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The Relation Between Co-Investing and the Level of Competition in the Private Equity Market

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Abstract

The purpose of this study is to evaluate the relation between the co-investment activity and the level of competition in the PE buyout market. The sample used for this research consist of 5208 PE backed buyout deals. The distinction is made between co-investment, regular and consortium deals. The deals were completed between 1998 and 2017. The level of dry-powder capital is used as a proxy for competition on the PE market. By means of an OLS regression with Newey-west standard errors are the relations empirically studied. The empirical results show a positive relation between co-investment activity and the level of competition. The results show for the consortium and regular deal activity no relation. Even though the research findings are as stated. In this research, because of model limitations, the empirical findings will be interpreted as positive correlations between co-investment activity and competition and no correlations between regular and consortium deal activity and competition.

Keywords: Private equity, Buy-out, Co-investing, Competition, Dry-powder Capital

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1.Introduction

In the private equity (hereafter *PE*) market multiple developments co-move. Starting with the development of the asset class from a niche in the 1980s, to a well-established asset class that is increasingly present in institutional investment portfolios (Meuleman, Wright and Lockett ,2009; Braun and Stoff ,2016). It seems that as the market kept growing, so did the level of competition. The literature often links these two developments. (Espinoza, 2018; Sensoy, Wang and Weisbach, 2016; Wright, Pruthi, Amess and Alperoch, 2019). Another development in the PE market is the increase in cooperation between general partners (hereafter *GPs*) and external parties. Most popular form of cooperation are between two or more PE funds, also Consortium deals. Or co-investment deals where GPs allow LPs to invest directly in a target, instead of investing through the fund. This cooperation form got more popular in recent years (Fang, Ivashina and Lerner, 2015).

It seems as these developments are all linked. Previous research found that as the popularity of the asset class among investors rose because of the perceived higher returns, so did the number of new PE funds. What is more, the investment strategy of LBOs was copied by managers non-PE funds. Resulting in less buyout targets per buy-out market incumbent (Braun, Jenkinson and Stoff, 2016). These are factors that possibly contributed to the increase of competition on the PE market. And which seems to influence the return of the asset class. As Harris, Jenkinson and Kaplan (2014) found, in more recent years the returns are converging. Hinting the increased difficulty to maintain the historically higher returns. This may be a motivation for GPs to finding new ways to reap the promised returns for its LPs. This could be the reason why in recent years strong increase in the number of co-investment deals. Since co-investment deals requires the LP to pay less or no management costs. This lowers the costs associated with PE investing. What results in higher net returns for co-investors. This link between maturing market and competition has been researched. But the illustrated relation between competition and the number of co-investment deals have not. Researching this is interesting as research topic, as the literature so far only focused on motivation for GPs to offer such an investment opportunity to their LPs and whether or not there is any adverse selection present (Fang et al, 2014; Braun, Jenkinson and Schemmerl, 2020). By studying the direct relation between competition and the co-investment activity the external situation is assumed to be a critical factor for the increased interest in co-investment opportunities

in PE. This study will supplement the literature with an empirical analysis of the relation between the level of competition and the co-investment deal activity in the PE market, with the following research question:

Is there a relation between competition on the Private Equity buyout market and the co-investment deals activity?

To answer this research question, the study analyses the relation between the co-investment deal activity by PE funds in the UK buyout market with the level of dry-powder capital present, as the proxy for competition level in the PE market. Additional to the co-investment deal activity, this study also incorporates regular and consortium deals. This tells whether the observed relation between co-investments deal activity and competition are also present for other deal-types. The empirical results of this research find a positive correlation between the co-investment deal activity and the proxy for competition. Suggesting that there is indeed a link between competition and activity in co-investments. What is more, no correlation was found when testing the model for the alternative deal types, consortium and regular deals. This finding suggests that with increased competition on the PE market, the co-investment deal activity is more likely to react to this than are the regular and consortium deal types.

This study contributes to the existing literature on the practice of co-investing by GPs and LPs. Where existing research on co-investing focuses on reasoning by GPs to offer these deals and where there is no consensus (Braun et al., 2019; Fang et al., 2014). Other research focusing on the development of PE market, touches the topic of increased competition and new understanding between GP and LP (Wright, Pruthi, Amess and Alperovych, 2019).

The remainder of this study is structured as follows. Section 2 presents and discusses the literature relevant to this study. Hereafter, section 3 discusses the data sample and methodology used for this study. Section 4 presents the results of empirical tests. Finally, section 5 concludes and discusses any topics for future research.

2. Literature review

2.1 Maturing market

Two developments persisting in the PE market are the maturing of the market and the increased level of competition. Over the years, as popularity and the number of incumbents grew, the returns dwindled. According to existing literature its popularity can be attributed to the promise of high returns the LPs reap by investing in this asset class or the outperformance of it relative to other asset classes (Braun, Jenkinson and Stoff, 2017). Persistent outperformance of an asset class is a rarity; however, such statements are often made when discussing PE investment returns (Espinoza, 2018).

The maturing of the market and corollary to this, increase in competition. Can be attributed to multiple forces. Firstly, the perception of high PE investment returns sparked interest of investors, which attributed to the creation of new PE funds. This meant an increase in market participants and more competition for the buyout targets amongst GPs (Wright et al., 2019). Moreover, as Braun, Jenkinson and Stoff (2016) state; as the market matured and level of competition grew, knowledge on creating operational improvements to portfolio firms is becoming assimilated across PE funds and other buyout market incumbents. This can be attributed to, valuation techniques and financial engineering becoming more widely used as the GPs switch from fund to fund or creating a new fund themselves. This sharing of knowledge and the increase in market participants have made it more challenging in recent years for GPs to find the sought-after buyout targets. As the number of targets in the buyout market have not increased proportionally to the inflow of capital with the popularity of the asset class. Consequently, it has become more challenging for GPs to invest the raised capital, leaving the funds with more dry-powder capital than ever registered in previous years (Wright et al.,2019; Espinoza, 2018; Braun and Stoff, 2016). As GPs are forced to spend the committed capital, since holding it can be seen as an indirect cost of PE investing for the LPs (Braun & Stoff, 2016). The GPs are motivated to invest more aggressively, racking up the multiples and prices paid for targets (Sensoy, Wang, Weisbach, 2014; Espinoza 2018; Wright et al. 2018; Lopez-de-Silanes, Phalippou and Gottschalg, 2015). This, increase in demand for targets, make proprietary deals less common in the buyout market. As investment banks in the buyout sector respond to the new situation (Braun, Crain and Gerl, 2015). This all adds pressure to the already competitive playing field in which PE funds operate in.

2.2 Dry-powder capital increase

A phenomenon that has increased in recent years in the PE market and that has been in the limelight is the aforementioned dry-powder capital. In the context of the PE industry, this is the unused capital that is committed by the LPs, but not yet invested by the GPs of the fund (Braun and Stoff, 2016; Mckinsey report, 2019).

The increase of dry-powder capital held by PE funds is often linked to higher levels of competition corresponding to a more mature market. An example is a study by Braun and Stoff (2016) the authors focus on the deployment rate, which is the ratio of invested and committed capital of a fund. They find evidence that suggests that the decrease of the deployment rate for PE funds can be attributed to external drivers as increased M&A activity and increase in fundraising activities. The two forces behind deployment rate, according to the writers, are the maturing and more competitive PE market. As the deployment rate is a ratio for the amount of dry-powder capital held by a fund, these findings suggest a relation between increased competition in the PE market and the level of dry-powder capital in the market.

2.3 Co-investing

The co-investment deal type can also be described as the disintermediation of investments in PE. Where traditionally an LP would invest in the PE fund, the committed capital would be used by the GPs of the fund to invest in new targets and manage its current portfolio companies. This alternative method of investing entails GPs to invest alongside the LPs directly into a target (Fang et al., 2014; Braun et al., 2020). In the study by Fang et al. It was found that co-investment in their sample were substantially larger than typical in the portfolio of that particular GP.

2.4 Co-investing and LPs

An important advantage of co-investing for LPs is the decrease of management costs. Which are the costs associated with committing capital to PE fund. The decrease of investment costs has become more important in recent years (Braun and Stoff, 2016)). As, returns of private equity and public equity have been converging (Harris et al. (2016); Harris Jenkinson Kaplan (2014)). This increased pressure on private equity fee structures. The impact of management fees and carried interest payments on net returns is significant (Metrick and Yasuda, 2010; Phalippou, 2009). Making disintermediation of PE fund investing a method to compensate for the falling returns. With lower associated

costs co-investments present a way to potentially increase net returns (Braun et al., 2016). Another benefit of co-investing for LPs is the possibility that presents them to increase their exposure to companies or sectors. This may be driven by the belief that investors are able to spot attractive portfolio companies. Another benefit is the possibility it provides investors to engage their portfolio towards particular sectors that are otherwise difficult to access via public markets (Braun et al., 2016). Moreover, co-investing may strengthen and deepen the relationship with GPs. This motivation may be important to LPs in case of an over scribed fund. For such funds limited number of investors are provided with the opportunity to invest in the fund. This is happening more often (Espinoza ,2018; Braun et al., 2020). Lastly, by cooperating closely with GPs the LP could acquire knowledge on how to perform due diligence, structure deals and disciplining of the GPs investment approach. Since, normally a PE fund is a "blind pool" of capital for the LP. Co-investing gives them the possibility to get insight into specific skills of the GP. They could use these skills later to inform themselves about whether to commit capital to future funds (Fang et al., 2015).

2.5 Co-investing and GPs

The reasons for GPs to offer co-investment opportunities is not studied widely yet. The scientific literature on this topic is limited to market surveys under PE firms offering co-investment deals and two scientific studies. One study by Braun, Jenkinson and Schemmerl (2020) focusses on the reasons why GPs would offer co-investment deals. By means of a like-for-like comparison between co-investment deals and normal return of single deals by GPs. The other study on this topic is by Fang, Ivashina and Lerner (2015). They focus on the difference in return between direct investing by the investor in the market and the return on co-investment deals with GPs. The findings of the study by Fang et al. (2015) suggest that LPs would have higher returns when investing in the market themselves, than by committing to co-investments. A reason they give for this finding is adverse selection by the GPs; they would present more risky investments as co-investment opportunities to the LPs to lessen their own exposure. This conclusion is in stark contrast with the findings by Braun et al. (2020) and does not reason with findings on the reputational importance of a PE fund for its existence. The research by Braun et al. (2020) suggest the main motivations behind offering co-investment opportunities to its LPs are linked to the size of the deal relative to the fund size and the age of the fund; they

don't suggest any adverse selection in co-investment deals offering as do Fang et al. (2015) suggest. Rather GPs use co-investment as a method for limiting single-deal exposure. This suggests that GPs rather create good long-term reputation than acting opportunistically by offering less attractive deals to LPs and in that way reduce their exposure to deals that are least attractive.

The reason for a GP to offer co-investment that is linked to relation building, entails that by co-investing the GP and the LP get to work closer together and having more interaction. Which could help with building stronger relation (Braun et al., 2015). This may be benefitting for the PE fund in the case of future fundraising. As research shows fundraising has become increasingly more competitive (Braun and Stoff, 2016). Relations between GPs and LPs have also become more important. This could especially be the case for young funds, with less strong track record. Or when funds are likely to be depleted of capital, co-investing creates the possibility to attract capital to do a deal that would otherwise not be because of the lack of capital left in the fund. And lastly, a reason for GP to engage in co-investing could be to involve a sector specialist in a deal. If the GPs miss certain knowledge or skills, co-investing gives them the opportunity to involve partner with more experience or knowledge.

2.6 Co-investing and Moral Hazard

Characteristic for investing in PE is the lack of transparency. Traditional method of PE investing, entails the GPs to select targets and manage the portfolio firms with very little involvement of LPs. This lack of transparency gives rise to questions of moral hazard. The issue of moral hazard has also been raised for co-investing deal selection. As it is not clear why certain targets are offered as co-investments. This question was researched by Fang et al (2014) and again by Jenkinson et al. (2019); reaping contrasting findings. Questioning if there was any adverse selection in co-investment deal selection. No consensus yet was established.

Another possible moral hazard issue linked to co-investing may be the actual involvement of the co-investor. In a study by Greenberger (2007) it is stated that co-investors may be split into different groups: active and passive co-investors. Where passive investing group has minimal involvement in the transaction and management of the portfolio company. The active co-investors are characterized by investors that obtain adequate information, audit rights and reporting rights to have sufficient information

about the co-investment. The proper sharing of information is essential for the active co-investor to make intelligent decisions concerning their rights. This last group may be more prone to moral hazard than passive group. Since, the ideal active co-investors have the back-office capacity to manage their stake in the co-investment. When parties lack this capacity, problems of misinformation may arise.

Other moral hazard issues that may arise, involve the deal or target size. Since co-investments also mean the GPs need to invest less equity, as part of the sum is paid by the LPs that are co-investing. In effect would entail investments of bigger size or higher priced deals. Multiples paid for targets have got increasingly high. Which in effect result in higher price paid. This does not necessarily mean that the worth of the company is also higher. So, risks of overpaying increase. Other risks with co-investment linked to moral hazard is the GP could invest in too big companies. By co-investing the equity ticket decreases, enabling them to acquire bigger targets. In a study by Fang et al. (2015) they showed that the co-investment investments were substantially bigger than the non-co-invest portfolio company. This could mean the GP would manage portfolio company bigger than the fund is capable of managing. Which could lead to mismanagement because of the lack of knowledge and capacity.

A last possible moral hazard issue, could be the amount of exposure a fund desires to have towards a certain sector. In the case for LP it is straightforward. For a GP however, this could impose additional risk to the portfolio of companies. Since one could reason that in good outcome more upside potential but also more downward when less good sector performance.

2.7 Relation between competition and co-investments

The developments and phenomena described thus far are the maturing market with increased level of competition and co-investment deals in the PE market. These may be linked by looking at the connection between the level of competition amongst GPs and other market participants in the buyout market and the performance of PE funds. A study by Braun et al. (2016) on this topic finds evidence for persistent performance during periods of low competition, but found no evidence for performance persistence in high competition periods. A study by Sensoy, Wang and Weisback (2014) found similar results. The paper states that the LPs who were early PE investors, and founded relations

with successful GPs, reaped lower returns from these connections as the PE market is maturing and level of competition in recent years increased. The competition was relatively low in the early investment years compared to more recent years of higher competition, also the persistent performance is present in earlier years in contrast to the more competitive market in recent years, where no evidence was found for this higher performance. The findings of the studies by Braun et al. (2016) and Sensory et al. (2014), are in line with the observation of the previously described trends in the PE sector. With the increased competition, as PE market matured, became more difficult to find the sought-after deals to reap the wanted returns. The findings from the studies suggest that the increase in competition on PE market affected the returns of such funds. As stated before, corollary to the increase in competition, the number of co-investment deals and the interest for such have increased (Preqin report, 2015). These developments show some logical path. Since co-investment deals serve as a way for LPs to lower their investment costs and in effect better the net-returns. Incorporating these deals in times of higher competition where it is more difficult to get higher returns. This leads to the theory that the increased competition of the maturing PE market may have encouraged the increase in co-investing deals. As returns are more difficult to get so costs issues for LPs and GPs get increasingly important. Making them more in favor of co-investing. Hence:

Hypothesis: There is no relation between the co-investment deal activity and the level of competition in the private equity buyout market.

The alternative of this hypothesis being, that there is a relation between the level of competition and the co-investment deals activity. This could mean that other considerations by LP and GP affect the decision to engage in co-investment.

3. Data and methodology

3.1 Sample construction

The sample consists of data on deal amount at certain points in time. This sample is extracted from Zephyr and include all completed and confirmed deals between January 1997 and December 2018. More specifically, the deals in the sample are selected on the basis of several criteria. The acquirer is a UK PE fund and the deal has to be an

institutional buyout. This is defined by the database as a deal where the PE party acquired 50% or more stake in the target company. This included deals where the PE is the parent of the acquirer that obtained the 50% or more stake in the target company. When filtering the data further, only the deals where one or more of the acquirers are a PE fund directly are added into the analysis. Otherwise the deals could be add-ons of existing PE portfolio companies, which is outside the scope of this research. From here, each deal was labelled as having single acquirer or multiple acquirers. For the instances where multiple acquirers were involved in the deal the distinction was made between: consortium or co-investment deals. The definition for co-investments in the literature is a transaction where the co-investor invests in a particular company on a side-by-side basis with a PE fund, in which the co-investor often is a LP (Greenberger (2007). Deals where multiple PE funds are acquirers are labelled as consortium deal. This in accordance with the definition stated by Lerner (1994). To make sure all deals from 1997 to December 2018 were labelled correctly each deal participant has been checked for its activities and when unclear, news on the specific deal has been checked together with the corresponding company profiles. In order to decide on the nature of the deal. This resulted in a data sample on PE deal activity by UK PE funds; with date of completion on deal, country and industry info on target and deal type labelling. The distribution of the sample according to these are depicted in tables 2 and 3.

The total deal sample consisted of data from 1997 until 2018. However, as deal information from 1997 and 2018 lacked data points these years were excluded from the sample. This resulted in a total sample amount of 5208 deals. From this total sample 4576 are regular deals where there is one PE involved in the investment. The numbers of consortium deals are 311 and co-investment deals amount to 321. In Table 1 panel A the distribution of deals over the types of deals per year are presented.

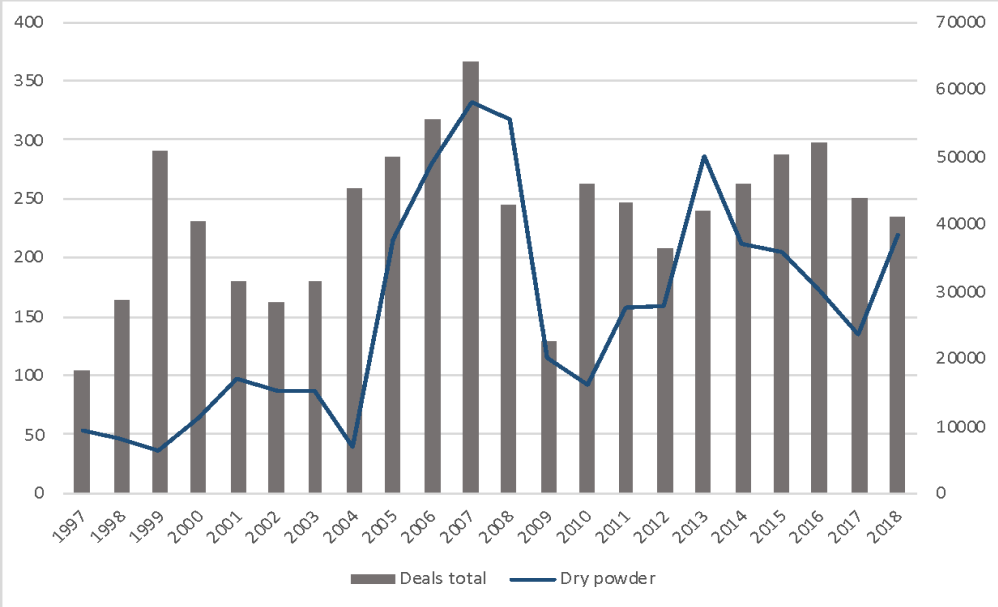
Table 1: Distribution by year of completion
Panel A

	Co-investment		Consortium		Single deal		All deals	
Year	N	%	N	%	N	%	N	%
1998	6	1.86	15	4.66	144	3.09	165	3.11
1999	10	3.10	29	9.01	251	5.38	290	5.46
2000	7	2.17	22	6.83	202	4.33	231	4.35
2001	1	0.31	14	4.35	165	3.54	180	3.39
2002	1	0.31	9	2.80	153	3.28	163	3.07
2003	3	1.55	12	6.21	165	5.47	180	5.28
2004	3	0.93	30	9.32	226	4.84	259	4.88
2005	14	4.33	21	6.52	250	5.36	285	5.37
2006	20	6.19	21	7.76	276	5.92	317	5.97
2007	30	9.29	19	5.90	318	6.82	367	6.92
2008	16	4.95	11	3.42	218	4.67	245	4.62
2009	7	2.17	4	1.24	118	2.53	129	2.43
2010	12	3.72	9	2.80	242	5.19	263	4.96
2011	9	2.79	14	4.35	224	4.80	247	4.65
2012	14	4.33	16	4.97	179	3.84	209	3.94
2013	20	6.19	10	3.11	209	4.48	239	4.50
2014	32	9.91	9	2.80	222	4.76	263	4.96
2015	32	9.91	13	4.04	243	5.21	288	5.43
2016	35	10.84	9	2.48	254	5.44	298	5.60
2017	29	8.98	8	2.48	213	4.56	250	4.71
Total	**321**	**100**	**311**	**100**	**4576**	**100**	**5208**	**100**

To test the hypothesis of this study the deal sample is structure in quarterly data. Showing per quarter the amount of regular, co-investment and consortium deals. This data is linked to quarterly PE dry-powder capital data from Thomson One database. More specifically the module focusing on PE. In the extraction of the data the time frame was from 1997 until 2018.

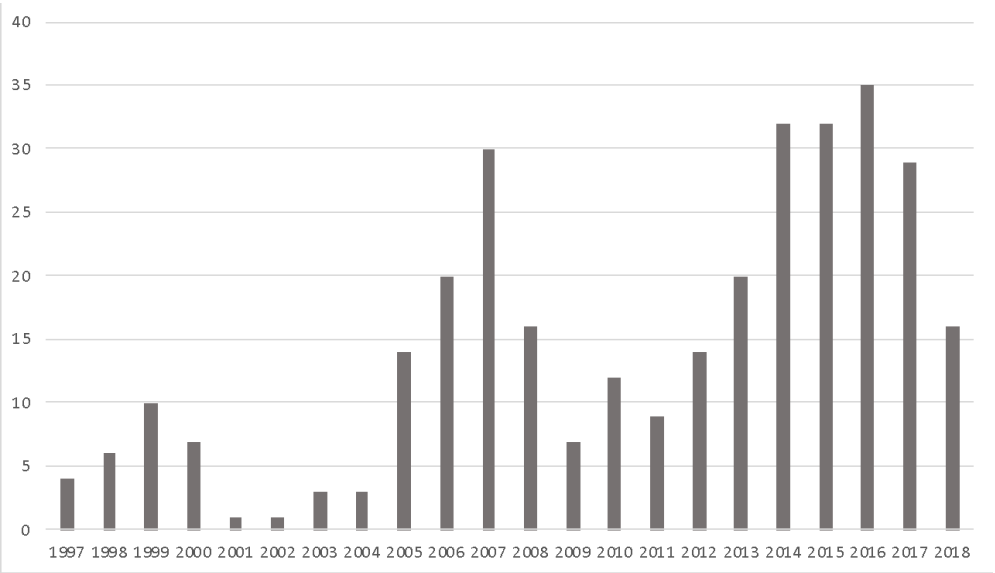
3.2 Sample description

The data in table 1 panel A is visualized in graph 1. The volume of deals with PE involvement is visualized with the level of dry-powder capital held by the UK PE funds per annum. The flow shows periods of strong increase and decrease of deal activity. Suggesting PE deal activity is sensitive to effect of the market. As moments of financial distress, as 2007 financial crisis, display strong increase of both deal activity as well as dry-powder capital.



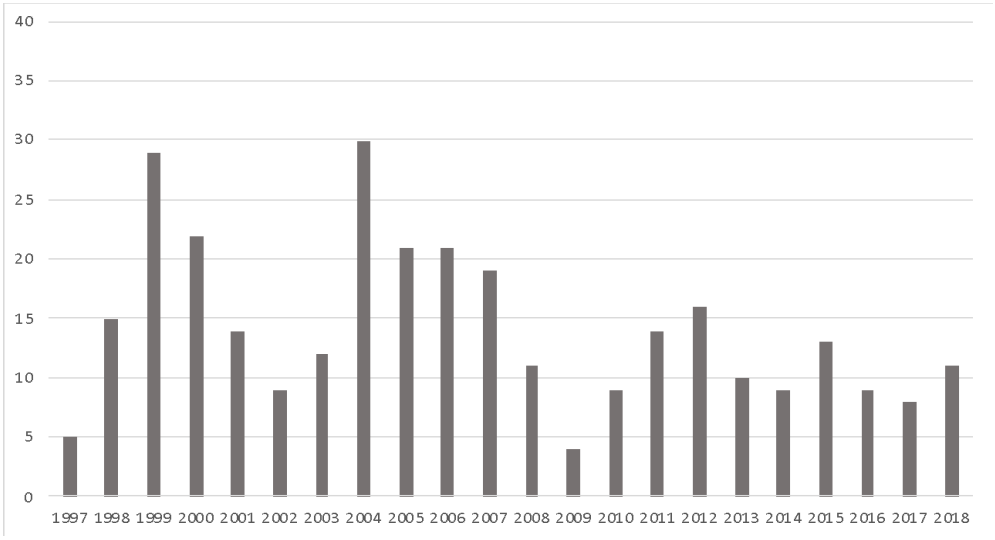
Graph 1: Total deal and dry-powder capital volume

When looking at graph 2, the total flow of co-investments is visualized with peak volumes similar to total deal volume. What becomes clear is the upward movement of volume of co-investment deals over time. Suggesting increasing popularity of this particular investment structure.



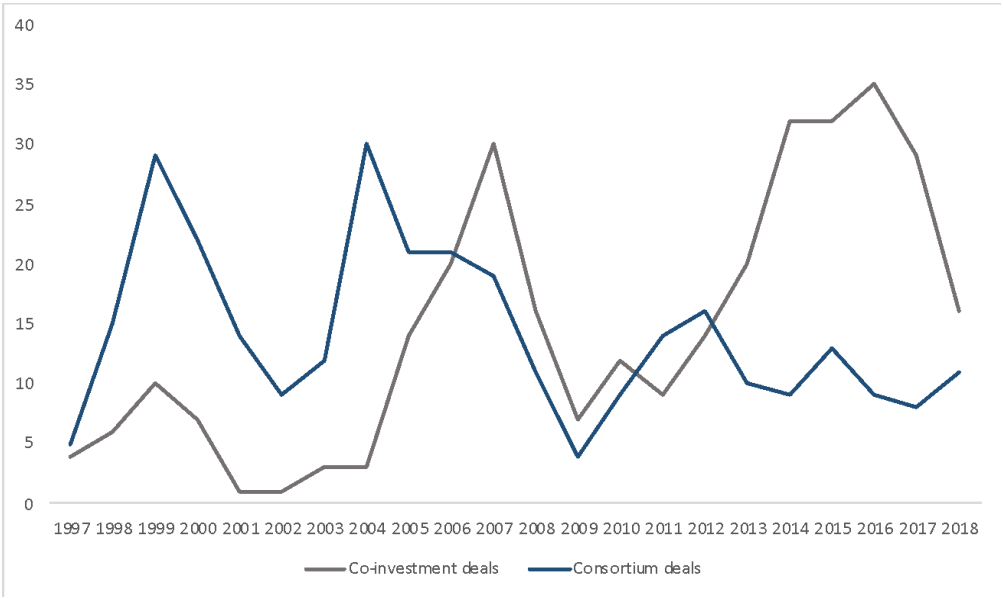
Graph 2: Distribution co-investment deals

When assessing graph 3, consortium deal flow, the opposite of co-investment trend is seen. Over time the deal activity of consortium deals overall decreases. Which might hint the decreasing interest in the structure.



Graph 3: Distribution consortium deals

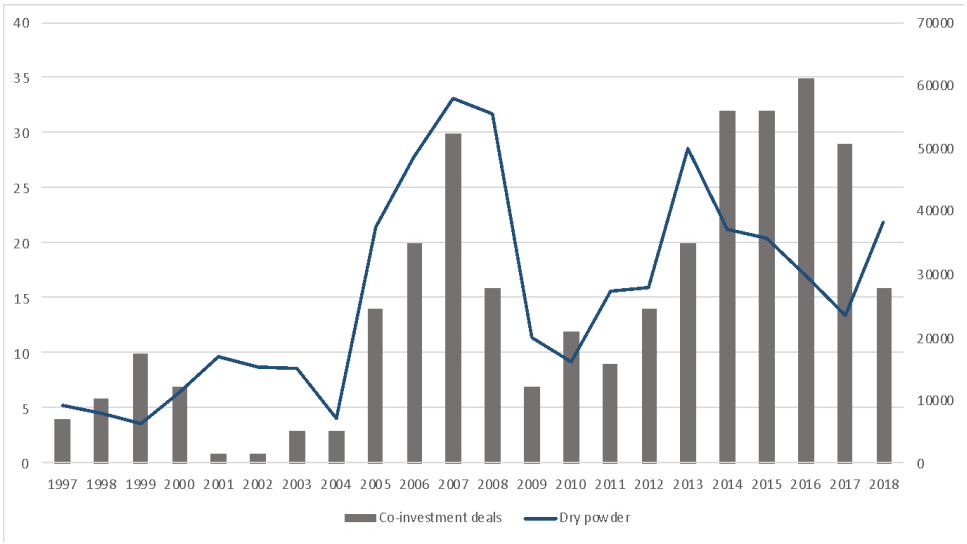
The described flow of the two investment structures becomes even more apparent when analyzing graph 4. Here the yearly number of co-investments are visualized against consortium deals per year over the sample period. The graph shows that from 2005 onwards in almost all years thereafter, except around 2011, there were more co-investment deals performed than consortium deals are.



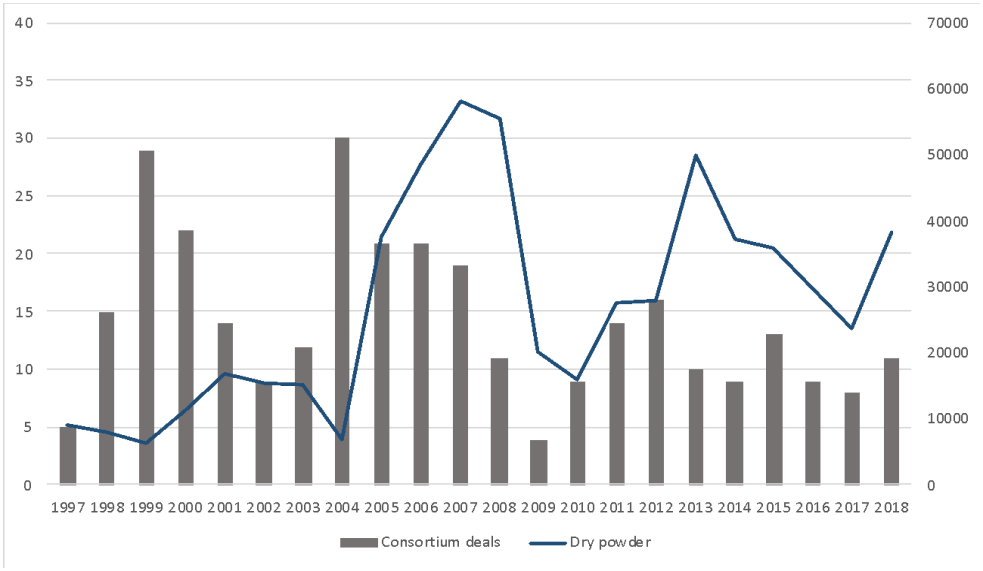
Graph 4: Co-investment and consortium deal flow

The level of dry-powder capital in the UK market also shows a rigid walk. But overall it displays an upward trend over the sample years (Graph 1). What is more, from the graph it is visible that the volume of dry-powder capital occasionally shows unexpected walk. One would expect to see low dry-powder capital levels when deal activity by PE funds is

high and high dry-powder capital levels when deals activity is low. However, the years 2006, 2007 and 2013 show both high levels of deals and high levels of dry-powder capital. When looking at dry-powder capital levels against co-investment activity (Graph 5); it shows a different pattern. The levels of co-investment deals and dry-powder capital have a more similar walk than is the case for regular or consortium deals (Graphs 1 & 6). The last deal type displays a lag, which is less apparent at co-investment deal sample.



Graph 5: Co-investments and dry-powder capital volume



Graph 6: Consortiums and dry-powder capital volume

The deal sample corresponding to this study also provides information on the country of origin of the target's companies. Table 2 shows this distribution. From this overview it shows that for co-investing deals, most targets are from UK (33.64%) followed by the US

(12.15%), France (9.35%) and Germany (8.10%). For single and consortium deals the distribution differs. There the majority also comes from the UK but there are followed by other EU countries.

Table 2: distribution by country target

	Co-investment		Consortium		Single Deal		All Deals	
Country	N	%	N	%	N	%	N	%
Austria	1	0.31	4	1.29	12	0.26	17	0.33
Belgium	5	1.56	4	1.29	34	0.74	43	0.83
Switzerland	4	1.25	2	0.64	39	0.85	45	0.86
Cyprus	0	0.00	0	0.00	1	0.02	1	0.02
Germany	26	8.10	36	11.58	221	4.83	283	5.43
Denmark	6	1.87	2	0.64	62	1.35	70	1.34
Spain	14	4.36	16	5.14	110	2.40	140	2.69
Finland	5	1.56	2	0.64	40	0.87	47	0.90
France	30	9.35	45	14.47	171	3.74	246	4.72
Great Britain	108	33.64	86	27.65	3018	65.92	3212	61.65
Greece	0	0.00	1	0.32	4	0.09	5	0.10
Gibraltar	0	0.00	0	0.00	2	0.04	2	0.04
Ireland	3	0.93	1	0.32	30	0.66	34	0.65
Italy	17	5.30	14	4.50	116	2.53	147	2.82
Luxembourg	2	0.62	2	0.64	8	0.17	12	0.23
Monaco	1	0.31	0	0.00	1	0.02	2	0.04
Malta	1	0.31	0	0.00	2	0.04	3	0.06
Netherlands	9	2.80	16	5.14	87	1.90	112	2.15
Norway	2	0.62	3	0.96	59	1.29	64	1.23
Portugal	0	0.00	0	0.00	5	0.11	5	0.10
Sweden	7	2.18	16	5.14	135	2.95	158	3.03
Russia	0	0.00	0	0.00	10	0.22	10	0.19
United States	39	12.15	32	10.29	166	3.63	237	4.55
Canada	5	1.56	1	0.32	19	0.42	25	0.48
South America	1	0.31	0	0.00	11	0.24	12	0.23
Africa	6	1.87	6	1.93	19	0.42	31	0.60
East Europe	5	1.56	7	2.25	62	1.35	74	1.42
Asia	8	2.49	3	0.96	36	0.79	47	0.90
Balkan Countries	1	0.31	2	0.64	10	0.22	13	0.25
Middle East	8	2.49	5	1.61	21	0.46	34	0.65
Caribbean	2	0.62	2	0.64	7	0.15	11	0.21
Anzac	4	1.25	1	0.32	19	0.42	24	0.46
unclassified	1	0.31	2	0.64	39	0.85	42	0.81
Total	**321**	**100**	**311**	**100**	**4576**	**100**	**5208**	**100**

There is also information on the industry of the target, which is displayed in table 3. Here is shown that for all deal types the targets are mostly active in manufacturing,

information and communication industry. No difference over the structure types can be observed here.

Table 3: Distribution by target industry

	Co-investment		Consortium		Single deal		All deals	
Industry	N	%	N	%	N	%	N	%
Agriculture, forestry and service activities	0	0.00	0	0.00	10	0.22	10	0.19
Mining and quarrying	5	1.56	4	1.29	30	0.66	39	0.75
Manufacturing	88	27.41	96	30.87	1314	28.72	1498	28.76
Electricity, gas, steam, air conditioning supply	11	3.43	5	1.61	101	2.21	117	2.25
Water supply, sewerage, waste management and remediation activities	5	1.56	6	1.93	61	1.33	72	1.38
Construction	6	1.87	4	1.29	114	2.49	124	2.38
Wholesale and retail trade, repair of motor vehicles and motorcycles	30	9.35	43	13.83	489	10.69	562	10.79
Transportation and storage	13	4.05	8	2.57	112	2.45	133	2.55
Accommodation and food service activities	12	3.74	9	2.89	222	4.85	243	4.67
Information and communication	46	14.33	71	22.83	596	13.02	713	13.69
Financial and insurance activities	19	5.92	10	3.22	265	5.79	294	5.65
Real estate activities	3	0.93	5	1.61	50	1.09	58	1.11
Professional, scientific and technical activities	17	5.30	14	4.50	278	6.08	309	5.93
Administrative and support service activities	15	4.67	15	4.82	285	6.23	315	6.05
Public administration and defense, compulsory social security	1	0.31	0	0.00	4	0.09	5	0.10
Education	0	0.00	1	0.32	54	1.18	55	1.06
Human health and social work activities	16	4.98	9	2.89	219	4.79	244	4.69
Art, entertainment and recreation	7	2.18	6	1.93	97	2.12	110	2.11
Other service activities	2	0.62	0	0.00	24	0.52	26	0.50
Unclassified	25	7.79	5	1.61	251	5.49	254	4.88
Total	**321**	**100**	**311**	**100**	**4576**	**100**	**5208**	**100**

3.3 Methodology

This study focuses on the relation between the activity in co-investment deals and the level of competition in the PE market. In order to analyze this relation this study tested the hypothesis by the following specifications*:*

(1) $Ratio\ Dealtype_{it} = \alpha_i + Drypowder_t\ \beta + \varepsilon_i$

(2) $Ratio\ Dealtype_{it} = \alpha_i + Drypowder_t\ \beta + X_2\beta_2 + \cdots + X_n\beta_n + \varepsilon_i$

(3) $Ratio\ Dealtype_{it} = \alpha_i + Dummie\ DP(High)_t\ \beta + \varepsilon_i$

(4) $Ratio\ Dealtype_{it} = \alpha_i + Dummie\ DP(High)_t\ \beta + X_2\beta_2 + \cdots + X_n\beta_n + \varepsilon_i$

The model specifications represented above consist of the alpha, which represents the intercept of the model. The variable beta stands for the regression coefficient of the explanatory and control variables. The epsilon indicates the white noise, or disturbance, term of the model. In the case of a perfect relation between the deal type and the independent variables of the model this error term would equal zero. The subscript "i" represents one of the possible deal types specified in this study. The subscript "t" represents the quarterly year time period.

Table 4 represents the summary statistics of all dependent and independent variables used for this study. The dependent variable in this study represents the activity of the deal types. These deal types are co-investment, consortium and regular deals. The data sample consist of the amount of each deal type per year quarter. The dependent variable is reformulated as a ratio of the total, this way the amount of deals is less linked to money spend. As with more money available for investments, there will be more deals. The ratio of co-investment deal activity runs from 0 to 0.047. The ratio for consortium deal activity fluctuates from 0 to 0.032. And the normal deals activity ratio is between 0.003 and 0.019. The independent variable of this study is the level of dry-powder capital, which caters as the proxy for the level of competition in the UK PE market. This is incorporated in this study in two ways. The first in the natural logarithm of the dry-powder capital level in the market. As taking the natural log of this variable fitted best to the data. To also take into account the effect of different levels of competition on the activity of different deal types. The dummy variables high- and low-level dry powder capital are incorporated in the specifications.

Table 4: Summary statistics

Table 4 shows the summary statistics of the variables, dependent and independent, of this study. The dependent variable of deal type Co-investment ratio$_t$, Deal ratio$_t$ and Consortium ratio$_t$ are the total deals of a specific type divided by the total number of such deal type in the sample. The independent variables consist of natural logarithm of total dry-powder capital Other independent variables are a dummy variable that equals 1 when the level of dry-powder capital total in a period is High, e.g. >30.000. The dummy variable equals 0 when dry-powder capital total in a period is Low, e.g. ≤30.000. The data underlying has been winsorized for 1% and 99%.

Panel A: Dependent variables

	N	Mean	S.D.	Min	Max
Co-investment ratio$_t$	88	0.011	0.011	0	0.047
Deal ratio$_t$	88	0.011	0.003	0.003	0.019
Consortium ratio$_t$	88	0.011	0.008	0	0.032
Panel B: Independent variables					
	N	**Mean**	**S.D.**	**Min**	**Max**
Ln (Dry-powder capital)	88	9.302	0.868	6.509	10.751
Dummy High Dry-powder capital	88	0.227	0.421	0	1
Dummy Low Dry-powder capital	88	0.772	0.421	0	1
Panel C: Control variables					
	N	**Mean**	**S.D.**	**Min**	**Max**
GDP Growth	88	0.009	0.016	-0.033	0.035
Ln (Capital raised)	88	8.659	0.918	6.509	10.402
Interest rate UK quarterly (%)	88	3.816	1.603	0.841	7.402
CPI UK quarterly	88	1.989	0.828	0.300	4.500

To test the hypothesis this study uses the OLS regression model. This means to research the effect of a change in the independent variable has on the dependent variable, while holding the other regressors constant. For this study this means the effect a change in dry-powder capital level, or competition, has on the ratio of specific deal type activities. The OLS regression model is a statistical estimation method that minimizes the sum of squared residuals between the regression line and the observed data points (Stock and Watson, 2012). The error term, or disturbance, incorporates all the factors that affect the differences between average test score and predicted values of the population regression line. Meaning that the error term contains all factors besides the independent variable that determine the value of the dependent variable.

A possible issue associated with measuring economic and financial data is omitted variable bias. This entails the dependent and independent variable also reacting to omitted variables present in the error term. To ensure the testing of the hypothesis is not affected by this bias, the specifications (2) and (4) also incorporate control variables. It

permits estimating the effect on the dependent variable of changing one independent variable while holding the other regressors (control variables) constant. It provides a way to isolate the effects on dependent variable.

The control variables used in the analysis are GDP growth, Capital amount raised ,UK quarterly interest rate and Inflation rate. In order to incorporate any effect of economic up or downturn on the co-investment deal activity the control variable GDP growth has been incorporated. For this control variable, the UK GDP growth was chosen since this study focusses on UK PE funds. Also, as table 2 depicted, the majority of targets the UK PE funds acquire are from the UK. The data on UK quarterly GDP levels is extracted from the databank of the Bank of England. After which, it was converted to a growth rate:

$$(GDP_t - GDP_{t-1})/(GDP_{t-1})$$

Another control variable is the inflation rate. Which in this study is represented by the CPI. This is defined as the quarterly growth of the consumer price index of all items in the UK. This data was extracted from the main economic indicators OECD databank. The next control variable used in this study is the UK long term interest rate quarterly data. extracted from the OECD databank. And lastly, the control variable total raised capital by UK PE funds is added. This data was extracted from Thompson1. By incorporating this control variable, it is attempted to control for any effects of periods of high and low fundraising by PE funds.

The data sample used to measure these effects are time series. A common issue with time series data are structural breaks that result in large outliers. These outliers can distort the effect measured by the OLS regression. To ensure the measured effect is not affected by the strong outliers the data set is winsorised (1%). Large outliers by structural breaks in this time series data, seems to be especially located around periods of economic and financial turbulence. Which is shown in figure 1. In the year 1999, around 2007 and later 2016 are in line with the timing of the dotcom bubble, the financial crisis and the European sovereignty crisis.

To ensure the OLS regression with multiple variables reaps unbiased and consistent regression coefficients, a set of assumptions needs to hold. The conditional distribution of the error term given the independent variables has a mean of zero. Secondly, the data needs to be identically and independently distributed random variables. next, any large outliers are unlikely. And lastly there is no perfect multicollinearity (Stock and Watson, 2012). The first assumption, that factors contained

in the error term are unrelated to the variables in the model. This is shown for the data set through the correlation matrix in table 8 in appendix. Where is shown that the correlation between the independent and control variables weak for all variables but the amount of raised capital. This will be incorporated when assessing the OLS regression results. is present however not strong. The first assumption also implies the sample is randomly assigned, however this for observed data in the best case this may be as if (Stock and Watson, 2012). The second assumption entails that the dependent and independent variables are independently and identically distributed across the observations. In the case of this study, where all the data is collected from databases it could be possible some bias may arise as result of violation of i.i.d. assumption. For this reason, the distribution of the errors will be tested. The third assumption holds when large outliers are unlikely. As mentioned previously with time series data there may be structural breaks that may distort the regressions. For this reason, the main outliers are winsorized. Furthermore, the outliers observed in the data sample are can all be explained. It was decided for this reason and to circumvent any missing sample data to winsorize and not to exempt the data from the sample. Lastly, it is assumed there is no perfect multicollinearity. To check if the added variables help the tests and not distort them there is tested for no perfect multicollinearity or strong multicollinearity. This means the correlation matrix, table 8, between the variables of the research. The matrix shows no strong or perfect multicollinearity between the added variables, except for the control variable capital raised. For the regression coefficient to be unbiased and consistent there needs to be no perfect multicollinearity.

Next to the assumptions for unbiased and consistent OLS regression coefficients, there are two other probable issues that may arise when working with time series data samples. The first is heteroskedasticity. This is tested by means of the Breuch-Pagan statistical test. Of which the null-hypothesis assumes constant variances, homoskedasticity. The tests, as depicted in table (13)-(15), show there is indeed heteroskedasticity. The other issue that may arise with testing through time series data is serial correlation. As the value of the dependent variable is often correlated with its value in the following period. Testing this assumption through Woolridge Test. This has the null-hypothesis that there is no first order autocorrelation. The output of the Woolridge test, as presented in tables (10)-(12), suggest autocorrelation. Because there is autocorrelation and heteroskedasticity the Newey-west standard errors are used for

the OLS regressions. These ensure consistent estimates even though there is autocorrelation and heteroskedasticity.

This study attempts to establish if there is a link between increased competition and co-investment deal activity. It is chosen not the to test causality, as you need a controlled experiment for this. Which in financial and economic research may be challenging. Especially when working with time series data. The risk of endogeneity of the model is important here. Endogeneity can transpire from omitted variable bias, measurement error or simultaneity. Especially since using time series economic data that also incorporate moments in time of financial distress, it is impossible to isolate the effect from competition. The use of a proxy for competition enforces this even more. Although previous research suggests the two forces, competition and dry-powder capital, are closely linked it is not perfect. For this reason, in this study no causal implications will be made. Lastly, the external validity of this study, which assesses if its inferences and conclusions can be generalized from the population and setting studied to other populations and settings (Stock and Watson, 2012). The population of interest is the PE market and the population studied is the UK PE market. Because of the limitations of this study, generalizing the findings to the complete PE fund populations is not possible.

4. Results

The regression results of the analyses executed on the relationship between level of competition and co-investment deal activity are depicted in table 5 for all model specifications. The tables 6 and 7 represent regression results for the test on the relations between consortium and regular deals with the level of competition.

Starting with the research hypotheses to test for any relation between activity in co-investment deals and the competition level over the sample period. For table 5 panel A the regression results for model specifications (1) – (3) suggest there is evidence to suggest there is a significant effect between the co-investment deal activity and competition. For specification (4) however, this outcome is not registered. This shows that when the amount of capital raised is added to the regression there is no effect between dry-powder capital and co-investment deal activity as earlier represented by (3). Which could mean the correlation between co-investment activity and competition is less strong as it this with raised capital. The correlation matrix Table 9, indeed shows this strong relation. When reviewing table 5 panel B, a similar finding is shown. For all

specifications (5) – (8) it depicts a significant positive effect between the co-investment activity and high level of dry-powder capital. These results suggest that indeed when dry-powder capital levels are high, co-investment deal activity has also increased. These findings however, have to be interpreted with caution as with financial and economic observed time series data it is difficult to generalize or speak of any direct relations. For this reason, it can be stated that there is positive correlation between competition and the co-investment deal activity. Although, this is not a relation directly it is however in line with existing research. As the research by Braun et al. (2016) stated that with more competition on the PE market the cost structures become increasingly more important. Motivating more LPs to look for methods of investing where there are relatively lower costs associated.

Table 5: Regression results Co-investment deal

The table depicts the regression results of the analyses testing the relationship between co-investment deal and competition for the PE buyout market. The dependent variable is the co-investment ratio, which depicts the co-investment deal activity in a certain year quarter. The specifications (1) – (4) in panel A represent the regressions with natural log of dry-powder capital as proxy for competition. Panel B consists of specifications (5) – (8), which have as dependent variable the dummy high dry-powder capital level as proxy for periods of higher competition. All regressions include time fixed effects and Newey-West standard errors. The adjusted R^2 is also included, as this value represents the descriptive power of the models. The *, ** and *** represent the significant levels 10%, 5% and 1% respectively.

Panel A: Dry-powder capital ~Ln

	Dependent variable: Co-investment ratio			
	(1) OLS	(2) OLS	(3) OLS	(4) OLS
Dry-powder capital (ln)	0.004***	0.004***	0.004***	0.001
	(0.001)	(0.001)	(0.001)	(0.002)
GDP growth (Δ)			-0.043	-0.049
			(0.061)	(0.063)
UK interest rate		0.002	0.003	0.003
		(0.002)	(0.002)	(0.002)
Raised capital (ln)				0.003***
				(0.001)
Inflation rate			-0.003**	-0.003
			(0.001)	(0.001)
Time FE	YES	YES	YES	YES
Newey SE	YES	YES	YES	YES
Adj. R^2	0.39	0.43	0.42	0.45
No. obs	88	88	88	88

Panel B: Dry-powder capital ~Dummy

	Dependent variable: Co-investment ratio			
	(5) OLS	(6) OLS	(7) OLS	(8) OLS
High Dry-powder capital (Dummy)	0.008**	0.008***	0.008***	0.005*
	(0.003)	(0.002)	(0.003)	(0.003)
GDP growth (Δ)			0.000***	0.000
			(0.000)	(0.000)
UK interest rate		0.002	0.003	0.003
		(0.002)	(0.002)	(0.002)
Raised capital (ln)				0.002***
				(0.001)
Inflation rate			-0.003***	-0.003**
			(0.001)	(0.001)
Time FE	YES	YES	YES	YES
Newey SE	YES	YES	YES	YES
Adj. R^2	0.40	0.40	0.44	0.46
No. obs	88	88	88	88

The initial research is extended by testing also the effect of the level of competition to the regular deal and consortium deal activity in similar method as co-investment deal activity is tested. This will show if the effect is related to co-investment activity specifically or if PE deals in general are affected. The table 6 panel A displays the regression results regarding the analysis of the effect between the activity in regular deals and the level of competition. The results show for both the regression with dependent variable types of dry-powder capital no significant relation between the level of competition. Panel B depicts the regression results between the effect of High-level competition and regular deal activity. It is shown that only for specification (7) a statistically significant effect is produced, although weak. This might hint a stronger effect of high competition on deal activity. However, as explanatory power of the model specifications (1) – (8) are rather low and given the constraint of observed time series data, as depicted previously, these results suggest that the regular PE deal activity is more sensitive to other market and economic variables. As this model does not explain the PE deal activity.

Table 6: Regression results Deal regular

The table depicts the regression results of the analyses testing the relationship between regular deal and competition for the PE buyout market. The dependent variable is the deal ratio, which depicts the regular deal activity in a certain year quarter. The specifications (1) – (4) in panel A represent the regressions with natural log of dry-powder capital as proxy for competition. Panel B consists of specifications (5) – (8), which have as dependent variable the dummy high dry-powder capital level as proxy for periods of higher competition. All regressions include time fixed effects and Newey-West standard errors. The adjusted R^2 is also included, as this value represents the descriptive power of the models. The *, ** and *** represent the significant levels 10%, 5% and 1% respectively.

Panel A: Dry-powder capital ~Ln

	Dependent variable: Deal ratio			
	(1) OLS	(2) OLS	(3) OLS	(4) OLS
Dry-powder capital (ln)	0.0009	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.000)	(0.001)
GDP growth (Δ)			0.024***	0.037**
			(0.015)	(0.016)
UK interest rate		0.001	0.001	0.001
		(0.001)	(0.001)	(0.000)
Raised capital (ln)		0.001**		0.021**
		(0.000)		(0.001)
Inflation rate				-0.000
				(0.000)
Time FE	YES	YES	YES	YES
Newey SE	YES	YES	YES	YES
Adj. R^2	0.14	0.20	0.21	0.20
No. obs	88	88	88	88

Panel B: Dry-powder capital ~Dummy

	Dependent variable: Deal ratio			
	(5) OLS	(6) OLS	(7) OLS	(8) OLS
High Dry-powder capital	0.002	0.001	0.002*	0.001
(Dummy)		(0.001)	(0.001)	(0.001)
GDP growth (Δ)			0.019***	0.037**
			(0.041)	(0.016)
UK interest rate		0.001	0.001	0.001
		(0.001)	(0.000)	(0.000)
Raised capital (ln)		0.001*		0.001*
		(0.001)		(0.000)
Inflation rate				-0.000
				(0.000)
Time FE	YES	YES	YES	YES
Newey SE	YES	YES	YES	YES
Adj. R^2	0.15	0.20	0.16	0.21
No. obs	88	88	88	88

Lastly, this study incorporates testing the relation between competition level and consortium deal activity in the PE market. The table 7 depict the regression results. These suggest that the model specifications (1) – (8) have very low explanatory power. Suggesting that the used variables do not explain the consortium deal activity.

Table 7: Regression results Consortium deal

The table depicts the regression results of the analyses testing the relationship between consortium deal and competition for the PE buyout market. The dependent variable is the co-investment ratio, which depicts the consortium deal activity in a certain year quarter. The specifications (1) – (4) in panel A represent the regressions with natural log of dry-powder capital as proxy for competition. Panel B consists of specifications (5) – (8), which have as dependent variable the dummy high dry-powder capital level as proxy for periods of higher competition. All regressions include time fixed effects and Newey-West standard errors. The adjusted R^2 is also included, as

this value represents the descriptive power of the models. The *, ** and *** represent the significant levels 10%, 5% and 1% respectively.

Panel A: Dry-powder capital ~Ln

	Dependent variable: Consortium ratio			
	(1) OLS	(2) OLS	(3) OLS	(4) OLS
Dry-powder capital (ln)	0.000	-0.002	-0.002	-0.002
	(0.001)	(0.002)	(0.002)	(0.002)
GDP growth (Δ)		0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)
UK interest rate			-0.000	-0.000
			(0.002)	(0.002)
Raised capital (ln)		0.003**	0.003**	0.003
		(0.001)	(0.001)	(0.001)
Inflation rate				-0.000**
				(0.001)
Time FE	YES	YES	YES	YES
Newey SE	YES	YES	YES	YES
Adj. R^2	0.05	0.09	0.07	0.06
No. obs	88	88	88	88

Panel B: Dry-powder capital ~Dummy

	Dependent variable: Consortium ratio			
	(5) OLS	(6) OLS	(7) OLS	(8) OLS
High Dry-powder capital	0.001	-0.001	-0.001	-0.001
(Dummy)	(0.001)	(0.002)	(0.002)	(0.002)
GDP growth (Δ)		0.000	0.000	0.000
		(0.000)	(0.002)	(0.000)
UK interest rate			0.001	-0.000
			(0.002)	(0.000)
Raised capital (ln)		0.001**	0.001	0.001
		(0.000)	(0.001)	(0.001)
Inflation rate				-0.000
				(0.000)
Time FE	YES	YES	YES	YES
Newey SE	YES	YES	YES	YES
Adj. R^2	0.05	0.06	0.05	0.04
No. obs	88	88	88	88

5. Conclusion

This study focuses on the activity of co-investment deals in the PE market by researching the relation between the activity of the deal type and the level of competition in the specific market. More specifically the question underlying this research is whether or not there is a relation between competition on the PE market and co-investment deal activity. This is done by means of a study of the UK PE buyout market for the sample period of 1998 – 2017. As there is no direct variable for competition, the level of dry-powder capital is taken as a proxy. Next to co-investment deal activity, also other PE deal types are incorporated. This in order to verify if the effect of competition on deal activity is similar across the deal types or if this is solely registered for co-investment deals.

The studies previously on co-investing assessed the possible reasons for GPs to engage in co-investing; if any adverse selection issues arise from a co-investing set-up. To this date, no general consensus has been reached. In order to supplement the existing research on co-investing so, a possible factor behind the popularization is studied: the level of competition in the PE market.

In line with previous research and stated research question there is evidence suggesting that competition and the amount of co-investment deals are indeed correlated. Which is in line with the observation of the flow of co-investment deals and dry-powder capital reported in graph 5. This study also found that regular and consortium deals by PE funds do no show a significant relation with the level of competition. These findings suggest that with these deal types possibly there are other factors playing a role in influencing the amount or possible the factor of competition is not strong enough.

The findings of the study don't confirm the proposed relation, between the maturing and increasingly more competitive market and co-investment activity in the PE market, as the validity of the research does not allow it to do so. However, this study does suggest a positive correlation between the two. And it suggests no such effect exists between regular and consortium deals. This is however, not sufficient to support the proposed theory. For this to happen more extensive research needs to be executed on the relation between competition and the co-investing activity. In addition, there are more trends besides increase in competition in the PE market that might influence LPs and GPs to co-invest. By assessing also these questions, can the co-investment activities by GPs and LPs be fully understood.

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Appendix

Table 8: Correlation matrix

Panel A: Independent and control variables							
		(1)	(2)	(3)	(4)	(5)	(6)
(1)	Dry-powder capital	1.00					
(2)	High dry-powder amount	0.86	1.00				
(3)	Interest rate	-0.15	-0.15	1.00			
(4)	GDP growth	-0.13	-0.12	0.06	1.00		
(5)	Inflation	0.21	0.15	0.00	-0.15	1.00	
(6)	Capital raised	0.74	0.69	0.03	-0.12	0.13	1.00

Table 9: Correlation matrix

Panel A: Independent and dependent variables						
		(1)	(2)	(3)	(4)	(5)
(1)	Dry-powder capital	1.00				
(2)	High dry-powder amount	0.86	1.00			
(3)	Ratio Co-investment	0.45	0.41	1.00		
(4)	Ratio Deal	0.34	0.32	0.39	1.00	
(5)	Ratio Consortium	-0.04	-0.01	-0.05	0.29	1.00

Table 10: Postestimation for autocorrelation Co-investment deals

Panel A: Breusch-Godfrey test for autocorrelation			
Dry-powder capital ~Ln	Chi2	Df	Prob > chi2
(1)	3.654	1	0.0559
(2)	8.831	4	0.0655
(3)	15.620	8	0.0482
Dry-powder capital ~Dummy	Chi2	Df	Prob > chi2
(4)	3.443	1	0.0635
(5)	9.207	4	0.0561
(6)	17.289	8	0.0272
Panel B: Alternative Durbin Watson test			
Dry-powder capital ~Ln	Chi2	Df	Prob > chi2
(1)	3.466	1	0.0627
(2)	8.589	4	0.0722
(3)	15.754	8	0.0460
Dry-powder capital ~Dummy	Chi2	Df	Prob > chi2
(4)	3.257	1	0.0711
(5)	8.997	4	0.0612
(6)	17.848	8	0.0224

Table 11: Postestimation for autocorrelation Regular deals

Panel A: Breusch-Godfrey test for autocorrelation			
Dry-powder capital ~Ln	Chi2	Df	Prob > chi2
(1)	16.947	1	0.000
(2)	20.325	4	0.000
(3)	22.982	8	0.003
Dry-powder capital ~Dummy	Chi2	Df	Prob > chi2
(4)	17.493	1	0.000
(5)	20.595	4	0.000
(6)	24.071	8	0.002
Panel B: Alternative Durbin Watson test			
Dry-powder capital ~Ln	Chi2	Df	Prob > chi2
(1)	19.080	1	0.000
(2)	23.15	4	0.000
(3)	25.804	8	0.001
Dry-powder capital ~Dummy	Chi2	Df	Prob > chi2
(4)	19.849	1	0.000
(5)	23.527	4	0.000
(6)	27.486	8	0.001

Table 12: Postestimation for autocorrelation Consortium deals

Panel A: Breusch-Godfrey test for autocorrelation			
Dry-powder capital ~Ln	Chi2	Df	Prob > chi2
(1)	3.378	1	0.066
(2)	5.872	4	0.209
(3)	14.363	8	0.073
Dry-powder capital ~Dummy	Chi2	Df	Prob > chi2
(4)	3.666	1	0.055
(5)	6.415	4	0.170
(6)	13.901	8	0.084
Panel B: Alternative Durbin Watson test			
Dry-powder capital ~Ln	Chi2	Df	Prob > chi2
(1)	3.193	1	0.074
(2)	5.505	4	0.239
(3)	14.239	8	0.076
Dry-powder capital ~Dummy	Chi2	Df	Prob > chi2
(4)	3.477	1	0.062
(5)	6.055	4	0.195
(6)	13.695	8	0.090

Table 13: Postestimation Heteroskedasticity for Co-investment deals

Panel A: Breusch-Pagan/Cook-Weisberg		
Co-investment deals	Chi2	Prob > chi2
(1) Dry-powder capital ~Ln	4.55	0.0329
(2) Dry-powder capital ~Dummy	6.94	0.0084

Table 14: Postestimation Heteroskedasticity for Regular deals

Panel A: Breusch-Pagan/Cook-Weisberg		
Regular deals	Chi2	Prob > chi2
(1) Dry-powder capital ~Ln	0.01	0.9084
(2) Dry-powder capital ~Dummy	0.01	0.9103

Table 15: Postestimation Heteroskedasticity for Consortium deals

Panel A: Breusch-Pagan/Cook-Weisberg		
Consortium deals	Chi2	Prob > chi2
(1) Dry-powder capital ~Ln	11.35	0.0008
(2) Dry-powder capital ~Dummy	7.47	0.0063