisis is also encouraging angels to be more selective in what start-ups they will invest in, with the Active our Angels survey identifying greater emphasis on length of financial runway, revenue generation, recurring revenue and a strong

[4] Peter Cowley is as an active angel investor based in Cambridge, UK. He has invested in more than 75 start ups. He has been Chair of the board of the Cambridge Business Angels. He was President of the European Business Angels Network (EBAN) - the trade body representing the early stage investor and start up community throughout Europe. (https://www.petercowley.org/).

[5] Mark Dobbin is the founder and President of Killick Capital Inc., a Newfoundland based investment firm to invest in the aerospace sector and in Newfoundland and Labrador companies. He was an early angel investor in St. John's-based Verafin, a FinTech giant in the anti-financial crime management space that was acquired by Nasdaq in November for $2.75 billion in cash. Dobbin was NACO's angel of the year in 2020.

[6] Peter Cowley's approach is as follows. "Unless I have known the entrepreneurial team for several years (ie I have been on a start-up journey with them already), I am no longer investing in start-ups. However, I am continuing to support my portfolio with time and investment." (https://www.petercowley.org/)

balance sheet as investment criteria. But only a minority of angels have shifted their focus to later stage deals.

3. DATA SOURCES

As various commentators have noted, there are enormous definitional and data challenges in measuring business angel investment activity (Mason and Harrison, 2008; Farrell et al, 2008; Avdeitchikova et al, 2008; Mason, 2016). The available evidence is largely confined to what has been termed the 'visible market' (Mason and Harrison, 2015) comprising angel groups and syndicates (although even this evidence is partial: Mason et al, 2019) and prominent individual investors (sometimes termed 'super angels'). Angel investing that occurs independently of networks and groups – the 'invisible' or unorganised part of the market - is largely undocumented.

This paper draws on two sources of evidence which capture different but overlapping segments of the angel market. The first is the investment activity of angel groups and individual angels that are members of LINC Scotland. Its web site lists 22 angel syndicates which are members[7]. This information is reported in aggregate form (LINC Scotland, 2020b). At our request LINC Scotland provided data on investments by quarter in both 2019 and 2020. With the Scottish economy entering lockdown in late March and remaining in lockdown throughout Q2 with restrictions gradually eased in June/July (Q3) but reintroduced from October (Q4) the data therefore cover both the first and second lockdowns. This source has two key strengths. First, it captures those investments by LINC members that have not been publicly disclosed. Second, although its coverage is dominated by angel groups it also includes investments made by some individual angels. Its key limitation is that it is only available in aggregate form.

[7] LINC Scotland also has additional members that are not publicly disclosed (individual investors, angel groups, private offices and other investment organisation).

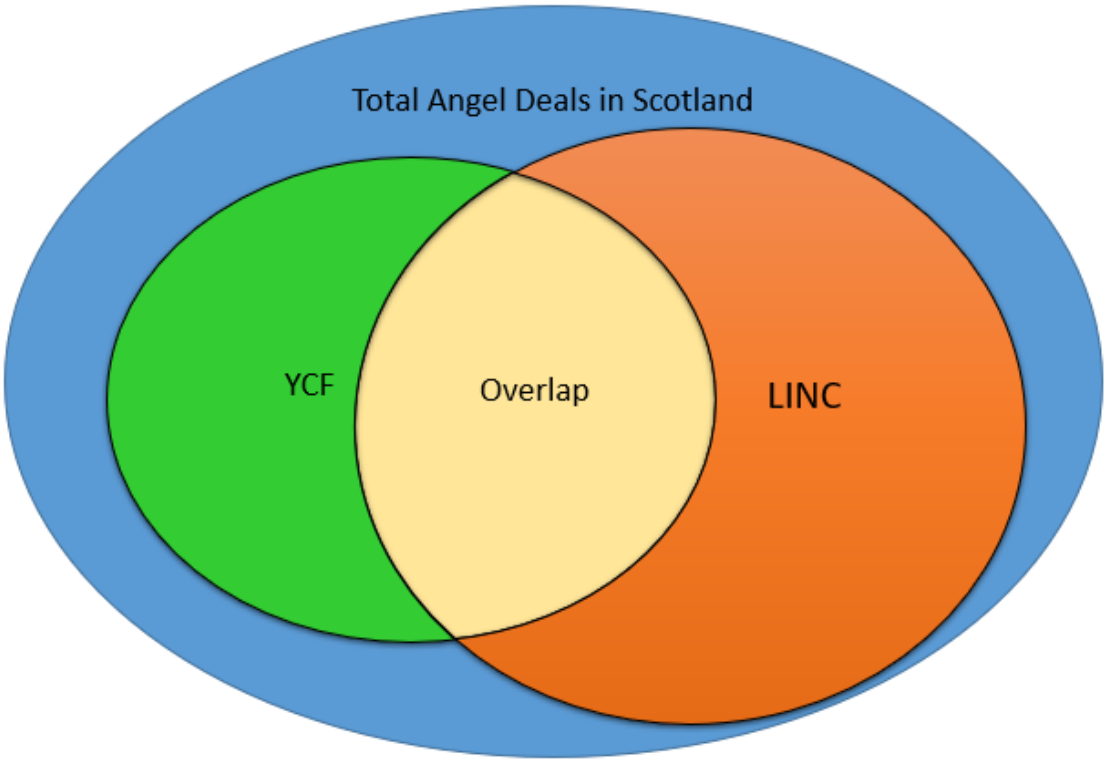
The second source is the investment deals that are reported by Young Company Finance (YCF) (www.ycfscotland.co.uk) a monthly publication available on subscription that tracks and reports on early stage high growth companies in Scotland. YCF is a partner organisation of LINC Scotland. The information includes investments by institutional investors (notably venture capital funds), government funds, equity crowdfunding platforms, angel groups and some individual angels. It provides the names of both the companies that have raised finance and the institutional investors (including angel groups) but most individual investors are not identified by name. It also provides the total amount invested in the deal; however, this is not provided for every investment and in the case of syndicated deals there is no breakdown of the amounts invested by each of the individual investors. YCF identified 271 deals that occurred during 2019 and 2020. Here again we disaggregate these investments by quarter. We restrict our analysis to angel-backed companies - those companies whose investors included named angel groups, named individuals (typically high-profile entrepreneurs) or are described as either 'private investors' or 'individual investors'. These investors have participated in 52% of the total number of deals in the YCF data base in our study period, once again demonstrating the importance of angels in financing early-stage companies.

The database also includes investments made by other types of investor. These include deals in which angels were co-investors as well as those in which angels did not participate. Venture capital funds were involved in 32% of investments (of which 44% were with angels). The other types of investors (incubators and accelerators, crowdfunding, corporate venture capital) were each involved in around 10% of investments. Government is also a significant player, involved in half of investments, as a co-investor, most often, but not exclusively, with angel groups[8]. This underscores the strong presence that governments have in the early-stage investment equity market, particularly in peripheral regions (Mason and Pierrakis, 2013). By cross-referencing angel-backed companies with publicly available sources (e.g. Crunchbase,

[8] For more information about activity levels of other sources of finance see Appendix 1

Pitchbook, Companies House, media webpages) it has been possible to identify those that have raised one or more previous rounds of funding and those which have existing investors that are making follow-on investments. The advantages of YCF's coverage are, first, that it provides deal-specific data, and second, its coverage is not restricted to investments made by LINC members. The key disadvantage is that YCF only includes publicly disclosed investments. The deals that it reports therefore do not include undisclosed investments made by LINC members or by other investors. It should be noted that it is companies, not investors, who make the decision not to disclose the investment.[9] A further disadvantage is that the information provided on investors requires some subjectivity in the classification of angel investments.

Figure 1 – Data set coverage



These two data sources therefore cover overlapping but not identical segments of the market (Figure 1). Of the total number of angel deals identified by YCF in our study period 60% were

[9] Jonathan Harris, publisher of Young Company Finance.

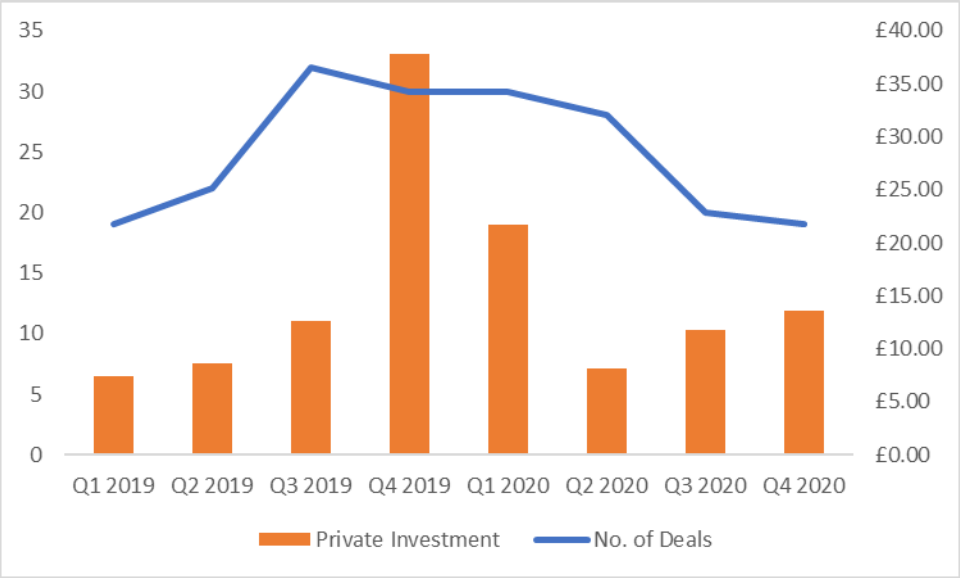
made by angel groups that were members of LINC. And, as with the vast majority of evidence on angel investing, the coverage of both sources is heavily skewed to the organised and hence 'visible' part of the market, primarily comprising angel groups.

4. RESULTS: BUSINESS ANGEL INVESTMENT ACTIVITY IN SCOTLAND

In the UK, the first cases of COVID were identified at the end of January. However, the initial impact of the COVID pandemic on business angel investment activity was very limited. Although the pandemic impacted on the investment sentiment of angels from March 2020 (Kraemer-Eis et al 2021) many will have wanted to complete deals before the end of the tax year (5th April) to quality for tax relief under the Enterprise Investment Scheme (EIS) and Seed Investment Enterprise Scheme (SEIS). Hence, investment activity by LINC members in Q1 2020 was similar to the second half of 2019. Investment activity in Q2 2020 was also surprisingly buoyant, with more deals than in the equivalent period in 2019 (+6; +27.3%) and just two fewer investments than in Q1 2020 (-6.7%) (Figure 2). Here again, this might reflect in part the completion SEIS and EIS deals in the first few days of April before the end of the tax year. More generally, it reflects the fact that the investment process generally takes several months to progress from the decision in principle to invest and negotiating the terms and conditions of the investment, to writing the cheque (Mason and Harrison, 1996), with deals in Q2 2020 reflecting a process that will have started in Q1 if not earlier. It may also reflect the 'triaging' of their portfolios – making small investments to support their investee companies that needed immediate funding to offset the decline in their revenues. The impact of COVID therefore only became apparent in Q3 2020, with a 28.6% decline in the number of investments (- 6 deals) between Q2 and Q3. Investment activity stabilized in Q4 with just one fewer investment than in Q3. The number of investments in Q3 and Q4 2020 was 37% below the equivalent period in 2019. In contrast to the number of deals, the amount invested declined sharply between Q1 and Q2 2020 (although the amount invested in Q1 2020 was unusually high and the amount invested in Q2 2020 was only slightly less than in Q2, 2019), but

increased in Q3 2020 and again in Q4 (Figure 2). Overall, the number of deals was only 6% lower 2020 than in 2019 while the amount invested by angels was down 3%. However, deals completed by angels were lower during Q3 and Q4 when compared to the previous year while the amount invested in Q2, Q3 and Q4 2020 were lower than in the same period in 2019.

Figure 2. Investment activity by LINC members: 2019 compared with 2020



Source: LINC Scotland

Table 1. YCF evidence on business angel investments: 2019 compared with 2002

	2019				2020			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Number of angel deals (n)	6	15	20	19	22	27	12	20
Amounts of total investment activity (£m)	6.1	97	17.3	28.9	16.6	39.7	12.4	25.4
Angel share of total investment activity (%)	21	52	59	48	56	75	44	54

Source: YCF

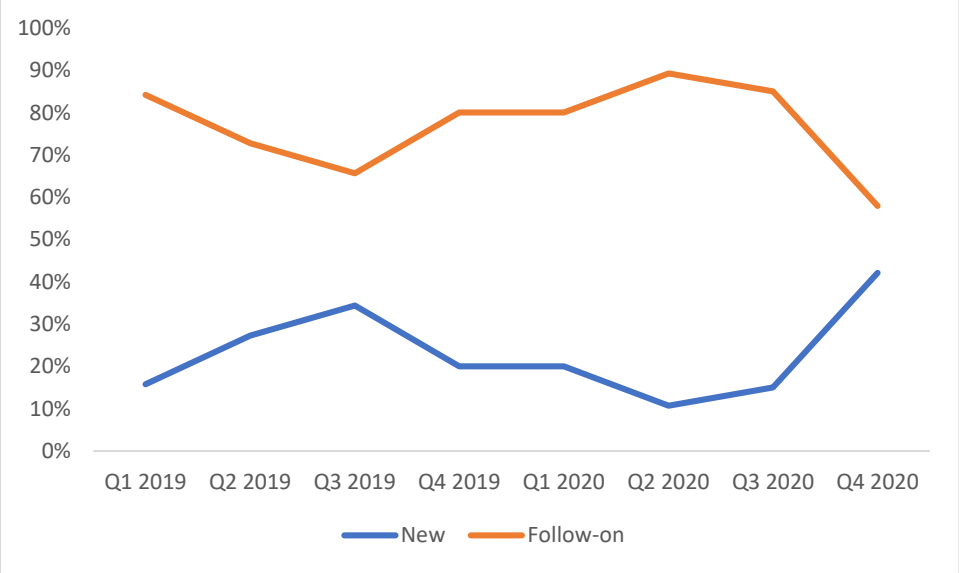
YCF data also indicates that angel activity was buoyant in the first half of 2020, with the number of investments significantly higher in both Q1 and Q2 2020 than in the equivalent period in 2019, and with the number of investments increasing between Q1 and Q2 2020 (Table 1). Investment activity dropped sharply in Q3 2020 but made a small recovery in Q4 2020. It also shows that total angel investment was lower in Q3 (-28%) and Q4 (-12%) of 2020 than in the equivalent periods in 2019.

In summary, both LINC Scotland and YCF data show that angel investment activity in Scotland was buoyant in Q1 2020 and remained at a high level of activity in Q2, but declined sharply in Q3, consistent with the survey evidence on angel sentiment that was reported in Q2, before stabilising and even exhibiting some signs of a modest bounce-back in Q4. This reflects the decline in uncertainty towards the end of 2020 as businesses exhibited creatively and innovation in response to changed market circumstances and demand picked up, prompting angels to think about new market opportunities, and as angels began to adjust to online investing. Nevertheless, it is important to emphasise that although angel activity increased in Q4 of 2020 the level of investment activity was lower than in the equivalent period in 2019. So, based on this evidence, the concerns that were voiced in the early months of the pandemic that there would be a collapse in angel investing, with adverse implications for entrepreneurial activity have not materialised. But neither is it the case that it has been unaffected.

What these aggregate investment trends mask is that following the onset of the pandemic angels have increasingly focused their investment activity on making follow-on investments and scaled back new investment activity (Figure 3). As noted earlier, a similar shift occurred in the aftermath of global financial crisis. Three-quarters of the investments made by angels in 2020 were follow-on investments, although quarterly proportions ranged between 83% (Q3) to 41% (Q1). However, the proportion of follow-on investments increased sharply in Q2 (increase of 22 percentage points) and Q3 (increase of 20 percentage points) as angels focused on the

need to support the companies in their portfolio and on account of the drop-off in deal flow. However, new investments bounced back strongly in Q4 2020, with follow-on investments dropping to 60% of all investments. Follow-on investments as a proportion of the total amount invested increased in Q2 and Q3 of 2020 compared with 2019, with a particularly large increase in Q3 from 78.6% to 98.9%. However, with the rebound in new investments in Q4 2020 follow-on investments dropped to just 53.9% of the amount invested This shift to follow-on investing is also identified in the YCF data. It identifies an increase in the share of total investments accounted for by follow-on investments from Q1 2020 through to Q3 2020, with a particularly sharp increase between Q2 and Q3, followed by a drop in Q4 as new investments increased (Table 2).

Figure 3. New and follow-on investments



Source: LINC Scotland

Table 2. Follow-on investments involving business angels: 2019 and 2020 by quarter

	2019				2020			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
% of follow-on deals in which business angels participated	66.7	53.3	70	63.2	40.9	63	83.3	60
% of follow-on amounts in terms of total angel investment	66.6	76.3	78.6	76.1	54.7	76.6	98.9	53.9

Source: Calculated from YCF data.

The recovery in new investments in Q4 2020 could reflect three factors. First is the return to the market of entrepreneurs who had deferred seeking funding in the early months of the pandemic. Second is that angels were becoming more accustomed to the online environment for connecting with entrepreneurs. And third, as noted above, is the increased confidence of angels as their level of uncertainly declined. The increase in new investments in Q4 may also reflect the longer time taken to complete the investment process as a result of constraints on the ability of angels and entrepreneurs to meet face-to-face. Taking 2020 as a whole, new investments accounted for 25% of total investment activity, exactly the same proportion as in 2019 while the proportion of investment by value was only marginally lower in 2020 (25% cf. 27%).

Deals involving angel groups are typically 'bundled' (Mason, 2018), with angel groups investing alongside one or more other investors, including government venture capital funds, private venture capital funds and, less often, crowdfunding, incubators and accelerators and corporates (Table 3). Typically, there are three investors in deals in which angels participate. However, the number of co-investors dropped sharply in Q1 and Q2 2020 compared with 2019 before recovering in Q3 and Q4, although remaining below the 2019 figure. It seems reasonable to infer that this decline in co-investors will have been a further reason why angels

have increased the proportion of the amount that they invested in follow-on investments in the early stages of the pandemic. Disaggregating between new and follow-on reveals that the average number of investors increased in 2020 for new investments (+4%) while follow investments have decreased (-12%) (Table 4). The increase in the number of investors in new angel deals in Q2, Q3 and Q4 of 2020 is particularly significant and is consistent with the strategy of reducing risk of investing in an entrepreneur that they have not met by investing alongside other investors who have connections with entrepreneur. Investing alongside other investors also minimises risk because it reduces the amount that any individual investor invests in the deal.

Table 3. Percentage of co-invested deals with angels

	2019				2020			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	percentage							
Grant	0	0	0	0	9	7	0	5
Incubator/Accelerator	20	0	10	16	18	4	8	10
Bank	0	0	0	0	0	0	0	0
Crowdfunding	0	0	0	0	5	4	0	10
VC	60	20	25	32	18	22	33	29
Government	80	60	85	63	50	56	50	52
Corporate Venture	0	7	15	21	9	0	17	5

Source: Calculated from YCF data

Table 4. Average number of investors in deals in which business angels participated

	2019				2020			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Average number of investors in angel deals	2.50	3.60	3.05	3.47	2.82	2.78	3.00	3.15
Average number of investors in new angel deals	2.50	2.57	3.17	2.86	2.77	3.10	3.00	3.25
Average number of investors in follow-on angel deals	2.50	4.50	3.00	3.83	2.89	2.59	3.00	3.08

Source: Calculated from YCF data

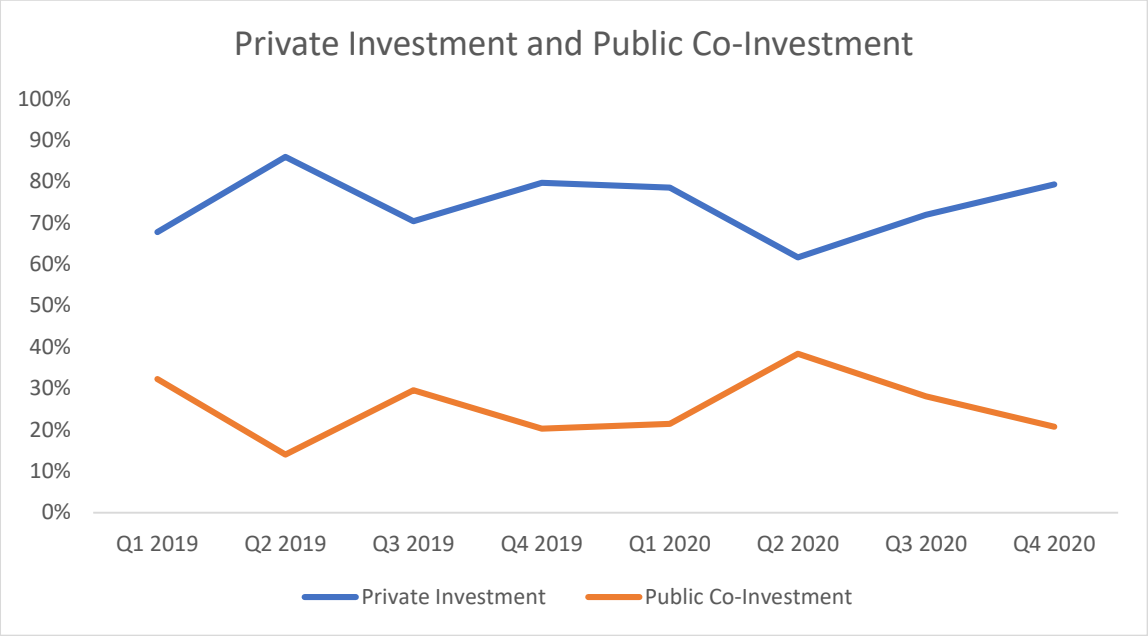
The public sector is the dominant co-investment partner of business angels (Table 3). The Scottish Government's Scottish Investment Bank (SIB) has three funds: the Scottish Seed Fund, Scottish Venture Fund (SVF) and the Scottish Co-Investment fund (SCIF). Both the SVF

and the SCIF invest with private sector partners. The SCIF invests alongside its accredited co-investment partners in qualifying deals.[10] These include both business angel groups and venture capital funds.[11] About 40% of LINC's member groups – the larger and longer established groups - are co-investment partners. These groups account for over half of the partners of the SCIF. In 2019 the public sector invested £1 for every £3.4 invested by LINC members, increasing to £1 for every £2.9 invested by LINC members in 2020.

Given the co-investment model it not surprising that public sector investment tracks trends angel investment (Figure 4). However, there are some deviations. Public sector investment recorded a much smaller decline in the amount investment from Q1 to Q2 2020 than business angels groups (-14.8% cf. -62.6%) but it continued to decline in both Q3 and Q4 2020 as angel groups increased the amount that they invested (although not the number of investments). Hence, public sector funds peaked at 38% of the total amount invested in Q2, falling back to 21% by Q4. The public sector therefore played an important role in maintaining liquidity in the market in the early stage of the pandemic with an average participation of 27% of the total investment. This becomes particularly evident when comparing to the significance of public sector investments in 2019 (maximum of 32% in Q1, minimum of 14% in Q2 and average of 24%) The public sector also tracked the increased focus of angel groups on follow-on investments, with the amount invested in new deals falling from Q1 through Q3 2020 (reaching to its minimum in Q3, accounting for just 4% of total public sector investment, compared with 9% amongst angels) before recovering in Q4 Figure 5). Moreover, further highlighting the importance the public sector in supporting the liquidity of the market in the early stage of the pandemic, they allocated 31% of their funds to new investments in Q2 compared with 20% by angels.

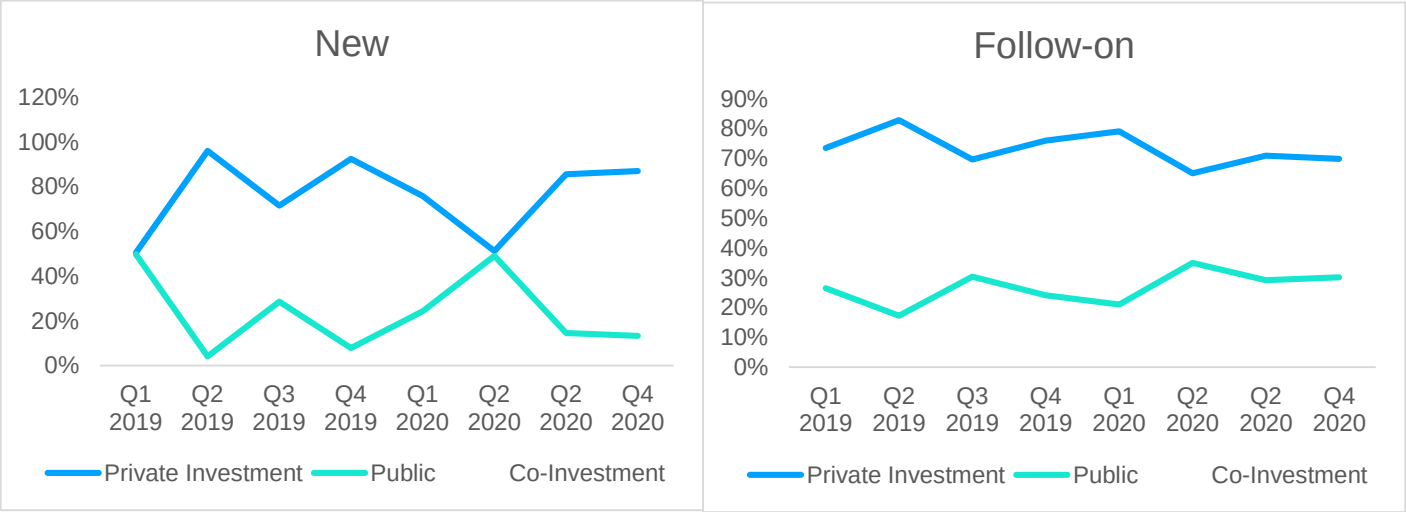
[10] Eligibility criteria include the following: significant presence in Scotland, meeting the EU SME definition, a deal size of between £20,000 and £10,000 (of which the SCIF will invest between £10,000 and £1.5m) and not operating in specific excluded sectors.
[11] https://www.scottish-enterprise.com/support-for-businesses/funding-and-grants/accessing-finance-and-attracting-investment/scottish-co-investment-fund

Figure 4. Amounts invested by LINC members and public sector co-investment funds



Source: LINC Scotland

Figure 5. Amounts invested in new and follow-on investments: LINC members and public sector co-investment venture funds



Source: LINC Scotland

YCF data – which covers a wider range of investors who are not co-investment fund partners – confirms that there was an increase in the number of angel deals that include Scottish

Government participation between Q1 and Q2 2020 (+4, +36%) followed by a sharp decline in Q3 (-9, -60%) recovering in Q4 (Table 5). The decline in the number of Government investments is consistent with the decline in angel investments in Q3 and its recovery in Q4, reflecting that the SCIF invests alongside its private sector investment partners and the Venture Fund also co-invests with private investors

Table 5. Angel investments involving the Scottish Co-Investment Fund

	2019				2020			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Number of deals involving business angels in which the Government participated	4	9	17	12	11	15	6	11
% deals involving business angels in which the Government participated	67	60	85	63	50	56	50	52

Source: Calculated from YCF data

Lastly, an additional way in which business angels can reduce risk is to invest in businesses that have been able to raise an earlier round of external finance. This would be seen as a positive signal. The proportion of investments made by business angels that had raised an earlier round of finance was higher in all quarters of 2020 compared with 2019 (year-on-year increase of 14 percentage points), with a particularly marked increase between Q2 and Q3 2020 (Table 6).

Table 6. Angel investments in deals that have raised earlier rounds of finance

	2019				2020			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Deals that have raised earlier rounds of finance (%)	83	67	80	84	91	81	92	90

Source: Calculated from YCF data

5. CONCLUSION

Business angels are critical players in the entrepreneurial ecosystem, funding companies at their seed, start-up and early scale-up stages. A decline in investing by business angels would therefore put at risk the speed and strength of the economic recovery from the coronavirus crisis. In contrast to the institutional venture capital industry, there is a lack of clarity on business angel investment activity since the onset of the coronavirus crisis, with evidence dominated by anecdotal evidence and investor surveys undertaken in the early stage of the crisis. Focusing on Scotland, which has a long-established and, in relative terms, large angel market, this paper utilises data on investments made during 2020 to offer a more robust picture of the impact of the coronavirus crisis on angel investment activity.

Drawing upon two sources of data on investments made by business angels in Scotland it is clear that business angels have continued to invest since the onset of coronavirus. Indeed, following a very active first quarter investment activity remained quite buoyant in the second quarter of 2020. However, there was a significant decline in the number of investments in Q3 although the amount invested actually increased. Investment activity stabilised in Q4. Looking at 2020 as a whole, investment activity was slightly lower to that of 2019 (-6% of deals and -17% in the amount invested). Significantly, the pandemic has resulted in angels focusing their investment activity on supporting their existing portfolios, and on businesses that have already raised at least one round of finance. New investments have declined in significance. And angels are also participating in deals with more co-investors, although this trend was apparent before the onset of the pandemic. These trends, especially when taken in conjunction with the decline in seed investments by venture capital funds (Beauhurst, 2021), point to potential problem for entrepreneurs seeking to raise their first round of angel funding. The developments that we identify here are fairly consistent with the anecdotal and survey

evidence that was being reported in Q2 and Q3 and with the limited statistical evidence from other countries.[12]

These investment trends exhibit a remarkable similarity to how both the Scottish and UK angel markets reacted in the aftermath of the Global Financial Crisis with angel investment exhibiting considerable stability in terms of both the number of investments and the amount invested and a marked shift to follow-on investments (Mason and Harrison, 2015). But whereas the recovery in investment activity from the GFC took around two years, evidence on angel sentiment suggests that it might be quicker on this occasion, reflecting the revision upward of economic growth forecasts (e.g. by OECD) as vaccine programmes are rolled out (Financial Times, 2021).

A further contribution of the paper is to highlight the shortcomings of investment data on angel investing which have typically been glossed over in previous quantitative studies. The first arises from how business angels are defined. As a membership organisation the LINC Scotland data only include investments made by its members, predominantly angel groups. The YCF data provides deal-specific information (company and, in most cases, investor names) and so gives researchers some discretion regarding how angels are defined but at the same time introduces subjectivity concerning what is defined as an angel investment. The ongoing evolution of angel investing with, for example, the emergence of angel side-car funds, the transitions of angel group membership from active to passive members and the evolution of informal angel groups into formal seed funds, brings further fuzziness to the definition of what is an angel investment to those already highlighted in the literature (Mason et al. 2019). The second limitation relates to the coverage of investment activity, with both sources heavily skewed to the 'visible' market comprising investments made by angel groups and prominent

[12] For example, the members of HBAN, the business angel association for the island of Ireland, reported that its members invested €59m in 59 deals in 2020, marginally down on 2019 (€16.8m in 66 deals) and significantly higher than in 2018 (€9.3m in 44 deals) (HBAN, 2021).

individual investors and in the case of the YCF data to deals that are publicly disclosed by investee companies. In summary, the availability of seemingly objective data on angel investments does not provide comprehensive coverage of angel investments even in the visible market nor does it solve the definitional difficulties.

Our analysis has implications for policy makers in Scotland and potentially elsewhere. The anecdotal evidence that suggests a decline in angel investing since the onset of the pandemic has prompted calls to introduce tax breaks for business angels or to enhance the generosity of the tax-breaks available in existing schemes. However, the evidence presented here - which indicates that there not been a collapse in angel investing- suggests that this is inappropriate, at least at this point in time. Nevertheless, there is scope for modifying some of the rules, notably the restriction to invest in ordinary shares and the 'closely connected' exclusion (to permit angels to work with the company prior to investing (e.g. founding angels: Festel and De Cleyn, 2013) to qualify). Rather, our evidence that business angels are concentrating their investments on follow-on investments to support their existing portfolio companies, along with evidence of a decline in seed investing by venture capital funds and an increase in the size of such investments, highlights the need for policy-makers to intervene to fill the emerging gap in first round funding, notably by expanding sources of non-dilutive funding such as grants and awards, and increasing the volume of seed and start-up investments by government investment vehicles. The evidence also highlights the importance of public sector co-investment funds in maintaining liquidity in the market, particularly in the early months of the pandemic. But because public sector funds are largely based on co-investment models this has meant that their investments have also become dominated by follow-on investments. The priority for Governments is therefore to ensure that the investments made by these vehicles do not automatically 'drift' to making larger and follow-on investments in line with the investments of their partners. In parallel with these interventions, the emphasis that angels place on knowing the entrepreneur before investing requires angel networks and platforms to work

more closely with the entrepreneurs that they promote to their investors in order to give them confidence that they know the entrepreneurs and their businesses well. But this imposes increased costs on these organisations which will be passed on to their investors (Rees-Mogg, 2021). Government should therefore consider supporting the operating costs of angel intermediary organisations. Without further interventions there is a real risk that entrepreneurs will be delayed in getting their innovations to market.

Finally, the study emphasises the need for the business angel research agenda to be informed by developments in the real world. Further research is still required to fully understand and measure the impact of covid19 on the angel market. First, there is a need to monitor angel investing during the Covid recovery phrase with evidence from angel surveys and from investment data. Has it recovered in volume terms? And what is the balance between new and follow-on investments? And in view of the widely expressed concerns about the adverse impact of the pandemic on the financing of women entrepreneurs (Barber, 2020; Wilhelm, and Mascarenhas, 2020) there is a need to monitor the gender breakdown of angel investments. Because of data availability our study focuses on the Scottish market, hence, it is important to measure the impacts of COVID19 in other geographic markets. Additionally, given the uneven geographical distribution of angels (which in the UK is concentrated in the so-called 'Golden Triangle' of London, Oxford and Cambridge: British Business Bank, 2020) to what extent has the recovery in angel investment activity occurred equally across all regions? Second, there is a need to identify any changes in the investment process. Specifically, do angels still require to meet entrepreneurs face-to-face before investing or are they making use of remote methods to undertake their investment appraisals? If so, how might this influence the deals that they reject and those that they invest in? And to what extent will the changes that they have made to their investment criteria in response to the uncertainty created by the pandemic be maintained? Are business angels increasing their dependence on other investors both in terms of sourcing deals and amounts invested? Additionally, have their co-investment preferences have

changed? For example, are angels more likely to invest alongside VCs and crowdfunding investors as a result of the pandemic. And finally, in view of the replacement of in-person pitches with virtual pitches (which angels groups indicate that they will continue post-Pandemic in conjunction with in-person pitches) to what extent will this result in a weakening in the localised nature of angel investing (Harrison et al, 2010)?

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Appendix 1 Percentage of deals by source of entrepreneurial finance reported by Young Company Finance

	Q119	Q219	Q319	Q419	Q120	Q220	Q320	Q420
Business Angels	21%	52%	59%	48%	56%	75%	44%	57%
Grant	0%	0%	6%	5%	5%	6%	4%	8%
Incubator/Accelerator	14%	3%	15%	13%	13%	8%	7%	8%
Bank	14%	3%	0%	0%	0%	0%	0%	5%
Crowdfunding	0%	3%	18%	3%	18%	6%	7%	8%
VC	38%	34%	24%	43%	26%	31%	37%	30%
Government	45%	59%	62%	50%	38%	56%	52%	43%
Corporate Venture	17%	10%	12%	20%	10%	6%	11%	8%
undisclosed	7%	3%	0%	3%	3%	0%	0%	5%
Total deals (n)	29	29	34	40	39	36	27	37

Note: It sums up more than 100% as some deals can have more than one type of investor (co-investment).