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Buy low, sell high? Do private equity fund managers have market timing abilities?☆

Tim Jenkinson[a,*], Stefan Morkoetter[b], Tobias Schori[b], Thomas Wetzer[b]

[a] University of Oxford, Saïd Business School, United Kingdom
[b] University of St.Gallen, St.Gallen Institute of Management in Asia, Singapore

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ABSTRACT

When investors commit capital to a private equity fund, the money is not immediately invested but is called by the fund manager throughout an investment period of up to five years. The private equity business model allows fund managers to invest and divest the committed capital during the fund's lifetime at their own discretion, which gives them the flexibility to time the markets. Based on 7,591 private equity deals, which are benchmarked against 14,390 M&A transaction multiples, we find evidence that on average private equity funds are able to create value by timing the financial markets. Market timing ability is not captured by performance measures such as the PME, yet it is a potential source of returns for investors.

1. Introduction

Market timing ability is one way for investment managers to achieve high returns on managed assets. An asset class which frequently engages in buying and selling companies is private equity (PE). PE funds collect capital from limited partners (LP) to take over (large) equity stakes in portfolio companies and sell them at a later stage of the PE funds' lifecycle. In this context, a PE fund acts as a blind pool of capital to which LPs commit their capital for a period of up to 10 years (or more), whereas the first three to five years are intended for investments. It is the PE fund manager, known as the general partner (GP), who decides - independent of LPs - when to buy and when to sell a specific portfolio company. In contrast to other asset classes, such as mutual funds or hedge funds, capital committed by LPs is not immediately transferred to PE funds, but only when a deal is completed. The PE fund model not only provides GPs with the discretion to decide on the initial investments but also with the opportunity to time the markets when exiting their investments.

In this paper, we focus on whether GPs are able to use their discretion over timing to create value for investors – in other words, whether they have market timing ability or not. Our study focuses on North American and European deals and analyzes whether PE funds sell their portfolio companies when average market multiples are higher than at the time of investment, relative to the overall market environment. We define market timing as the difference between the average market exit multiple and the average market entry multiple – scaled for industry, region and time. Market multiples are defined as median enterprise value multiples (i.e., EV/EBITDA) of comparable strategic M&A transactions, which we match with the PE deals based on deal time, target industry, and target region. Using this benchmarking approach, we match 7,591 North American and European PE deals in the time period between 1998 and 2019 for which investment and exit dates are known and M&A market multiples are available, comprising 14,390 strategic M&A transactions. In addition, we develop a framework to investigate whether PE funds achieve superior market timing at the time of the investment or at the time of the deal exit.

Our findings provide empirical evidence that PE fund managers do time the markets successfully. On average, GPs sell their portfolio companies when market multiples are 0.32 multiples higher than at the time of investment, thereby displaying positive, yet modest, market timing abilities. We use a simulation model to account for time trends in our data, which produces similar results, except for vintage year periods between 2001 and 2003, after the

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* Corresponding author.
E-mail addresses: tim.jenkinson@sbs.ox.a.c.uk (T. Jenkinson), stefan.morkoetter@unisg.ch (S. Morkoetter), tobias.schori@unisg.ch (T. Schori), thomaswetzer@jebsen.com (T. Wetzer).

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dot-com bubble, where we find no evidence for market timing abilities of fund managers. Comparing market timing ability of PE fund managers when acquiring a company versus selling a portfolio company, our results show that GPs are more successful in timing the exit of a transaction. We argue that our finding is driven by the PE funds' greater flexibility in choosing exit timing as compared to the investment decision, which can also be driven by exogenous factors (e.g., the willingness of the current owners to sell a company, and their timetable).

The contribution of our paper is threefold. First, we contribute to the strand of literature which focuses on market timing and value creation of PE funds. The existing PE literature that focuses on market timing abilities of PE fund managers has mainly adopted an initial public offering (IPO) perspective (e.g., Pástor et al., 2009; Cao and Lerner, 2009). While research has investigated whether market timing has any impact on the long-term performance of portfolio companies after being sold by a PE fund (see e.g., Cao and Lerner, 2009), IPOs only comprise one, in fact small, fraction of potential PE exits. Our paper is able to analyze market timing ability more generally, and more immediately as we focus on both entry and exit transactions. Gredil, 2022 examines PE market timing abilities in public markets and concludes that GPs follow public market prices and that they are more informed about the public market than the marginal investor. In contrast to Gredil, 2022 who analyzes GP market timing abilities on the fund-level, our study examines their abilities on the deal-level. Ball et al. (2011) and Lerner (1994) both investigate market timing abilities in venture capital (VC) funds. While Lerner (1994) finds that VCs in the biotech industry are able to time markets well and take companies public at market peaks, Ball et al. (2011) use a cross-industry sample and find no consistent support for market timing abilities of VC fund managers. In contrast to Ball et al. (2011) and Lerner (1994) who focus on VC funds, our study emphasizes timing abilities in buyout and growth funds and we do not constrain our analysis to IPOs as the only means of deal exit.

Second, we contribute to evidence on the market timing ability of asset managers by leveraging the fact that GPs have complete discretion and decision-making power over their investments and exits. This setting enables us to investigate market timing ability and isolate it from other investment decision drivers. In contrast to PE funds, mutual funds and hedge funds do not allow for such an investigation as fund managers in these asset classes typically invest capital immediately after capital is called from investors, and reduce their investment positions in the face of investors' capital calls or other external factors (Bollen and Busse, 2001). Not surprisingly, for mutual fund managers in particular, market timing ability is rarely observed (e.g., Chang and Lewellen, 1984; Henriksson, 1984; Grinblatt and Titman, 1989; Chen et al., 1992; Volkman, 1999; Wermers, 2000). For a few exceptions, some studies find empirical support for market timing abilities in mutual funds (e.g., Jiang et al., 2007) as well as in hedge funds (e.g., Chen and Liang, 2007).

Finally, our paper adds to the broad discussion of whether PE funds add value for investors relative to public markets. A standard approach comparing PE performance to public markets is the use of public market equivalent (PME) returns, as introduced by Kaplan and Schoar (2005). A potential limitation of the PME pertains to its disregard of PE fund managers who time their investments well. For example, a fund that sold all of its investments in 2007 (before the Lehman crash) might have the same PME as a fund that sold in 2009 (after the crash). Thus, the PME does not account for the fact that the exit in 2007 would have been preferable from a timing and value creation perspective. The difference would be reflected in money multiples and in internal rates of return (IRR) but not in the PME. Since investors delegate discretion to GPs for selecting portfolio companies as well as managing investment timing, market timing ability may be an important factor for investors to pay close attention to. Our findings appear particularly important in light of recent evidence by Brown et al. (2021) who show that LPs only exhibit modest abilities in anticipating PE market cycles and in favorably timing their commitments to PE funds. They argue that, precisely because of the delegation of investment timing to the fund manager, LPs display significant commitment risk since they are only able to time their commitments to funds, and have no control over timing entries and exits of particular portfolio companies.

The remainder of this paper is organized as follows. Section 2 reviews the related literature. Section 3 outlines the concept of value creation through market timing. Section 4 presents the data sample and explains our methodology. Section 5 provides and discusses the empirical results. Section 6 concludes.

2. Literature review and hypothesis development

A major difference of the PE fund business model, in comparison to mutual funds as well as hedge funds, is that PE funds do not receive the investors' capital immediately after a fund commitment. Instead, GPs call the committed capital as opportunities arise during an investment period of up to five years after the fund's closing date. Furthermore, there is no economic incentive to invest quickly as management fees are paid on committed, rather than invested capital. Committed capital is called following the PE fund's acquisition of a portfolio company. The return calculation of the PE fund only commences after capital has been invested in the portfolio company. Therefore, committed capital yet to be invested does not affect the PE fund's performance in the same way as it affects performance of a mutual fund (known as a 'cash drag'). In addition, PE funds do not acquire stock positions for trading reasons, but they buy large (mostly majority) stakes in companies and hold them for an average of four to six years. Consequently, the time period for which investors' capital is tied to a PE fund is significantly longer than for investments in mutual or hedge funds. Once committed, the LPs cannot access their capital until the fund sells the assets (theoretically, this happens only at the end of a fund's lifecycle, i.e., after 10 to 12 years). This model gives GPs not only discretion over their investments, but also significant opportunities to time the markets when exiting their investments – without external pressure from PE investors. We seek to investigate whether these PE-inherent features contribute to the abilities of GPs to time the markets and to contribute to value creation.

2.1. Private equity performance measures

Until the early 2000s, most research focused on net IRR as the sole PE performance measure (e.g., Ljungqvist and Richardson, 2003; Jones and Rhodes-Kropf, 2003). An alternative metric commonly used to assess PE fund performance is the investment multiple, which divides the sum of all cumulative distributions and the residual fund value over the paid-in capital (Harris et al., 2014). However, as Harris et al. (2016) point out, neither net IRRs nor investment multiples allow for a direct comparison of PE returns with public market performances.

Aware of the limitations of the net IRR, Kaplan and Schoar (2005) developed the PME – a relative market multiple. The PME separates cash flows between the fund and the LP into (i) distributions (cash flows returned to the LP, net of carried interest) and (ii) capital calls (investments plus management fees paid by the LP into the fund). Distributions and calls are discounted with realized market returns. The ratio of these two valuations is the PME, which is greater than one if the value of the distributions exceeds the cost of calls.

A limitation of the PME measure concerns its inability to control for market timing. From an institutional investor's perspective with a fixed asset allocation in place (e.g., 10% to private equity) or under the assumption that an investor always reinvests capital distributions by PE funds into public equity, market timing abilities may not matter. If an investor continuously reinvests capital distributed by a PE fund in the same asset class, market timing ability may have limited value as exposure to a specific asset class remains constant. However, in reality it is rarely possible to re-invest into private equity immediately as there is a gap between committing and investing into a PE fund. Institutional investors also differentiate between a strategic and a tactical asset allocation. Strategic asset allocation defines the average allocation to a specific asset class, whereas the tactical asset allocation allows managers – within a predefined scope – to over- or under-weight a specific asset class. Managers may benefit from market timing ability as they can hold cash for some time instead of directly reinvesting the capital.

2.2. Market cycles and PE fund managers' investment activities

Lerner (1994) shows that fund managers react to market cycles by providing evidence that VC fund managers successfully raise capital for follow-on funds by taking their portfolio companies public at market peaks. By developing a model for optimal IPO timing, Pástor et al. (2009) show that buyout sponsors patiently await favorable market conditions for new leveraged buyout (LBO) listings and then react to changes quickly. Ljungqvist et al. (2020) observe the investment and exit behavior of PE funds. They show that funds deliberately call committed capital when investment opportunities improve, and exit their investments by taking advantage of favorable business climates. However, the authors also argue that only existing and established funds have the ability to make use of short-term changes in market conditions. Gredil, 2022 documents that PE fund managers take into account the valuation of public equities with regard to their investment timing. Furthermore, the author shows that PE investors benefit from substantial gains due to delegation of market timing. This finding corroborates our argument that PE fund managers have the potential to display market timing ability due to the discretionary nature of the PE business model.

Cao and Lerner (2009) investigate "quick flips", i.e., reversed leveraged buyouts (RLBOs) that went public in less than a year after the LBO. Such quick flips are usually triggered by hot equity markets in which fund managers see favorable placement opportunities for their portfolio companies. Cao (2011) shows that buyout funds reduce LBO holding periods for new issuance under more favorable external conditions or high industry valuations, thereby providing evidence that market timing can lead to value destruction. Lastly, Jenkinson and Sousa (2015) support the window of opportunity hypothesis in which they show that exit strategies (such as IPOs and secondary deals) are strongly influenced by debt and equity market conditions. In our study, we focus on market timing as an endogenous factor for GPs to exit an investment and thereby suggest another explanation why PE funds may decide to sell their investment at a certain point in time.

2.3. Hypotheses

Existing literature therefore suggests that market timing may be beneficial to improve the financial performance of a PE investment. In our paper, we are the first to explicitly test for market timing ability of PE fund managers at the deal level and test two main hypotheses. First, we investigate to what extent PE fund managers take advantage of their discretionary business model and are able to better time the markets by favorably buying and selling portfolio companies.

Hypothesis 1. PE fund managers display market timing abilities.

Second, we are also interested to understand if market timing is more pronounced at entry or at exit of an investment. Because PE funds tend to have more flexibility when exiting investments as compared to committing to investments (e.g., which also depends on the preferences of the vendor) we argue that PE fund managers should be able to better time an exit decision as compared to the acquisition of a company.

Hypothesis 2. PE fund managers better exploit market timing on the deal exit than the deal investment, thus market timing is more pronounced on the deal exit.

In the following section, we explain how we define market timing undertaken by GPs and how it potentially contributes to the value creation process of a PE fund.

3. Value creation through market timing

PE funds typically create value through three drivers, i.e., (i) multiple expansion, (ii) EBITDA improvements, and (iii) deleveraging. While the latter two are largely operational and financial value creation drivers, multiple expansion refers to the difference between entry and exit valuations and can also be driven by external factors. Leleux et al. (2015) note that multiple expansion is achieved either by multiple engineering (proving to the market that the portfolio company is now worth more) or by multiple surfing (buying at the low point of a cycle and selling at the peak) or both.

Multiple engineering is linked to operational improvements. For instance, in the case of significant revenue growth, the EV/EBITDA valuation may increase as investors tend to pay higher prices for larger and faster growing companies. Guo et al. (2011) investigate the value creation drivers in U.S. buyouts and find that the changes in industry valuation multiples make up 20% of overall value creation. Puche et al. (2015) estimate that 15% of value creation in buyout deals comes from the so-called 'multiple effect'. Puche and Braun (2019) emphasize the importance of GP negotiation skills and find a positive correlation between fund returns and multiple expansion.

In contrast, multiple surfing is pure market timing, which is the focus of our study. This effect includes the management's ability to increase growth as well as – and more relevant for our study – the fund manager's ability or luck to favorably time the markets.

3.1. Market timing

To create value through market timing, fund managers should aim to buy when market valuations are low and to sell when markets are high. In order to track market timing abilities of fund managers, we define market timing as the delta between the median M&A transaction multiple at investment (which we label *market entry multiple*) and the median M&A transaction multiple at exit (which we label *market exit multiple*). Importantly, in contrast to using entry and exit multiples of portfolio companies, which can be influenced by effects of both multiple engineering as well as multiple surfing, we use M&A market multiples to investigate market timing abilities of GPs at deal entry and deal exit. Our underlying idea is that M&A market multiples are unlikely to be affected by multiple engineering effects of individual portfolio companies, thus allowing us to effectively isolate market timing abilities driven by multiple surfing. An important implicit, but reasonable, assumption is that prices paid for assets will be closely correlated with the prices paid in contemporaneous M&A transactions

(e.g., Robinson and Sensoy, 2016).

$$Market\ timing_d = Market\ exit\ multiple_{r,i} - Market\ entry\ multiple_{r,i} \quad (1)$$

where *market timing* is a GP's ability to time the market in a given deal *d* based on median market multiples of contemporaneous strategic M&A transactions that are comparable to the PE transaction. $Market\ exit\ multiple_{r,i}$ is the median M&A transaction multiple in the quarter of the exit benchmarked against the PE target's region *r* and industry *i* (please refer to Section 4.2 for a detailed description of the benchmarking process). $Market\ entry\ multiple_{r,i}$ is the median transaction multiple in the quarter of an investment benchmarked against the PE target's region *r* and industry *i*. Funds create value from timing it as the market multiple at which they sell is higher than the market multiple at which they buy. Again, it is important to stress that we use transaction multiples of strategic M&A transactions in the M&A market instead of PE deal multiples.

To illustrate our approach, consider the case of Eldon Holding AB which is an industrial company with headquarters in Sweden. The company was acquired by EQT II fund in March 2001. After a holding period of five years, Eldon was sold in a trade sale in March 2006. In the first quarter of 2006, when EQT II acquired Eldon, the average transaction multiple in the European industrials industry was 7.0. When EQT II sold Eldon in the first quarter of 2006, the average transaction multiple was 11.2. This was almost the highest multiple during the entire exit period. Only in the second quarter of 2005, when market multiples were at 13.7, would an exit have resulted in even better exit timing. EQT II therefore timed the markets well and achieved a delta between market multiple at investment and market multiples at exit of 4.2. Hence, EQT II created value through market timing in their investment and exit of Eldon.

3.2. Investment timing and exit timing

In addition to investigating the general market timing ability of GPs, we explore at which point, if at all, fund managers time the markets, i.e., at investment *and/or* at exit. To separate market timing skills of GPs on the investment and exit side, we develop a framework to compare the M&A market multiples at the PE deal year-quarter (both investment and exit) relative to the M&A market multiples around the PE transaction. By applying this approach, we can observe how well PE funds choose the optimal timing to buy or sell their portfolio companies. As part of the general lifecycle of a PE fund (between 10 and 12 years), the investment period is typically 3 to 5 years. In our model, we assume an average investment period of 3 years (i.e., 12 quarters) during which PE funds have time to invest.[1] Specifically, we use the 6 quarters up to but excluding the deal quarter and the 6 quarters following the deal quarter as our baseline to establish the M&A market multiple environments in which the deal was transacted. Referring again to the acquisition of Eldon by the EQT II fund, the European industrials market multiple in the first quarter of 2001 was 7.0. Market multiples in the investment period, which for this fund was from the third quarter of 1999 until the third quarter of 2002, were on average 13% higher (excluding the multiple in the first quarter of 2001 when Eldon was acquired). This implies that EQT timed the investment successfully. Evidently, at exit, EQT would want the market multiple to be higher than the average M&A market multiple in the exit period. We compute investment timing as follows.

$$Investment\ timing_j = \left[\frac{Market\ entry\ multiple_{r,i}}{\left(\frac{\sum_{i=-6}^{6} Market\ entry\ multiple_{r,i}}{12} \right)} - 1 \right] x\ 100 \quad (2)$$

Similarly, we calculate exit timing as follows.

$$Exit\ timing_j = \left[\frac{Market\ exit\ multiple_{r,i}}{\left(\frac{\sum_{i=-6}^{6} Market\ exit\ multiple_{r,i}}{12} \right)} - 1 \right] x\ 100 \quad (3)$$

$Investment\ timing_j$ and $exit\ timing_j$ are the GP's investment and exit timing abilities of transaction *j*. We compute $Investment\ timing_j$ as the M&A transaction market multiples in the quarter of the realized investment, benchmarked against the target's region *r* in the industry *i*, relative to the mean M&A transaction multiples of the 12 quarters around the actual PE investment (6 quarters before the investment plus 6 quarters after the investment). Similarly, we estimate $Exit\ timing_j$ as the M&A transaction market multiples in the quarter of the realized exit, benchmarked against the target's region *r* in the industry *i*, relative to the mean M&A transaction multiples of the 12 quarters around the actual PE exit (6 quarters before the exit plus 6 quarters after the exit). To optimize overall market timing, PE funds that are buying a portfolio company seek to *minimize investment timing*, while PE funds who are selling a portfolio aim to *maximize exit timing*.

4. Data and methodology

4.1. Data sample

Our analysis is based on 7,591 PE transactions completed between January 1, 1998 and December 31, 2019 by 2,288 individual PE funds both in North America and Europe. We gather all PE data from Preqin. For each transaction we observe (i) the date of investment, (ii) the date of exit, (iii) the target name, (iv) the target industry and (v) the target region. Target industries are based on the Global Industry Classification Standard (GICS). We distinguish between seven industries, i.e., consumer products, energy, healthcare, industrials, materials, technology, telecommunications. Portfolio companies that mainly operate in the real estate, financial institutions, and public services industries are excluded. Target region consists of two regions, i.e., North America and Europe. In addition, for certain deals we obtain more detailed information on deal characteristics (e.g., deal size, target investment and exit value, net IRR) and PE fund characteristics (e.g., fund age, fund sequence, fund target size).

The Preqin database lists almost 50,000 different PE deals for the time period we are interested in. These deals include (i) deals that are invested but not yet exited and (ii) deals that have been exited (i.e., PE funds have sold their investments). To investigate the ability of PE funds to create value through market timing, we only include deals in our analysis which have already been exited by the respective PE funds. This reduces the deal sample to approximately 20,000 deals. We further remove restructurings and write-offs as market timing only plays a subordinate role in these deals (Achleitner et al., 2011). Moreover, in cases where the precise investment/exit date is unknown, Preqin assumes by default that the deal took place on June 1st of a given year. Thus, we remove all 'June 1st-deals' as they give us no reliable indication of fund man-

[1] We use 3 years as an investment period because for our dataset, the mean (median) investment period is 2.4 (2.0) years. In untabulated tests, we alternatively calculate investment timing using a 16 and 24 quarter investment period, respectively. Our results remain similar.

Table 1
Sample summary. This table shows the sample summary of 7591 PE deals completed between the years 1998 to and including 2019 for which we obtained investment and exit information. In Panels E through G, the sample comprises 8316 observations as some of the deals were only partially exited. Panels H through I report the breakdown by fund types and fund focus region of 2288 unique PE funds. PE deal information is obtained from Preqin.

	N	%
All investments	7591	100
Panel A: Investment types		
Buyout	5193	68.4
Growth	1107	14.6
Other (e.g., PIPE)	1291	17.0
Panel B: Investment years		
1998–2000	515	6.8
2001–2010	4683	61.7
2011–2019	2393	31.5
Panel C: Investment regions		
North America	4266	56.2
Europe	3325	43.8
Panel D: Club deals		
Yes	1471	19.4
No	6120	80.6
	N	%
All exits	8316	100
Panel E: Exit types		
IPO	294	3.5
Trade sale	3738	45.0
Secondary	2749	33.1
Other (e.g., private placement)	1535	18.5
Panel F: Exit years		
1998–2000	39	0.5
2001–2010	2531	30.4
2011–2019	5746	69.1
Panel G: Partial exits		
No	7347	88.4
Yes	969	11.7
	N	%
All funds	2288	100
Panel H: Fund type		
Buyout	1821	79.6
Venture	295	12.9
Other	172	7.5
Panel I: Fund focus region		
North America	1360	59.4
Europe	854	37.3
RoW	74	3.2

agers' market timing abilities. After this screening process, our final sample comprises 7,591 PE deals for which we have required investment and exit information.

Table 1 shows the sample summary of 7,591 deals for the investment (i.e., entry level in Panels A to D, for the exit level in Panels E to G and for the fund-level in Panels H and Panel I. Panel A of Table 1 shows that of the 7,591 deals in our sample, 68.4% are buyout deals, whereas 14.6% are PE growth deals. PE growth deals are defined as equity investments into a private company, whereas the PE fund acquires a non-controlling or minority stake. 'Other' investment types comprise 17.0% of our sample which include PIPE (private investments in public equity) deals and special situations. In our sample, PIPE investments comprise 2.1% of all PE transactions. Panel B of Table 1 shows that 6.8% of our investments occurred before 2001, whereas 61.7% of all investments occurred between 2001 and 2010. Investments between 2011 and 2019 account for 31.5% of our sample. In addition, Panel C of Table 1 shows that our dataset is well balanced between investments in Northern America versus Europe (i.e., 56.2% vs. 43.8%). The majority of deals in our sample are sole-sponsored deals (80.6%) versus 19.4% of club deals.

Panels E to G of Table 1 summarize key statistics on the exit-level for which we obtained 8,316 exits. We report more exits than deals because deals can be partially exited, therefore in some instances we record multiple exits for the same deal. Panel E shows that 45.0% of the deals are exited as trade sales, 33.1% are secondary sales, and 3.5% are IPOs. 'Other' exit types comprise 18.5% of our sample and include sales to management and unspecified exits. Panel F reports that 30.4% of exits occurred between 2001 and 2010 while 69.1% of exits occurred between 2011 and 2019. GPs do not always sell 100% of their holding in a company but often divest only a fraction of their total ownership (Jenkinson and Sousa, 2015) which are referred to as partial exits. Panel G reports that these partial exits comprise 11.7% of all deals. In partial exits, market timing abilities depends on market multiples at several exits. Unfortunately, we do not know the share sold at each exit. To overcome this drawback, we take the average market multiples at each partial exit to form a total exit market multiple.

Finally, Panels H and I of Table 1 report the summary statistics on the fund level for which our sample comprises 2,288 unique funds. Panel H reports that 79.6% of all funds were buyout funds, 12.9% were VC funds and 7.5% were other funds. Panel I shows that the majority of funds in our sample focus on North America which account for 59.4% of our sample. Funds with a fund focus region on Europe and Rest of the World (RoW) account for 37.3% and 3.2% of our sample, respectively.

Table 2 reports the summary statistics of our sample. Panel A of Table 2 reports the statistics on the investment (i.e., entry) level and shows that the mean (median) investment size is 365.4 (112.0) USDmn. On average, there are 1.2 exits per investment and it takes on average 4.6 years (holding period) until portfolio companies are sold, which is comparable to other studies (e.g., Cao, 2011; Lerner, 1994). Panel B of Table 2 reports that the mean (median) exit size is 564.2 (250.0) USDmn. As described above, investments that are not exited by the end of 2019 are not included in our sample. In unreported analyses, we exclude all investments made in 2017 and 2018 which were exited before the end of our observation period in 2019. These exits can be regarded as early exits or "quick flips" (Cao and Lerner, 2009) as their holding period is significantly shorter than the average holding period. Our results remain similar when we exclude these transactions.[2] Panel C of Table 2 reports the summary statistics on the fund level. On average, there are 1.1 PE funds involved in a PE deal. Fund target size is frequently linked to fund performance and value creation (Jones and Rhodes-Krop, 2003; Phalippou and Gottschalg, 2009). The mean (median) fund target size is 955.2 (324.5) USDmn. The average fund sequence is 2.0, which is in line with Phalippou and Gottschalg (2009) or Kaplan and Schoar (2005). At the time of the investment, the average fund age is 2.3 years while the average fund age at exit is 6.9 years. The mean (median) net IRR in our sample is 15.1 (12.8)%, similar to Harris et al. (2016).

4.2. Matching PE deals with M&A transactions multiples

To measure market timing abilities of GPs, we map PE deals to transaction multiples of comparable M&A deals. This approach allows us to investigate market timing abilities of GPs independent of PE transaction valuations (which are not generally available to us). For the purpose of our study, we benchmark the PE deals to transaction multiples of strategic M&A transactions. We define strategic M&A deals as deals in which no financial sponsors are involved. We collect a sample of 10,710 strategic transactions from Thomson One. The regional and industrial definitions of Preqin (from which we obtain our PE deal sample) and Thomson One (from which we obtain our benchmark sample including company valuations) are comparable. North America is the largest region in

[2] Furthermore, our results remain stable when we restrict our sample to investments with holding periods of more than three years.

Table 2
Deal and fund-level summary statistics. This table shows summary statistics for 7591 PE deals between 1998 and 2019 for which we obtained investment and exit information. We report entry-level information in Panel A and exit-level information in Panel B. Panel C reports fund-level summary statistics. PE deal information is obtained from Preqin.

	Mean	Median	StDev	p5	p95	*N*
Panel A: Entry-level						
Investment size[a]	365.4	112.0	992.9	8.0	1430.4	2609
Exits per investment	1.2	1.0	0.5	1.0	2.0	7591
Holding period[b]	4.6	4.3	2.6	0.9	9.6	7591
Panel B: Exit-level						
Exit size[a]	564.2	250.0	1118.6	24.0	2008.4	3019
Panel C: Fund-level						
Funds per deal	1.2	1.0	0.4	1.0	2.0	7591
Fund target size[a]	955.2	325.0	1984.6	41.9	4000.0	2219
Fund sequence number	2.0	1.0	1.5	1.0	5.0	2288
Fund age at investment[b]	2.3	2.0	1.8	0.0	6.0	2288
Fund age at (last) exit[b]	6.9	7.0	3.2	2.0	13.0	2288
Net IRR[c]	15.1	12.8	15.1	-4.2	41.5	1200

aUSDmn; byears; cin%

both databases, while consumer products is the largest industry. Also, the distribution of deals across the observation period is similar between the two databases.

We define the matching process of PE deals with M&A transactions multiples by linking PE deals and M&A transaction based on the following three criteria.

1. Year-quarter of a given PE investment/exit
2. Target region
3. Target industry

To generate M&A benchmark clusters, we take the median of all matched M&A transactions which fit our three criteria. This allows us to generate median M&A transactions multiple values which we use to approximate the favorability of investing or exiting a PE investment. M&A multiples follow a similar trend (e.g., peaks in 2006/2007 and slumps in 2008/2009) while their volatility and magnitude differ. Multiples in North America are fairly consistently higher than in Europe, and multiples in the healthcare industry are consistently higher than in the energy industry (see Figure 1) Thus, is appears important to define our benchmark clusters by deal date as well as by deal region and deal industry.

To ensure that our benchmarking analysis is not driven by outliers, we define a minimum threshold of five comparable M&A transactions. For example, for the industry group 'materials' we only have three transaction multiples available in North America for deals which took place in the first quarter of 2000. In order to avoid our analysis being driven by such outliers, we exclude any PE deals for our market timing analysis that took place in the industry group 'materials' in North America in the first quarter of 2000. On average, we have 11 multiples per benchmark group for transaction multiples in our sample. Out of an original of 1,710 M&A clusters, we retain 1,459 M&A clusters for which we have at least five observations. This leads to the exclusion of 602 PE deals or approximately 7% of our total deal sample. Transaction multiples display a higher correlation with PE transaction multiples compared to more widely available trading multiples. Despite a slight reduction of our sample size, we argue that transaction multiples therefore serve as a superior benchmark compared to trading multiples.[3]

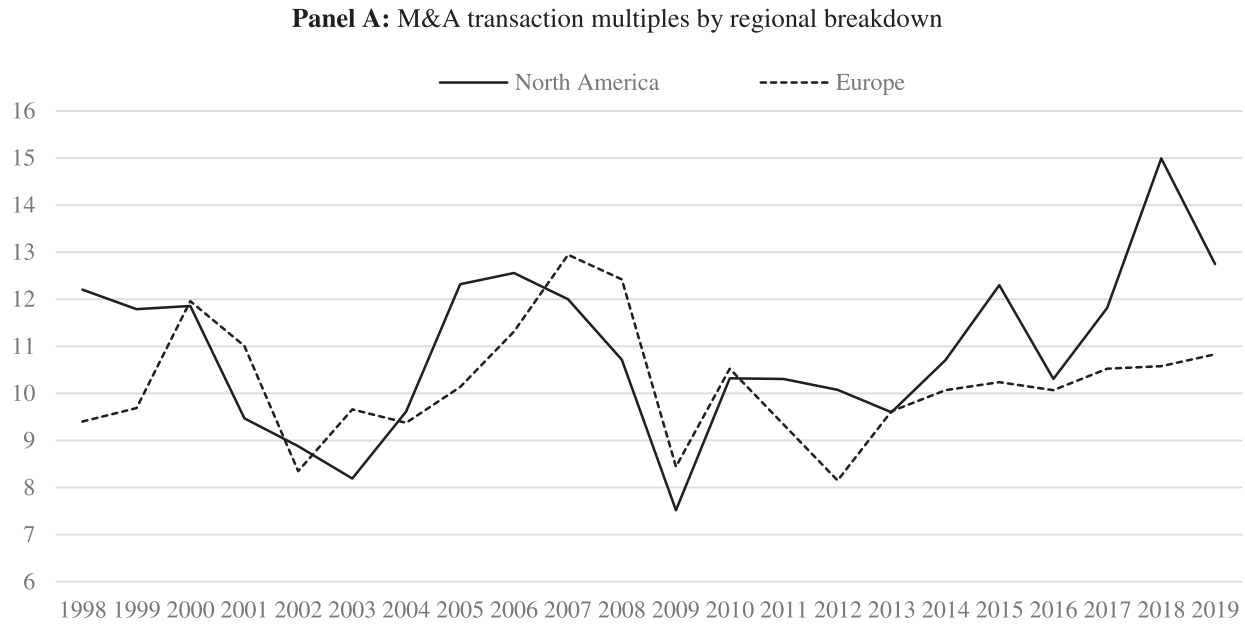
As an additional verification of our assumption, we use an alternative database of 1,600 exit multiples for a subsample of vintage years from Thomson One (as used in Morkoetter and Wetzer (2016)) and find a correlation of 0.8 with benchmark transaction multiples (see Figure 2).

4.3. Simulation model

As our data may be prone to time trends, we also employ a simulation model.[4] Our simulation model underlies the assumption that, in bullish markets, PE funds would always benefit from apparent market timing effects since firms can be sold at a higher price than they were originally bought irrespective of market timing efforts (or, in other words, pure luck). Put differently, if time trends are present, we may observe effects of market timing which may be not due to timing skills of the PE fund but due to macroeconomic effects. In addition, as the number of deals in our sample increases, the probability of significant market timing by random chance also increases (e.g., Jiang et al., 2007). Therefore, we run a bootstrap simulation, i.e., random resampling of entry and exit multiples, to compare our results to randomized investment and exit behavior of PE fund managers under the null hypothesis that there is no market timing. First, for each vintage year, we randomly draw an entry quarter from our observed deal sample calibrated based on the probability density function of investment periods across our full sample. Second, given the randomly drawn entry quarter, we randomly select an exit quarter calibrated based on the probability density function of holding periods across our full sample. Importantly, the distribution of exit quarters for each deal in our simulation is dependent on the randomly assigned entry quarter, so that the simulation of exit multiples follows a similar investment behavior comparable to our observed sample. Third, for each vintage year, we randomly resample 10,000 times and construct 10,000 investment and exit multiples. Based on these investment and exit multiples, we calculate our market timing measures and, for each vintage year, compare the market timing distributions of our observed sample with the distribution of our simulation results. For the simulation, given the structure of our data and the limited number of M&A transaction multiples in each benchmark cluster, we calculate median M&A multiples clustered by the year-quarter, instead of the same year-quarter, target industry and target region.

[3] Using a separate dataset of 1'600 exit multiple as in Morkoetter and Wetzer (2016), we find a correlation of 0.2 between PE transaction multiples and trading benchmark clusters and a correlation of 0.8 between PE transaction multiples and transaction benchmark clusters.

[4] We thank an anonymous reviewer for suggesting to use a simulation model.



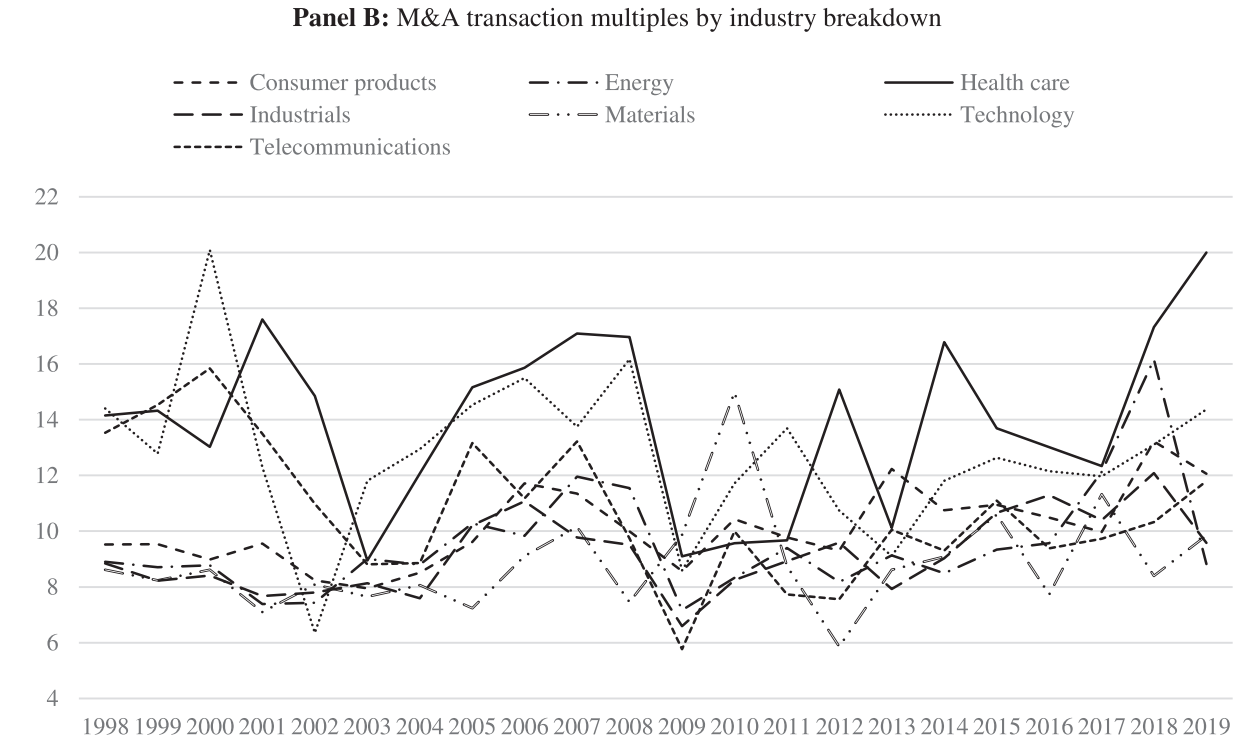


Fig. 1. M&A transaction multiples between 1998 and 2019. This figure shows the median transaction multiples for the time period between 1998 and 2019. In Panel A, we split the sample by deal regions, i.e., North America and Europe. In Panel B, we split the sample by industry, i.e., consumer products, energy, healthcare, industrials, materials, technology and telecommunications.

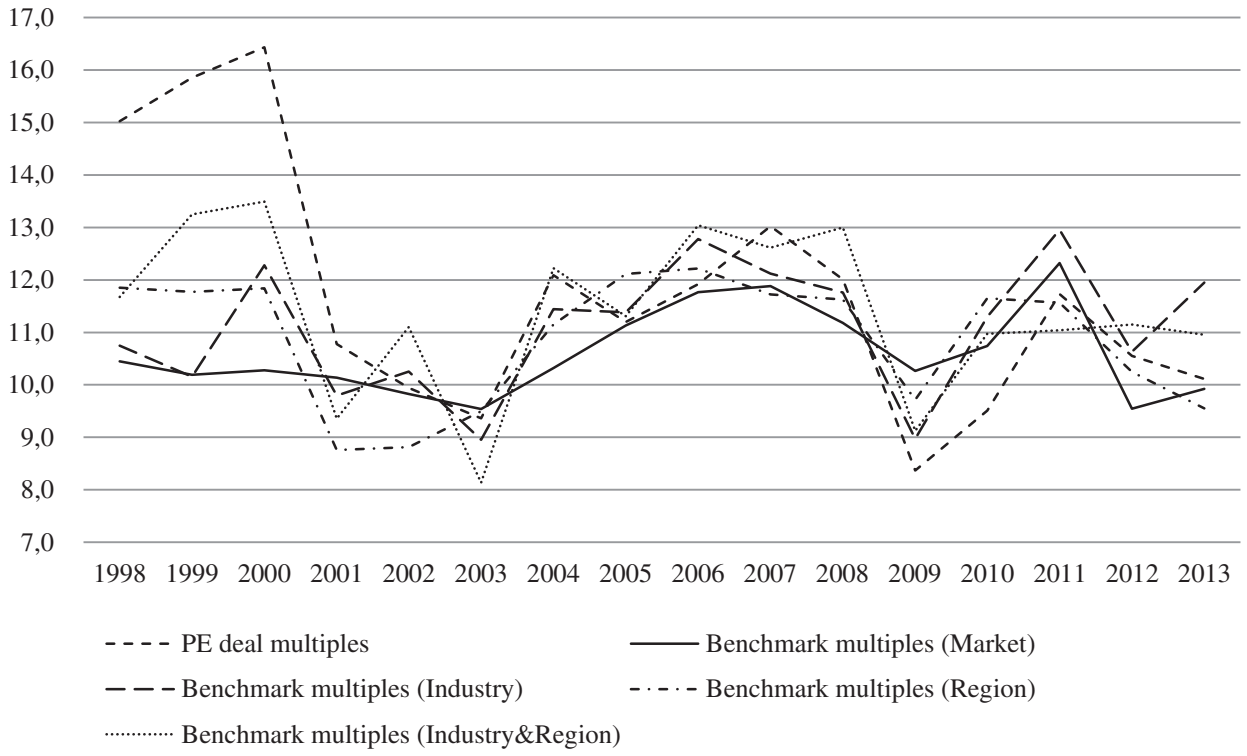


Fig. 2. PE exit multiples and market multiples in 1998–2013. This figure shows a set of median EV/EBITDA multiples from 1998 to 2013. The graph underlines the high correlation of PE deals and market multiples as this is the major underlying assumption of this paper. The dotted red line represents the median multiples of approximately 1600 PE exit deals that are also used by Morkoetter and Wetzer (2016). These PE deals are from Thomson One and are otherwise not used in our analysis. The correlation between median multiples (benchmarked by investment time) and PE transaction multiples is 0.2. The correlation between median multiples (benchmarked by investment and target region) and PE transaction multiples is 0.5. The correlation between median multiples (benchmarked by investment time and target industry) and PE transaction multiples is 0.4. The correlation between median multiples by (benchmarked by investment time, target industry, and target region and PE transaction multiples is 0.8.

4.4. Empirical results

Table 3 presents our main results on PE funds' market timing ability based on M&A transaction multiples. As part of our identification strategy, we use a benchmark that accounts for variation of M&A transaction multiples along three dimensions, i.e., target region, target industry and the year-quarter of the PE investment and exit, respectively.[5] First, in Panel A of Table 3 we test market timing ability against the hypothesis that no such abilities exist by comparing our results against the mean of zero. Panel A shows that the mean entry multiple in our sample is 10.80 and the mean exit multiple is 11.12. The mean (median) difference between market multiples at exit and market multiples at investment 0.32 (0.30) with the mean being statistically significantly different from zero at the 1% level. The standard deviation of 5.58 and the 25th percentile threshold at -2.46 and the 75th percentile threshold at 3.16 suggest that market timing realization between PE fund managers vary substantially. Assuming a median enterprise value at investment of 306 USDmn for PE deals and a median EBITDA of 34 USDmn,[6] the average multiple increase of 0.4 would result in an enterprise value at exit of 320 USDmn which is equivalent of an increase in enterprise value of approximately 14 USDmn through market timing alone. For simplification, our estimation assumes that the target's EBITDA remains constant over time. Importantly, a dispersion in market timing realization does not necessarily imply that fund managers have suboptimal market timing abilities.[7] For example, a manager with good market timing abilities may deliberately forgo a window of opportunity in exiting a deal when market multiples are generally high in favor of EBITDA expansion considerations. Thus, while, on average, we would expect fund managers with good market timing abilities to display positive multiple surfing, this may not be a true assertion in every case.

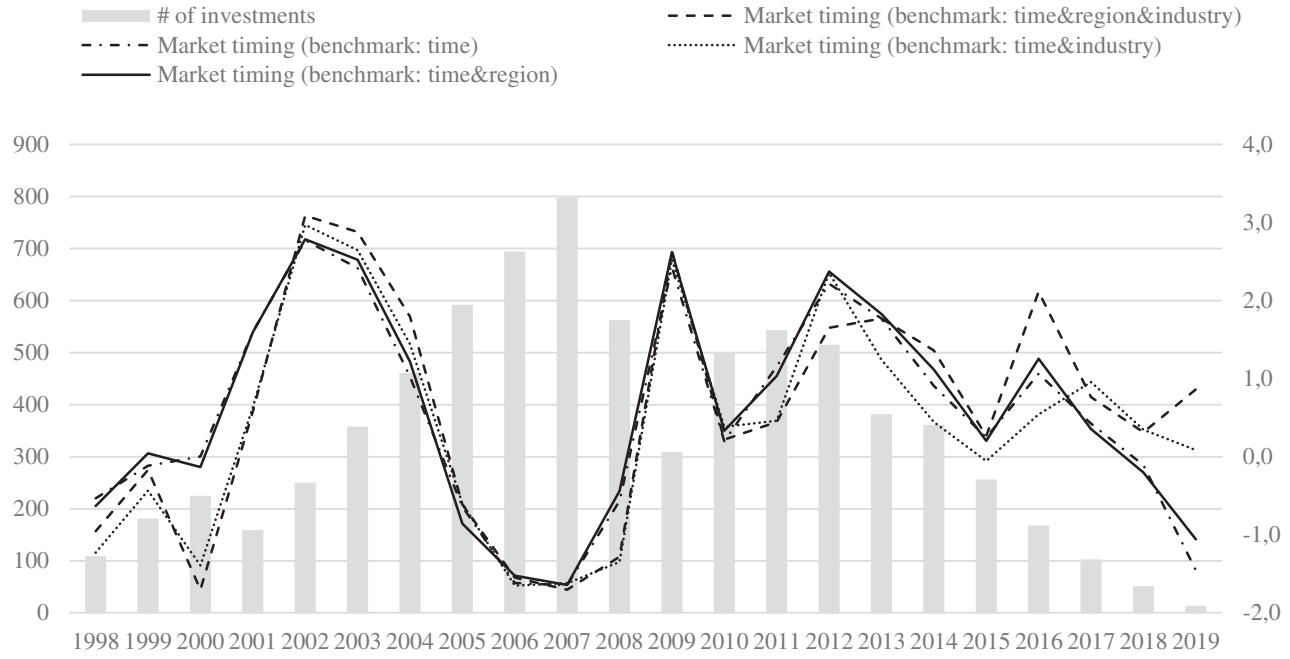
Panel B of Table 3 reports the market timing results by deal characteristics. Overall, we find evidence of market timing in the majority of subsample analyses, with the exception of small deals (i.e., investment size smaller than the median investment size) where we observe no market timing and IPOs where we find significantly negative market timing. It may be easier for GPs to time the markets for small deals as it potentially is more difficult to find suitable, alternative investment and exit opportunities as PE deal sizes increase. Small deals thereby may allow GPs more deal flexibility which can be reflected in superior market timing ability. We further assess market timing abilities using a normalized measure of market timing whereby we calculate market timing relative to a PE fund's market multiple at entry. Our results suggest that, on av-

[5] We rerun our analysis using three alternative approaches to cluster M&A transaction multiples, i.e., by (i) time, (ii) time and industry as well as (iii) time and region. The results in Appendix A1 show that our results remain statistically and economically stable.

[6] Estimations are taken from Morkoetter and Wetzer (2016) as Preqin reports few data points on target financials.

[7] We are grateful for an anonymous reviewer for raising this point.

Panel A: Market timing by investment year



Panel B: Market timing by exit year

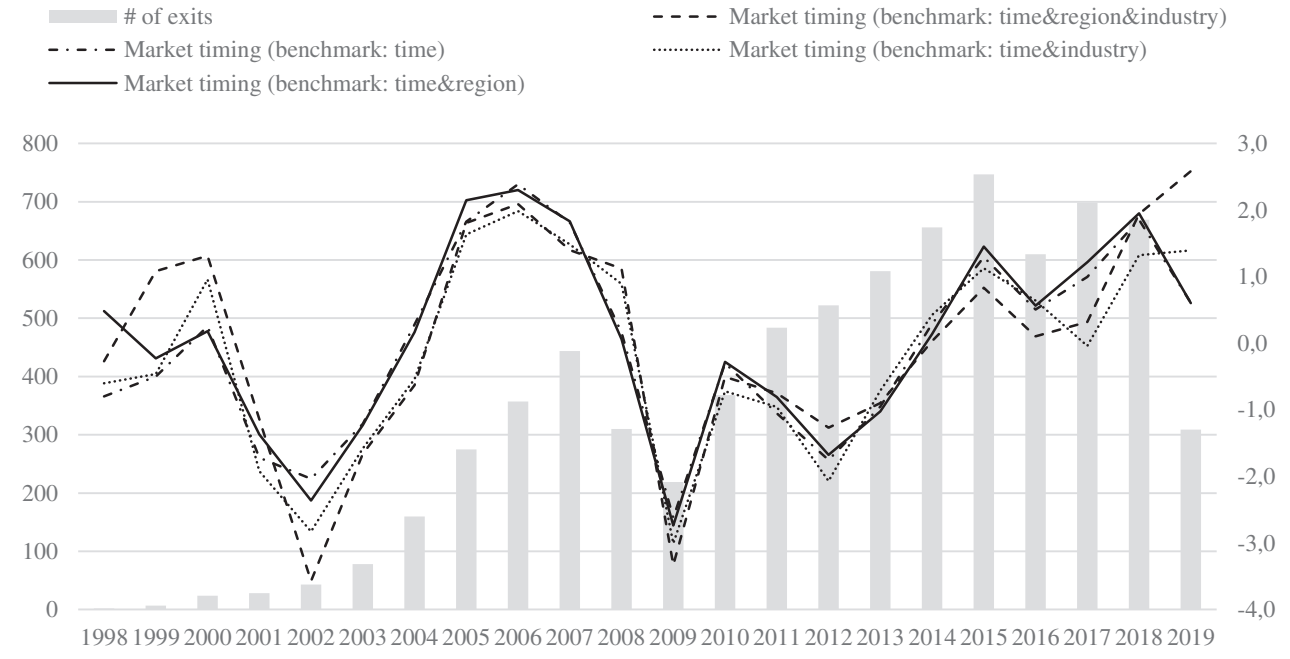


Fig. 3. Market timing over time. This figure shows the market timing for the sample between 1998 and 2019. We report four variations of market multiple benchmarks: (i) transaction time, (ii) transaction time and the target region, (iii) transaction time and target industry, and (iv) transaction time, target industry, target region. In Panel A, we report market timing by the corresponding investment year. In Panel B, we report market timing by the corresponding exit year.

Table 3
Market timing of PE fund managers. This table reports the investment and exit market timing performance based on median M&A transaction values clustered by region, industry and year-quarters. Panel A reports the mean entry and exit multiples as well as overall market timing. Panel B shows mean market timing based on selected subsamples. One-sample *t*-test are used to calculate the differences in means from zero. Variables are winsorized at the 1% level. The symbols ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	Mean	Median	StDev	p25	p75	*N*
Panel A: Main results						
Entry multiple	10.80***	9.89	3.96	8.09	12.75	7591
Exit multiple	11.12***	10.47	4.00	8.41	12.81	7591
Market timing	0.32***	0.30	5.58	-2.46	3.16	7591
Panel B: Market timing						
Geographic regions						
North America	0.42***	0.24	6.13	-2.76	3.61	4266
Europe	0.19***	0.35	4.78	-2.12	2.75	3325
Investment type						
Buyout	0.26***	0.30	5.34	-2.33	3.05	5193
Growth	0.58***	0.53	5.95	-2.55	3.40	1107
Others	0.33**	0.06	6.15	-2.82	3.45	1291
Investment size (USDmn)						
< median (112)	0.56***	0.60	5.71	-2.29	3.28	1302
>= median (112)	0.00	0.09	5.49	-2.67	2.97	1307
Holding period (years)						
< median (4.3)	0.51***	0.40	5.49	-2.20	3.34	3790
>= median (4.3)	0.13**	0.23	5.66	-2.72	3.05	3801
Exit type						
IPO	-0.84*	-0.44	4.53	-2.32	1.90	88
Trade sale	0.39***	0.49	5.79	-2.59	3.36	3541
Secondary sale	0.23**	0.30	5.60	-2.54	3.06	2617
Other	0.40***	0.00	4.99	-1.97	2.90	1345

erage, market timing contributes to an increase of 14% of the entry market multiple (see Appendix A2).

Second, as aforementioned, we account for time trends in our data and compare market timing ability of GPs against a simulation model where we simulate market timing effects based on random entry and exit dates within specific entry and exit periods following a PE fund's vintage year. Table 4 reports the results of our main analysis in column (1) in comparison to the bootstrapping simulation in column (2) split by vintage year periods of economic expansion and contraction.

Our results show that, for each vintage year period, actual market timing is significantly higher than the simulated market timing, except for Panel B where we find no significant difference for the vintage years between 2001 and 2003. Observed market timing is up to 0.70 multiples higher than in our simulation model, depending on the vintage year period. Interestingly, for vintage years between 2004 and 2008, overall market timing is negative for the observed as well as simulated sample. However, market timing in our actual sample is at -0.15 multiples less negative compared to the simulated sample which reports a market timing of -0.27. Relative to our simulation model, we find the economically strongest evidence for the presence of market timing of fund managers for the vintage years between 1995 and 2000 as well as for the vintage years between 2013 and 2018.

Regarding entry and exit multiples, Table 4 suggests that across all vintage year periods, exit multiples in our actual sample are consistently higher than in the simulation. Our results therefore point to the notion that fund managers may make use of actively timing the market when exiting PE deals. In contrast, we find mixed evidence for market timing on deal entry. Table 4 shows that actual entry multiples are significantly lower between 1995–2000 and 2013–2018, compared to the simulation results. In contrast, for the remaining vintage year periods, we find support for superior market timing on the deal entry.

As above, we also assess our results using a normalized measure of market timing by dividing market timing by the entry market multiple. We find that actual, normalized market timing is between -1% and 6% higher than in our simulation, depending on the vintage year period (see Appendix A3).

4.5. Investment and exit timing

To this point, we focused on overall market timing ability of GPs. In this section, we analyze investment and exit timing ability separately. Since PE funds tend to have more flexibility when exiting investments as compared to committing to investments, we test whether GPs make use of this additional flexibility to exploit market timing when exiting their investments. For example, Jenkinson and Sousa (2015) suggest that GPs wait for the right opportunity to go public. At the same time, PE funds may have to commit to investment whenever potential targets are offered with only limited timing flexibility.

Table 5 shows the results for investment timing (Columns 1 to 3) and exit timing (Columns 4 to 6) by deal characteristics. Regarding investment timing, we find no evidence of market timing abilities. In particular, Table 5 shows that fund managers tend to buy at multiples that are 1.79% higher than the average multiple of 12 quarters surrounding the deal quarter.[8] In contrast, we find supporting evidence of overall exit timing. Table 6 suggests that fund managers are able to sell at multiples are 2.08% higher than the average multiple of 12 quarters surrounding the exit quarter. Exit timing is significantly positive except for deals in North America (see Panel A), other investment types (see Panel B) as well as IPOs in Panel F.

[8] To ensure that our results are not driven by outliers, for our baseline results we require M&A multiples to be available for all 12 quarters surrounding the investment and exit quarter to calculate a reliable benchmark. In untabulated tests, we re-run our analysis by requiring M&A multiples to be available for at least half of all quarters. Our results remain stable. In further tests, we also extend the number of quarters surrounding investment and exit quarters to 16 and 24 quarters, respectively to serve as a benchmark. We find that our results remain quantitatively and statistically stable.

Table 4
Market timing simulation with bootstrapping. This table shows the entry and exit multiples as well as overall market timing based on median M&A clusters on the year-quarter level. The difference in means for entry and exit multiples as well as market timing compares the means between the actual multiples and the means obtained through bootstrapping simulation. Panels A to E report the result split by vintage years during economic expansion and contraction periods. The differences in means from zero are calculated using two-sample *t*-tests. Variables are winsorized at the 1% level. The symbols ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

By vintage years	Actual (1)	Bootstrap (2)	*t*-test (3)
Panel A: 1995–2000			
Entry multiple (mean)	10.86	11.32	-0.45***
Exit multiple (mean)	11.23	10.97	0.24***
Market timing (mean)	0.36	-0.34	0.70***
N	1421	60,000	
Panel B: 2001–2003			
Entry multiple (mean)	10.96	10.75	0.21***
Exit multiple (mean)	11.24	11.11	0.13***
Market timing (mean)	0.27	0.36	-0.09
N	1145	30,000	
Panel C: 2004–2008			
Entry multiple (mean)	11.24	11.12	0.12***
Exit multiple (mean)	11.09	10.86	0.23***
Market timing (mean)	-0.15	-0.27	0.11***
N	3390	50,000	
Panel D: 2009–2012			
Entry multiple (mean)	10.48	10.52	-0.04
Exit multiple (mean)	11.83	11.76	0.07**
Market timing (mean)	1.35	1.23	0.12***
N	1091	40,000	
Panel E: 2013–2018			
Entry multiple (mean)	11.67	12.09	-0.42***
Exit multiple (mean)	12.17	12.06	0.11**
Market timing (mean)	0.50	-0.03	0.53***
N	544	60,000	

Table 5
Investment and exit timing by deal characteristics. This table splits the investment and exit market timing performance by deal characteristics. The difference in means from zero is verified through a one-sample *t*-test. Market timing (i.e., investment timing and exit timing) measures are winsorized at the 1% level. The symbols ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively. All continuous variables are winsorized at the 1% levels.

	Investment timing			Exit timing		
	(1)	(2)	(3)	(4)	(5)	(6)
	Total	StDev	*N*	Total	StDev	*N*
All	1.79***	26.49	5012	2.08***	24.87	4657
Panel A: Region						
North America	1.35**	29.46	2486	0.88	28.30	1965
Europe	2.21***	23.20	2526	2.96***	22.00	2692
Panel B: Investment type						
Buyout	1.58***	26.11	3535	2.24***	24.40	3314
Growth	1.95*	27.85	707	2.51**	25.42	638
Others	2.58***	27.03	770	0.98	26.56	705
Panel C: Investment size (USDmn)						
< median (112)	2.14**	25.52	900	2.86***	23.38	965
>= median (112)	2.08**	24.84	928	1.80**	24.98	931
Panel D: Holding period (years)						
< median (4.3)	1.71***	26.47	2312	2.53***	25.82	2344
>= median (4.3)	1.86***	26.52	2700	1.64***	23.88	2313
Panel E: Partial exit						
No	–	–	–	1.97***	24.80	4039
Yes	–	–	–	2.86***	25.36	618
Panel F: Exit type						
IPO	–	–	–	-0.17	25.13	216
Trade sale	–	–	–	2.34***	25.17	2051
Secondary sale	–	–	–	1.45**	23.85	1554
Other	–	–	–	3.22***	25.90	836

We further assess the benefits of exit timing over investment timing in a cross-sectional setup and use our timing measures as defined in Eqs. (2) and (3). To explore the exit and investment timing, we combine investment and exit observations for each fund in one dataset and multiply 'investment timing' by -1 since for fund managers, optimizing market timing implies minimizing investment timing (i.e., pay a lower multiple relative to the benchmark) and maximizing exit timing (i.e., receive a higher multiple relative to the benchmark). In line with our prior analysis, we require M&A multiples to be available for all 12 quarters surrounding the investment and exit quarter respectively.

$$Market\ timing_j = \alpha + \beta\ Exit\ timing_i + \varphi\ Deal\ size_j + \delta\ FE_j(\text{Region}, Industry, Vintage, Fund, Deal, GP) + \varepsilon_{i,j} \quad (4)$$

We define the variable of interest, *exit timing*, as 1 if fund *i* exited the transaction *j*, and 0 otherwise (i.e., in that case the PE fund invested in the transaction). In total, we run seven different regression models using combinations of control vectors and fixed effects to measure the impact of exit timing benefit on overall market timing. Table 6 reports our findings. In our baseline model in Column 1, the results show that market timing is 3.6% higher when exiting the transaction, as compared to investing in the same transaction. Our findings corroborate the notion that PE fund managers tend to have more flexibility when exiting investments and thus seem to make better use of market timing abilities (e.g., Gredil, 2022). As Achleitner et al. (2011) argue, it requires dedicated skill to time the markets, which appear to be

Table 6
Investment vs exit timing. This table reports cross-sectional regression for investment and exit timing abilities on overall market timing ability. The sample includes PE transactions completed within 1998 and 2019. We define *exit timing* as a dichotomous variable which equals 1 if the PE transaction was exited and 0, otherwise. Continuous variables are winsorized at the 1st and 99th percentiles of their distributions. Standard errors in parentheses refer to robust standard errors. The symbols ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Exit timing	3.634***	3.636***	4.345***	3.632***	3.778***	3.989***	3.756***
	(0.524)	(0.527)	(0.811)	(0.521)	(0.557)	(0.694)	(0.535)
Deal size (ln)			-0.198				
			(0.247)				
Region FE	No	Yes	Yes	Yes	Yes	No	Yes
Industry FE	No	Yes	Yes	Yes	Yes	No	Yes
Vintage FE	No	No	No	Yes	No	No	No
Fund FE	No	No	No	No	Yes	No	No
Deal FE	No	No	No	No	No	Yes	No
GP FE	No	No	No	No	No	No	Yes
Observations	9669	9669	3723	9669	9669	9669	9669
Adj. R-squared	0.005	0.005	0.007	0.005	0.020	0.053	0.016

more effective when selling portfolio companies. When gradually adding control vectors and control for unobserved heterogeneity using fixed effects (i.e., deal region, deal industry, vintage year, fund-level, deal-level, GP), our results remain statistically and economically stable. Depending on model specifications, we find that market timing is between 3.6% to 4.3% higher when exiting the transaction, as compared to investing in the same transaction. Importantly, we find significantly better exit than entry timing when controlling deal fixed effects. While Gredil, 2022 provides evidence that market timing of fund managers is more informative on the deal exit side compared to the deal entry side, our study is the first to contrast timing abilities between deal entry and deal exit within a given deal. When controlling for all other aspects of a given deal in specification (6) of Table 6, exit timing results in a multiple that is 4.0% higher than for the exit timing, relative to the 12 quarters surrounding the exit and entry, respectively. In addition, by including GP fixed effects in specification (7) of Table 6, we show that exit timing is a more important driver for multiple surfing than is entry timing, irrespective of idiosyncratic market timing ability of a given GP.

5. Conclusions

Building on literature that explores performance and value creation in private equity, we investigate how market timing abilities of PE fund managers can positively contribute to the value creation of PE funds. We do so by analyzing the GP's ability to time the overall capital market environment during both investments and exits of their portfolio companies. We find evidence of significant, yet modest, market timing, as GPs are able to sell portfolio companies when market multiples are higher compared to market multiples at the time of investment. Our results suggest that, on average, market timing represents a 0.32 market multiple increase between the time of investing and the time of exiting a transaction. Our results remain stable when using a simulation model to account for potential time trends in our data. Thus, actual PE timing decisions also compare favorably to randomized entry and exit timing. Market timing is particularly beneficial when exiting a portfolio company, potentially because fund managers often experience considerable flexibility in their decision to time the exit of an investment.

Appendix

Table A1
Alternative clustering of M&A transaction multiples. This table reports the summary for entry and exit multiples as well as for overall market timing using three alternative clustering methods of M&A transaction multiples to estimate PE multiples. In Panel A, we estimate PE multiples by calculating the median M&A transaction multiples clustered by the year-quarter only. In Panel B, we estimate PE multiples by calculating the median M&A transaction multiples clustered by the year-quarter and deal industry. In Panel C, we estimate PE multiples by calculating the median M&A transaction multiples clustered by the year-quarter and deal region. Variables are winsorized at the 1% level. The symbols ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	Mean	Median	StDev	p25	p75	*N*
Panel A: Market level						
Entry multiple	9.81***	10.08	1.29	8.82	10.68	9424
Exit multiple	10.25***	10.45	1.32	9.40	11.30	9424
Market timing	0.44***	0.46	1.91	-0.95	1.89	9424
Panel B: Market-industry level						
Entry multiple	10.59***	9.98	3.03	8.38	12.36	9413
Exit multiple	10.81***	10.50	2.72	8.84	12.39	9399
Market timing	0.21***	0.28	3.64	-1.79	2.46	9388
Panel C: Market-region level						
Entry multiple	9.88***	9.95	1.64	8.47	11.07	9424
Exit multiple	10.40***	10.32	1.69	9.30	11.27	9424
Market timing	0.51***	0.51	2.37	-1.17	2.17	9424

Table A2
Normalized measure of market timing. This table shows the main statistics (mean, median, standard deviation, 25th percentile, 75th percentile and number of observations) for a normalized market timing measure. We calculate normalized market timing as the median M&A transaction multiple at exit minus the median M&A transaction multiple at entry relative to median M&A transaction multiple at entry of a given PE transaction. The difference in means from zero is calculated using a one-sample *t*-test against zero. Normalized market timing is winsorized at the 1% levels. The symbols ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	Mean	Median	StDev	p25	p75	*N*
Panel A: Main result						
Overall market timing	0.14***	0.03	0.53	-0.21	0.36	7591
Panel B: By deal characteristics						
Geographic regions						
North America	0.16***	0.02	0.58	-0.23	0.39	4266
Europe	0.11***	0.04	0.45	-0.19	0.32	3325
Investment type						
Buyout	0.13***	0.03	0.51	-0.21	0.35	5193
Growth	0.17***	0.06	0.58	-0.21	0.38	1107
Others	0.15***	0.01	0.57	-0.23	0.38	1291
Investment size (USDmn)						
< median (112)	0.17***	0.06	0.56	-0.20	0.38	1302
>= median (112)	0.11***	0.01	0.50	-0.24	0.34	1307
Holding period (years)						
< median (4.3)	0.16***	0.04	0.54	-0.19	0.37	3790
>= median (4.3)	0.12***	0.02	0.52	-0.23	0.34	3801
Exit type						
IPO	0.01	-0.05	0.38	-0.21	0.19	88
Trade sale	0.15***	0.05	0.55	-0.22	0.38	3541
Secondary sale	0.13***	0.03	0.53	-0.21	0.35	2617
Other	0.12***	0.00	0.49	-0.18	0.32	1345

Table A3
Normalized measure of market timing for bootstrap simulation. This table shows the normalized market timing based on median M&A clusters on the year-quarter level. We calculate normalized market timing as the median M&A transaction multiple at exit minus the median M&A transaction multiple at entry relative to median M&A transaction multiple at entry of a given PE transaction. The difference in means for normalized market timing compares the means between the actual, normalized market timing and the normalized market timing obtained through bootstrapping simulation. The differences in means from zero are calculated using two-sample *t*-tests. Variables are winsorized at the 1% level. The symbols ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	Actual (1)			Bootstrap (2)	*t*-test (3)		
	Mean	S.E.	*N*	Mean	S.E.	*N*	[(1)-(2)]
By vintage year periods							
1995–2000	0.05	0.005***	1421	-0.01	0.001***	60,000	0.06***
2001–2003	0.04	0.006***	1145	0.05	0.001***	30,000	-0.01
2004–2008	0.01	0.003**	3390	0.00	0.000	50,000	0.01**
2009–2012	0.14	0.004***	1091	0.13	0.000***	40,000	0.01**
2013–2018	0.05	0.003***	544	0.00	0.000***	60,000	0.05***

Declaration of Competing Interest

None.

CRediT authorship contribution statement

Tim Jenkinson: Conceptualization, Methodology, Writing – original draft. **Stefan Morkoetter:** Conceptualization, Formal analysis, Methodology, Writing – original draft. **Tobias Schori:** Formal analysis, Data curation, Methodology. **Thomas Wetzer:** Formal analysis, Data curation, Writing – original draft, Methodology.

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