What drives private equity performance in emerging markets? An African perspective

By

Olwethu Cata

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Supervisor: A/Prof. Francois Toerien

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Declaration

I, Olwethu Cata, do hereby declare that the work presented in this thesis, is my own, except where acknowledged and that this thesis or any part of it, has not been previously submitted for the award of a degree at any university.

Signature:

Date: 13 May 2024

Abstract

Despite the increasing amounts of capital being dedicated to the asset class, few attempts have been made to evaluate Private Equity (PE) returns in emerging markets and for Africa specifically. Understanding the risk factors associated with PE returns in emerging markets and whether institutional investors can expect adequate compensation for accepting such risks is important to optimal asset allocation. This thesis investigates PE performance using a novel dataset of 250 portfolio investments made and exited by 28 General Partners (GPs) across 52 funds in Africa over the period 1996 to 2019. It addresses the following four research questions: (1) How has PE in Africa performed relative to public markets? (2) Is the performance achieved by GPs on the continent persistent? (3) What determines the holding periods of PE investments on the continent? (4) How do macroeconomic conditions impact PE returns on the continent? In doing so, the study makes a significant original contribution to the literature on PE performance by providing new evidence from a minimally investigated region and contributes insights that have practical significance for the capital allocation strategies of institutional investors allocating to PE funds on the continent.

The contributions are made in four sequential studies. The first examines how PE in Africa has performed relative to public markets. To do this, public market equivalent returns were calculated, which represent the return that an investor would have received if an equivalent investment had been made in the MSCI Emerging Market Index. The findings indicate that, on a gross of fees basis, a dollar invested in private equity in Africa has, on average (median), returned 78% (37%) more than a dollar invested in the MSCI Emerging Market Index over the period 1996 to 2019. Not only have top quartile funds outperformed the index, but so have the average, median, and bottom quartile funds - implying better relative performance than has previously been reported for PE in emerging markets. These results explain the recent increases in investor allocations to PE investments in Africa and imply that an allocation to PE may contribute positively to an allocator's overall portfolio return.

The second study investigates whether the GP performance in Africa is persistent using the deal level approach introduced by Braun et al. (2017) that allows for a decomposition of the sources of persistence. The findings suggest that IRR performance is persistent across subsequent deals exited by the same GP and indicate that persistence is driven by the third and top quartiles. This implies conventional wisdom to back GPs that have previously achieved top quartile performance holds in Africa. In exploring the sources of persistence, this study finds that GPs differ systematically in their ability to achieve timeous and high value exits and that this factor has a substantial influence on persistence. Unlike the developed markets literature that documents the disappearance of persistence, the results indicate that the increasing capital flows to the PE industry on the continent

have had a limited negative influence on persistence. This suggest that past PE performance in Africa is a good predictor of future returns.

The third study investigates the factors that have an impact on PE investment holding periods in Africa. It focuses on the impact of deal characteristics and market conditions on holding periods and uses survival analysis to examine how these factors impact exit behavior. The results indicate that investment duration is persistent across subsequent deals exited by the same GP. This suggests that the ability to timeously realise value is attributable to skill and implies that investment duration may be an important dimension of GP selection. Furthermore, contrary to the increasing holding periods documented by studies focused on developed PE markets, the results indicate that the holding periods of PE deals in Africa have declined over time in line with an improving exit environment as more capital is dedicated to the asset class on the continent. The results also indicate that holding periods are countercyclical and so are lower for investments held when the economy is performing, credit spreads are low, and aggregate industry commitments are increasing. This suggests that GPs on the continent time their exits to take advantage of favourable market conditions.

The fourth study uses quantile regression to investigate the impact of macroeconomic conditions on PE returns and examines the combined impact of deal, GP, and macroeconomic factors on performance. The results indicate that GDP growth has a strong positive impact on deal level returns while credit spreads have a negative association with performance. The impact of GDP growth is larger on high performing investments than on low performers while the magnitude of the negative relationship between returns and credit spreads is larger for higher performing investments. Notably, the results indicate that capital flows have a significant positive impact on top quantile performers and a nonsignificant influence on low and median performers. Combined with the findings of the third study, this suggests that top performers take advantage of improving liquidity conditions by exiting timeously and therefore realise higher performance.

Overall, the results suggest that an allocation to the asset class may contribute positively to an allocator's overall portfolio return. Notably, the presence of deal-by-deal performance persistence indicates that the conventional wisdom of selecting GPs that have previously achieved good performance may be applicable when selecting GPs on the African continent. Furthermore, the finding of holding period persistence demonstrates the importance of the ability to timeously realise exits as a dimension of GP selection. This implies that LPs should pay due consideration to whether the track records of GPs demonstrate persistent abilities in evaluating market conditions and making value enhancing decisions about the timing of exits.

Dedications

To my daughter, Zazi.

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Chapter 1: Introduction and background

1.1 Introduction

Institutional investor interest in private equity (PE) has grown rapidly in the last fifteen years and has resulted in the asset class becoming a mainstream feature in developed markets whilst increasing amounts of capital are being dedicated to PE in emerging markets (Klonowski, 2019; Preqin, 2018). During the period 2008 to 2017, emerging markets focused fund managers closed an average of 484 funds per annum, which accounts for an annual average share of 42% of funds closed globally. Over this period, funds focused on emerging markets raised an average $83 billion per annum, which amounts to an annual average share of 26% of PE capital raised globally (Preqin, 2018). Capital allocations to PE in emerging markets increased rapidly in the aftermath of the global financial crisis of 2008, reaching their apex as a proportion of global fundraising in 2013 at 51% of the number of funds closed, and 40% of the aggregate capital raised globally. PE in emerging markets will likely continue to play an important role in the construction of portfolios as investors seek to diversify and improve the risk-return characteristics of their portfolios.

The levels of interest in making commitments to PE in Africa have increased and the continent is consistently ranked in the top-five most attractive emerging markets[1] for private capital in global institutional investor surveys (EMPEA, 2020). For instance, according to the African Private Capital Association (AVCA) survey data, in 2021, 65% of institutional investors planned to increase their allocations to PE on the continent over the following three years. Among those investors, 95% reportedly already had exposure to PE on the continent and 50% planned to increase their pace of deployment over the next five years (AVCA, 2021b). Consequently, the PE market in Africa has grown significantly over the past fifteen years in terms of the number of deals completed, and amount of capital invested. According to data released by Preqin, Africa focused fund managers completed an average of 72 buyout deals per annum and invested an average aggregate annual value of $2,4 billion during the period 2008 to 2017. Over this period, the number of deals completed on the continent accounted for an annual average of 15% of the buyout transaction completed in emerging markets.

PE has become a key mechanism for reorganising and revitalising mature companies, funding growth companies that are at the frontier of technological innovation, and is an important driver of entrepreneurship and promoter of economic growth (Lerner, 2013). The growth of PE on the continent has contributed to alleviating the financing gaps that have constrained the competitiveness and growth of firms and has thereby contributed to sustainable private sector development.

[1] Alongside Southeast Asia, China, India, Latin America (excluding Brazil), and Brazil (see, EMPEA, 2020).

Consequently, various countries in Africa have proposed and enacted pension fund reforms to enable and encourage greater investment in the asset class (Baloyi et al., 2022; Nkam et al., 2020; Treasury, 2022). For instance, the South African National Treasury recently completed a consultation process that culminated in the gazetting of amendments to Regulation 28 (the part of the South African legislation that limits pension fund exposure by asset class) that increased the percentage of pension assets that can be allocated to PE.

Despite the increasing amounts of capital being dedicated to the asset class, few attempts have been made to evaluate PE returns in emerging markets, and in Africa specifically. This is due to the dearth of reliable data, which has made analysing PE performance a challenging task (Lossen, 2007). To put this into perspective, the existing research on PE in Africa mainly consists of evaluations of the industry's development and economic impact (Babarinde, 2012; Jover & Mlambo, 2014; Mataen, 2014; Mlambo, 2013); investment decision-making (Bent et al., 2004; Hamman et al., 2021; Portmann & Mlambo, 2013; Van Deventer & Mlambo, 2009); and periodic survey reports published by industry bodies (e.g., AVCA and SAVCA[2]). There are only three studies that have examined PE returns in Africa, namely those by Errais and Gritly (2022), Missankov et al. (2008), and van Niekerk and Krige (2009). This scarcity of scholarly research examining PE returns in Africa is lamentable given that PE funds are custodians of a significant and increasing proportion of the continent's pension assets.

The existing body of studies that have examined PE performance has mostly focused on developed PE markets, particularly Europe and the US (see, for example, Kaplan & Schoar, 2005; Harris et al., 2014; Braun et al., 2017; and Harris et al., 2023). Given their different stages of development, it is unlikely that findings from developed PE markets can be generalised to emerging markets such as Africa. Furthermore, the considerable differences in economic and institutional traits across emerging markets make the findings reported in the handful of studies that are based on other emerging markets, particularly China, Brazil, and India (see, for example, Fang et al., 2018; Gohil, 2014; Minardi et al., 2019; and Kumar & Firoz, 2023), less applicable as examples for institutional investors that are deploying capital into PE in Africa to learn from (Ribeiro, 2008). Therefore, there is scholarly interest in elucidating whether investors have benefitted from the increasing allocations to PE demonstrated by the rise in the number of deals completed in emerging markets, and Africa specifically (AVCA, 2023; Kumar & Firoz, 2023). Furthermore, there is a need for more research that examines PE returns in emerging markets, and Africa in particular, to improve understanding of their return dynamics and idiosyncratic characteristics.

[2] The South African Private Equity and Venture Capital Association

Understanding the drivers of PE returns is important to pensioners, regulators, and policy makers because PE funds are custodians of a significant and growing proportion of the continent's pension assets. Furthermore, research that elucidates the dynamics of PE returns in Africa is relevant to practitioners because the drivers of PE returns have practical implications for the capital allocation strategies employed by institutional investors. Given this context, this study investigates how PE has performed relative to public markets and the factors that drive PE returns in Africa from the perspective of an institutional investor.

The rest of this chapter is structured as follows: Section 1.2 provides the institutional background to PE investing, Section 1.3 provides the justification for this study, Section 1.4 briefly describes the data and its representativeness, Section 1.5 provides the research objectives, and Section 1.6 discusses the organisation of this thesis.

1.2 Background on intermediation in the PE industry

Institutional investors have historically accessed PE investments by making capital commitments to PE funds rather than making solo direct investments into private companies. Hence, once an institutional investor decides to invest into PE, the challenge becomes which funds to back (Goyal et al., 2021). PE funds are predominantly organised as limited partnerships with a 10-year term where the PE firm serves as the General Partner (GP) and institutional investors serve as Limited Partners (LPs). The types of institutional investors that invest into funds in Africa include pension and endowment funds, government aid agencies, development finance institutions, private equity fund of funds, insurance companies, and banks (SAVCA, 2023). Funds usually acquire investments during their first five years and GPs have full discretion over investment acquisition and disposal decisions for the duration of a fund's term. Consequently, selection decisions are long-lasting and consequential because they result in binding capital commitments that provide GPs with full discretion over the timing of capital calls and distributions. Indeed, although a market for buying and selling LP stakes has emerged in developed PE markets, it is illiquid and costly (Nadauld et al., 2019), and similar markets are yet to develop in emerging markets.

The relationship between LPs and GPs constitutes a principal-agent relationship wherein a principal (LP) delegates discretionary powers to an agent (the GP) to perform investment management work (Balboa & Martí, 2007; Freiburg & Grichnik, 2013). GP selection is challenging because LPs cannot tell the quality of a GP's investment proposition from a simple inspection of the proposal document, referred to as a private placement memorandum (Akerlof, 1970). The process is characterised by information asymmetries that are more pronounced when evaluating young GPs since LPs have even less information, such as performance track records, to assess the capabilities and motivations of recently established investment teams (Burton & Scherschmidt, 2004; Freiburg & Grichnik, 2013; Huynh, 2016; Zarutskie, 2010). Furthermore, GPs have more information about their own capabilities and have an economic incentive to convince LPs that they are highly capable, and that their opportunities are important and will create value (Balboa & Martí, 2007; Shane & Cable, 2002). Theoretically, GPs could opportunistically withhold information that reflects lower capabilities and overstate their experience or access to quality opportunities. Consequently, LPs face the risk of investing into GPs that do not have the capabilities to successfully manage a fund ("adverse selection") or invest into GPs that will focus their own interests at the expense of LPs ("moral hazard").

The growing number of GPs that have successfully raised funds in emerging markets suggests that LPs have devised methods to deal with agency issues. LPs follow selection processes that assess a range of criteria, the most important being the team composition, GP's track record, and the investment strategy (Barnes & Menzies, 2005; Groh & Von Liechtenstein, 2011; Kuckertz et al., 2015). They evaluate whether the skillsets possessed by the GP's investment team correspond with the proposed investment strategy and the extent of the prior working relationship amongst the team members (Burton & Scherschmidt, 2004; Groh & Von Liechtenstein, 2011; Ivashina & Lerner, 2019). The alignment of interest amongst team members is an important consideration as inequalities in the sharing of performance fees, also known as carried interest, lead to the departures of senior partners, which has a negative impact on the GP's ability to fulfil its mandate and raise additional capital (Ivashina & Lerner, 2019). Importantly, LPs prefer GPs that have demonstrated success in executing a similar strategy, and have to form a view on whether the strategy would be successful in the future (Barnes & Menzies, 2005). The prior empirical studies have also indicated that raising a follow-on fund is positively associated with GP experience and the performance of prior funds (Barber & Yasuda, 2017; Brown et al., 2019; Kaplan & Schoar, 2005; Sensoy et al., 2014).

The focus of selection processes on investment team capabilities suggests that LPs consider a GP's human capital and organisational capital resources to be important determinants of its ability to perform, which implicitly invokes the resource-based view of the firm and upper echelon theory (Zarutskie, 2010). Human capital resources include the skill, knowledge, intelligence, judgement, experience, insights, and the relationships of individual investment professionals within a GP (Barney, 1991). Organisational capital resources on the other hand include the human knowledge, skills, processes, systems, and culture of a GP (Hasan, 2018). The resource-based view of the firm suggests that resources that are rare, cannot be easily imitated, are non-substitutable, and are valuable in the sense that they enable the GP to effectively implement strategies that exploit high value opportunities can provide sustained competitive advantage (Barney, 1991; Wright et al., 1994). Upper echelon theory on the other hand suggests that senior management team characteristics should predict organizational outcomes (Hambrick & Mason, 1984).

Once a commitment is made, LPs cannot fully monitor the investments because they delegate the responsibility over day-to-day management of funds to the GPs. Although some LPs play a greater governance oversight role through appointment to Limited Partner Advisory Committees (LPAC), it is difficult to monitor the effort exerted by the GP in the management of portfolio companies. Scholars examining this principal-agent relationship have suggested that appropriately structured Limited Partnership Agreements (LPAs) can provide optimal incentives for the GP to work hard (Axelson et al., 2009; Baks & Benveniste, 2010). The main contractual mechanism used to improve the alignment of interests is the GP compensation structure. GPs are paid an annual management fee that is typically 2% of a fund's total capital during the investment period and 2% of invested capital after the investment period[3]. GPs also receive a share (typically around 20%) of a fund's profit, called carried interest, that becomes payable after LPs have received distributions that exceed their capital contributions and have earned an IRR that exceeds an agreed hurdle rate. Furthermore, to align risk appetites, GPs are required to make a capital commitment that will be invested *pari passu* with the capital of LPs.

Explanations for why LPs commit to funds, rather than make solo direct investments, mostly point to transaction costs and informational advantage. Investing into private companies is challenging and involves significant risk of adverse selection and moral hazard (Fried & Hisrich, 1994). Adverse selection (moral hazard) arises because the management of potential investee companies are privy to information (actions) that would influence the value an investor attributes to the company or the actions of management. GPs may have an informational advantage that enables them to reduce adverse selection at a lower cost than would be the case if LPs made solo direct investments (Fried & Hisrich, 1994; Chan, 1983; Sahlman, 1990). These lower costs are mostly due to the economies of scale associated with providing fund management services to several LPs (Chan, 1983), the economies of scope derived from the GP's network (Sahlman, 1990), and the benefits that result from the learning curve associated with evaluating transactions on a continuous basis (Hall & Hofer, 1993; Sahlman, 1990).

GPs utilise structured investment decision-making processes that enable them to reduce adverse selection and identify the highest quality opportunities (Fried & Hisrich, 1994). This involves using their

[3] Interestingly, Begenau and Siriwardane (2024) have indicated that some LPs appear to consistently pay lower fees than others and that this effect is partially explained by their size, experience, and past performance. They surmise that attributes such as bargaining power or negotiation skill impact the fees paid by LPs.

professional networks to source many pipeline transactions, which are reduced by eliminating the lower quality opportunities through investment screening (Fried & Hisrich, 1994; Gompers et al., 2016; Gompers et al., 2020). The significant resources devoted to investment evaluation is made evident by how few investments are closed compared to the number of deals originated. For instance, Gompers et al. (2016) suggest that out of every 100 pipeline deals, an average of 15 are taken into due diligence and less than four are closed. They also suggest that smaller GPs are more likely to source proprietary deals and that this might be due to the smaller size of their target companies compared to the larger buyouts that tend to be sold in auctioned processes. The most important factors used to differentiate and select between investment opportunities seem to be the competitive position of the company, the management team's track record, profitability, the valuation, and the GP's ability to add value to the company (Block et al., 2019; Gompers et al., 2016).

Upon investment, the prospects of success depend on the actions of the portfolio company management team, which the GP cannot fully monitor, and who could therefore engage in risky behaviour (Fried & Hisrich, 1994). GPs utilise numerous mechanisms that mitigate moral hazard by improving the alignment of interests with portfolio company management. Kaplan and Stromberg (2009) place these value enhancement initiatives into three categories: financial, operational, and governance engineering. In financial engineering, GPs provide portfolio company management teams with equity incentives so that they can participate on the upside. Management teams are required to make personally meaningful equity investments, the so-called 'skin-in-the-game', so that they also have downside exposure if value creation plans are not achieved. In addition, the use of leverage to partially fund transactions inculcates efficiency in the management of portfolio company cashflows because portfolio companies must meet debt repayment obligations. In governance engineering, GPs control the boards of portfolio companies by appointing representatives as non-executive directors that play an active role in the governance. In operational engineering, GPs use their industry and operational expertise to identify bolt-on acquisitions and to develop a value creation plan, and to provide support during its implementation by management.

This active management required in PE investments makes GP selection decisions consequential because LPs delegate full discretion over the management of investment to GPs. Therefore, when considering the inclusion of PE as part of a diversified portfolio, LPs must understand the risk factors that are associated with PE investments and evaluate whether they can expect adequate compensation for accepting such risks. Indeed, PE portfolio companies are actively managed investments whose characteristics may be different from public companies and require LPs to accept idiosyncratic GP and fund specific risks (Aliaga-Díaz et al., 2020).

1.3 Justifications for the study

Given this context, this study uses a novel dataset that consists of 250 fully exited portfolio investments made by 28 GPs across 52 funds in multiple regions of Africa that has been obtained directly from an institutional investor, on a confidential and anonymised basis, to investigate the factors that drive PE returns in Africa. It aims to address the following four research questions: (1) How has PE on the continent performed relative to public markets? (2) Is the performance achieved by GPs on the continent persistent? (3) What determines the duration of PE investments on the continent? (4) What is the impact of macroeconomic conditions on PE performance? In doing so, this thesis seeks to contribute to filling the gap in the academic literature on PE performance in Africa and to provide practical insights that would be informative to institutional investors allocating to PE funds on the continent.

Understanding the risk factors associated with PE returns and whether LPs can expect adequate compensation for accepting such risks is important to optimal asset allocation (Aliaga-Díaz et al., 2020). In efficient markets, the returns generated by fund managers should be no greater than the market return because all public information is already reflected in prices (Fama, 1970). In contrast, PE markets are far from frictionless and so LPs would expect their PE investments to yield a premium relative to freely traded public markets (Gompers & Lerner, 2000; Harris et al., 2014). The prior literature examining the performance of PE relative to public markets has faced data challenges that have caused controversy and, for some time led to a confusing picture of performance (Harris et al., 2014; Kaplan & Schoar, 2005; Phalippou & Gottschalg, 2009; Stucke, 2011). This controversy emanated from the use of defective data sourced from commercial providers who collected performance data through voluntary disclosure by GPs (Brown et al., 2015; Harris et al., 2014; Stucke, 2011). Essentially, the lack of public disclosure requirements has made sourcing PE data challenging and prior studies had to rely on data collected through methods that downwardly biased returns (Harris et al., 2014; Stucke, 2011).

The recently increased availability of data sourced directly from LPs has enabled researchers to reevaluate PE performance and to conclude that PE has historically outperformed public equity (see, for example, Higson & Stucke, 2012; Harris et al., 2014; Harris et al., 2016; and Robinson & Sensoy, 2016). These studies have focused on the US and European PE markets and few attempts have been made to compare PE performance to public equity in emerging markets, examples of the latter being studies involving China, Brazil, and India (see, for example, Gohil, 2014; Kumar & Firoz, 2023; and Fang et al., 2018). As highlighted earlier, the considerable differences in economic and institutional traits between these countries and Africa make the findings of these studies less applicable for LPs looking to better understand relative performance on the continent. Furthermore, no prior attempts have been made to examine the performance of PE in Africa relative to public equity by computing public market equivalent (PME) returns to compare how an equivalent investment in public markets would have performed. Therefore, how PE on the continent has performed relative to public equity remains unclear.

PE portfolio companies are actively managed investments whose characteristics may be different from public companies and require LPs to accept idiosyncratic GP and fund specific risks (Aliaga-Díaz et al., 2020). Interestingly, there is a developing literature consensus that suggests PE performance is persistent (see, for example, Kaplan & Schoar, 2005; Lerner et al., 2007; and Harris et al., 2023). These findings have been interpreted to mean that PE performance is attributable to skill rather than luck since the ability to persistently outperform indicates that there is something unique and time-invariant about the qualities of GPs that can accomplish this feat (Ewens & Rhodes-Kropf, 2015; Korteweg & Sorensen, 2017). At a practical level, the findings of persistence have translated into the conventional wisdom that suggests LPs should back GPs that have previously achieved top quartile performance. However, recent studies have suggested that this persistence may be transient and difficult for LPs to exploit (see, for example, Braun et al., 2017; Chung, 2012; Harris et al., 2023; and Korteweg & Sorensen, 2017). They indicate that skilled GPs, i.e., those that can persistently outperform, are scarce and are becoming even more so with time (Braun et al., 2017; Harris et al., 2023; Sensoy et al., 2014). This intimates that GP selection may no longer be the mechanical process based on past performance postulated by the conventional wisdom. Yet, despite academic intrigue and considerable implications for the practical capital allocation strategies of LPs, no prior studies have attempted to investigate persistence in Africa.

Furthermore, the extant literature has mostly investigated persistence at the fund level (see, for example, Kaplan & Schoar, 2005; Phalippou & Gottschalg, 2009; and Harris et al., 2023). This approach sequences the funds according to GP and analyses persistence using a regression framework with a lagged structure, where a significant lagged coefficient indicates that the performance of the current fund is dependent on the returns of the preceding fund. However, unlike the mutual funds research that typically examines persistence using annual returns, fund level studies analyse persistence at a very low frequency (Braun et al., 2017). This is because PE funds have a 10-year life, and their returns can only be known with certainty once all investments have been fully exited. Hence, fund level studies typically use returns that are based on audited GP appraisals of unrealised net asset values (NAV) of remaining portfolio investments, which may be biased estimates of final value (see, for example, Jenkinson et al., 2013; Barber & Yasuda, 2017; and Brown et al., 2019).

At the same time, GPs typically raise a subsequent fund halfway through the current fund, which may lead to spurious findings of persistence since funds are exposed to the same financial and economic conditions (Korteweg & Sorensen, 2017). Furthermore, the recent literature suggests that shifting the unit of analysis to the portfolio company may present an opportunity to improve the understanding of persistence and its sources (see, for example, Braun et al., 2017; Nanda et al., 2020; and Brown et al., 2020). Yet, there are only two studies that have examined persistence at the deal level, namely, those of Braun et al. (2017) and Nanda et al. (2020), and these studies have focused on deals completed in Europe and the US. This author is only aware of one study, namely that of Gohil (2014), that has analysed persistence in an emerging market, namely India, and it has done so at the fund level. No prior studies have investigated deal level persistence in an emerging market, nor have any analysed persistence in Africa at any level.

The liquidity properties of PE investments are likewise an important consideration in determining the role that PE can play in a diversified portfolio and in deciding the appropriate allocation strategies. This is because LPs make binding commitments at fund inception and delegate discretion on the timing of investments and exits to GPs, who are sophisticated market participants and may perceive when there are 'windows of opportunity' to exit at the best possible price (Ball et al., 2011; Gredil, 2022; Jenkinson et al., 2022; Jenkinson & Sousa, 2015). Furthermore, timeous distributions seem to be one of the ways in which GPs are expected to add value because LPs consider IRR to be the most important benchmark for PE performance (Gompers et al., 2016; Gompers et al., 2020). Yet, the recent literature has indicated that holding periods are increasing and that higher competition and capital flows to the asset class might be contributing factors (Jenkinson & Sousa, 2015; Joenväärä et al., 2022). These prior studies have focused on the European and US PE markets, and the importance of these issues to allocative efficiency indicates that extending this research to PE in Africa is long overdue.

In determining the role that PE can play in a diversified portfolio, LPs must also evaluate how the asset class contributes to the systemic risk exposure of their total portfolios. In fact, the literature has indicated that securities are influenced by a variety of factors and that some are systematic and cause much of the covariance among securities (Bodurtha Jr et al., 1989; Chen et al., 1986). Yet, although researchers have conducted extensive research on the relationship between macroeconomic conditions and public market returns, only a handful of studies have investigated the influence of macroeconomic conditions on PE returns (see, for example, Aigner et al., 2008; Phalippou & Zollo, 2005; Diller & Kaserer, 2009; and Steger, 2017). These studies focused on developed markets and PE in emerging markets, and Africa specifically, has received little attention.

The prior literature has also mostly analysed the influence of macroeconomic conditions at the fund level (see, for example, Aigner et al., 2008; Gresch & Von Wyss, 2011; and Steger, 2017). Consequently, they benchmark the period over which macroeconomic conditions impact returns based on vintage period because the distribution of portfolio investments across time is usually unavailable to researchers (Braun et al., 2017). Therefore, fund level studies are challenged in matching the period during which portfolio investments are exposed to the macroeconomic conditions of interest and as a result do not control for the idiosyncratic variability across individual investments (Braun et al., 2017; Brown et al., 2020). The two studies that have analysed the determinants of PE performance in Africa, namely those by van Niekerk and Krige (2009) and Errais and Gritly (2020), each analysed a single macroeconomic variable and so excluded most of the variables that have been found to be significant by the prior literature. Therefore, there is a need for more research that investigates the impact of macroeconomic conditions on PE returns in Africa because understanding the macroeconomic drivers of return is important to the capital allocation decisions of LPs. This study aims to contribute to filling this gap.

1.4 Research Objectives

This study therefore has the following specific objectives:

- to determine how PE in Africa has performed relative to the MSCI Emerging Market Index.
- to ascertain whether PE performance in Africa is persistent and, if so, to investigate its sources.
- to investigate the determinants of PE holding periods in Africa.
- to investigate the macroeconomic factors that have an impact of PE returns in Africa.

1.5 Brief description of the data

This study uses a novel dataset that consists of the returns of 250 portfolio investments made by 28 GPs across 52 funds over the period 1996 to 2019. An attractive feature of this dataset is that it is obtained directly from an institutional investor, on an anonymised and confidential basis, and is made up entirely of gross returns generated by exited investments. Importantly, the dataset includes deals exited by GPs with whom the institutional investor has interacted, irrespective of whether it invested with the GP, thus limiting potential sample selection issues. The structure of this dataset is a major advantage as it details portfolio company characteristics and incorporates most of the exited investments history of the GPs in the sample.

The representativeness of the sample is assessed by comparison to the publicly available data on the number of exited deals reported by AVCA (see EY and AVCA, 2016; AVCA, 2021a). Given that the data released by Preqin (2018) does not specify the number of deals exited in the various regions of the continent, the AVCA reports are the most detailed source of information on the universe of deals that have been exited by PE firms in Africa. The data reported by AVCA on the number of exits in Africa starts in 2007 and, during the period 2007 to 2019, the sample used in this study has an annual average coverage of 42% compared to the number of deals reported by AVCA. The year with the highest number of sample exits has a coverage of 67% while the lowest has a coverage of 16% compared to the exits reported by AVCA. Furthermore, the distribution of sample exits across regions is similar across the two datasets, with 37.6% (49%) of the sample (AVCA[4]) exits coming from Southern Africa, 30.8% (28%) from West Africa, 12% (11%) from North Africa, 12% (10%) from East Africa, 0% (2%) from Central Africa, and 6.4% (0%) from multi-region. Therefore, the author believes that the limited potential for survivorship bias, combined with the size of the sample and granularity of the data, makes it the most suitable data set made available to date to an academic researcher to examine PE returns in Africa.

1.6 Organisation of the study

This study is organised into five chapters. **Chapter 1** provided an introduction and background to the study and outlined its justifications and objectives, which are actualised in the following chapters.

Chapter 2 examines how PE in Africa has performed relative to public markets. To do this, public market equivalents are calculated using the method introduced by Kaplan and Schoar (2005) that compares the PE returns to an equivalent investment in the MSCI Emerging Market Total Return Index. The chapter contributes new evidence on the performance of PE investments in Africa. The results indicate that private equity in Africa has outperformed the MSCI Emerging Market Total Return Index over the period 1996 to 2019. Not only have top quartile funds outperformed the index, but so have the average, median, and bottom quartile funds - implying better relative performance than has previously been reported for PE in emerging markets. This appears to explain the recent increases in investor allocations to PE investments in Africa and implies that an allocation to PE may contribute positively to an allocator's overall portfolio return.

Following from the results in Chapter 2, **Chapter 3** investigates whether the GP performance in Africa is persistent and, if so, decomposes the sources of such persistence. There is only one study, by Gohil (2014), that has attempted to examine persistence in an emerging market, namely India, and no prior

[4] This share is based on the number of deals exited over the period 2007 to 2013 (see EY and AVCA, 2017). The regional split reported by AVCA for deals exited over the periods 2015 to 2020 is as follows: Southern Africa (36%), West Africa (23%), North Africa (17%), East Africa (16%), multi-region (16%), Central Africa (2%) (AVCA, 2021a).

studies have attempted to decompose the sources of persistence in emerging markets nor have any examined persistence in Africa. This chapter analyses persistence at the investment level and decomposes the extent to which persistence is the result of specific portfolio companies rather than selecting the right region, industries, market timing, and other GP specific factors. This novel approach has only been used by two other studies to analyse persistence in developed PE markets, namely those of Braun et al. (2017) and Nanda (2020), and this chapter provides new evidence on the investment level sources of persistence in Africa.

The results suggest that IRR performance is persistent across subsequent deals exited by the same GP. The results further indicate that persistence is driven by the third and top quartiles and that the conventional wisdom to back GPs that have previously achieved top quartile performance holds in Africa. In exploring the sources of persistence, the chapter finds that GPs differ systematically in their ability to achieve timeous and high value exits and that this factor has a substantial influence on persistence. Furthermore, unlike the US and European studies that document the disappearance of persistence, the results indicate that the increasing capital flows to the PE industry on the continent have had a limited negative influence on persistence. The results suggest that PE on the continent largely conforms to the conventional wisdom that past performance is a good predictor of future returns.

Following from the results of Chapter 3, which suggest that the time taken to exit investments may be an important dimension of GP selection, **Chapter 4** investigates the determinants of PE holding periods in Africa. To do this, the impact of deal characteristics and macroeconomic conditions on holding periods are examined as well as whether holding periods exhibit persistence on a deal-by-deal basis using the approach introduced by Braun et al. (2017). Furthermore, survival analysis is used to examine how deal characteristics and market conditions impact exit behavior.

The results indicate that investment duration is persistent across subsequent deals exited by the same GP. Together with the presence of time invariant GP factors that explain holding periods, these findings suggest that the ability to timeously realise value is attributable to skill and implies that investment duration may be an important dimension of GP selection. In contrast to the increasing holding periods documented by studies focused on developed PE markets, results indicate that the holding periods of PE deals have declined over time in line with an improving exit environment as more capital is dedicated to the asset class on the continent. Furthermore, the results suggest that holding periods are countercyclical and so are lower for investments held when the economy is performing, credit spreads are low, and aggregate industry commitments are increasing. The findings also show that favorable economic conditions and increasing aggregate industry commitments increase the probability of above-median IRR performance, suggesting that GPs on the continent time their exits to take advantage of favorable market conditions.

Following the results of Chapter 4, **Chapter 5** uses quantile regression to investigate the impact of macroeconomic conditions on PE returns in Africa and explores the combined impact of deal, GP, and macroeconomic factors on PE performance on the continent. The results indicate that GDP growth has a strong positive impact on deal level returns while credit spreads have a negative association with performance. The impact of GDP growth is larger on high performing investments than on low performers while the magnitude of the negative relationship between returns and credit spreads is larger for higher performing investments. Notably, the results indicate that capital flows have a significant positive impact on top quantile performers and a nonsignificant influence on low and median performers. Furthermore, deal returns remain persistent for median and top quantile performers even after controlling for deal, GP, and macroeconomic variables. Combined with the findings of Chapter four, this suggests that top performers take advantage of improving liquidity conditions by exiting timeously and therefore realise higher performance.

Lastly, **Chapter 6** provides a summary of the results and discusses their practical implication for LPs considering that are considering allocations to PE in Africa.

Chapter 2: The performance of PE in Africa relative to listed equity

2.1 Introduction

The PE market in Africa has grown significantly over the past fifteen years as LPs seeking to diversify and improve the risk-return characteristics of their portfolios increased allocations to the region (Preqin, 2018). The growth of PE investments in Africa and LP optimism about the asset class on the continent have continued to be on an upward trajectory despite the increasing global macroeconomic challenges that began with the covid pandemic. For instance, although 2022 saw a global slowdown in the number of PE deals completed, PE in Africa was one of the few regions that experienced an increase in both the number of deals completed (46%) and deal value (3%) (AVCA, 2023). Naturally, the remarkable growth in PE investments on the continent raises the question of whether LPs have benefitted from increased allocations to the asset class (Kumar & Firoz, 2023). There is therefore a need for research that examines how PE has performed because PE funds are becoming custodians of a significant and growing proportion of the continent's pension assets.

This chapter uses a unique dataset of 250 exited deals completed during the period 1996 to 2019 to examine how PE in Africa has performed in absolute terms and relative to public markets. There are five reasons that make this topic important to both academics and practitioners. Firstly, in determining the role that PE can play in a diversified portfolio, LPs need to understand how the asset class has performed over the long term both in absolute terms and relative to the public market. Secondly, most of the prior studies that have examined the performance of PE funds relative to public markets have focused on the US and European PE markets (see, for example, Kaplan & Schoar, 2005; Phalippou & Gottschalg, 2009; Stucke, 2011; Harris et al., 2014; and Harris et al., 2016) and, given the differences in their stages of economic and PE industry development, it is unlikely that the findings of these studies can be generalised to emerging markets. Thirdly, there are a handful of studies that have attempted to examine relative performance in emerging markets (see, for example, Missankov et al., 2008; Gohil, 2014; Fang et al., 2018; and Kumar & Firoz, 2023), but this literature has mostly focused on PE in China and India (see, for example, Gohil, 2014; Fang et al., 2018; and Kumar & Firoz, 2023). The economic and institutional differences between Africa and these emerging economies make the findings of these studies less applicable to LPs looking to allocate to PE in Africa (Ribeiro, 2008).

Fourthly, due to the scarcity of data on PE performance, there is only one study, namely that of Missankov et al. (2008), that has attempted to compare PE returns in Africa to public equity. This study analysed returns at the fund level in a single country, South Africa, using a relatively small sample of 11 funds over the period 1992 to 2006. The sample period examined by Missankov et al. (2008)

excludes the period following the global financial crisis, which heralded substantial growth in PE investments in emerging markets, and in Africa specifically (Preqin, 2018). Furthermore, the study did not compute public market equivalent returns to compare how an equivalent investment in public markets would have performed. Lastly, PE returns can only be known with certainty once all the investments have been exited and so researchers that analyse returns at the fund level tend to rely on NAVs (see, for example, Missankov et al., 2008; Kaplan & Schoar, 2005; Phalippou & Gottschalg, 2009; and Harris et al., 2014). The literature has suggested that these appraisals of the value attributable to remaining investments may be biased estimates of final value (see, for example, Jenkinson et al., 2013; Barber & Yasuda, 2017; Brown et al., 2019). Hence, the approach taken in this study circumvents this issue by using the returns of fully exited investments (see, for example, Braun et al., 2017).

This chapter makes three main contributions. Firstly, this study builds on the one study, Missankov et al. (2008), that has compared PE returns to public markets by using the largest sample to date that consists of fully exited deals completed in multiple regions of Africa over a sample period that exceeds two decades to compute public market equivalent returns. Secondly, its findings that PE on the continent has outperformed public markets adds new evidence from a minimally investigated region to the studies that have analysed how PE has performed relative to public markets, particularly the small group that has examined PE returns in emerging markets (see, for example, Gohil, 2014; Fang et al., 2018; and Kumar & Firoz, 2023). Lastly, this chapter contributes insights that have practical significance and are informative to LPs that are considering allocating to PE on the continent.

The remainder of this chapter proceeds as follows: Section 2.2 reviews the literature, Section 2.3 describes the data and variables, Section 2.4 provides the results, and Section 2.5 concludes and discusses the practical implications for LPs.

2.2 Literature review: theoretical and empirical considerations

The number of international studies investigating PE investments has grown significantly since the surge in private equity funding in the early 2000s. A substantial part of these studies has concentrated on comparing PE performance to public markets and is related to the broader financial economics literature that investigates whether financial intermediaries add value through their activities, e.g., mutual funds. Theoretically, the returns generated by fund managers in efficient markets should be no greater than the market return because all public information is already reflected in prices (Fama, 1970). However, this “semi-strong” form of efficiency does not hold for PE investments, which are closely held and characterised by information asymmetries that lead to an unequal distribution of knowledge about opportunities. Hence, the uneven distribution of knowledge about investment opportunities among GPs at any point would be expected to result in a highly skewed distribution of returns as more knowledgeable GPs select a higher concentration of the high-quality opportunities (Diller & Kaserer, 2009). In any event, because PE investments are illiquid, they would be expected to yield a premium relative to freely traded public markets (Harris et al., 2014).

Despite the growth in papers that examine PE performance, researchers have faced considerable data-related challenges that have made their observations controversial. Chiefly, the lack of public disclosure requirements has made sourcing PE data challenging and prior studies had to rely on data collected through methods that involve potential self-selection bias. For instance, the pioneering studies (e.g., Kaplan & Schoar, 2005; and Phalippou & Gottschalg, 2009) used data compiled by commercial data providers, who in turn sourced their data from public disclosures by public pension funds through Freedom of Information (FOI) requests and voluntary disclosures by GPs. Challenges associated with data sourced through FOI requests include its exclusion of the performance of the prior funds of GPs where the pension fund was not invested, thus making it difficult to reach conclusions on long term performance (Brown et al., 2015). On the other hand, GPs that voluntarily disclose performance may be reluctant to provide information that reveals bad performance in prior deals or may cease to report performance when current fund performance declines (Harris et al., 2014; Stucke, 2011). These data issues led to conflicting findings and an inconsistent picture of PE performance (e.g., see Kaplan & Schoar, 2005; Stucke, 2011; and Harris et al., 2014).

The quantitative metrics used to assess PE performance are the internal rates of return (IRR) and the multiple of invested cost (MOIC). The IRR and MOIC are measured based on capital contributions and distributions received by LPs, as well as the residual fair values of any unrealised investments as of the calculation date. These metrics measure absolute performance and so do not provide a direct way to compare PE performance with public markets (Harris et al., 2016). For this reason, Kaplan and Schoar (2005) developed the public market equivalent (PME), which is a ratio that compares the return on a dollar invested in PE to an equivalent investment in the public market index, where a value greater than 1 indicates outperformance. Interestingly, although the PME is widely used in the academic literature, LPs consider IRR and MOIC to be the most important benchmark for PE investments (Gompers et al., 2016; Gompers et al., 2020).

The seminal paper of Kaplan and Schoar (2005) examined a sample of 169 buyout and 577 VC funds raised in the US over the years 1980 to 2001. The data was obtained from Venture Economics (VE), which collected PE data through voluntary reporting by LPs and GPs and supplied it to customers as its core business. Kaplan and Schoar (2005) limited their investigation to the sample of funds that had been fully exited or whose NAVs remained unchanged for at least six months. They reported an average equal-weighted (size-weighted) PME of 0.96 (1.05) for all funds suggesting that PE had underperformed on an equal-weighted but outperformed on a size-weighted basis against the S&P500. Admittedly, the authors reported a substantial difference in the average size weighted PMEs of VC (1.21) and buyout (0.93) funds, suggesting that the observed outperformance was driven by large VC funds. They therefore concluded that PE performance was approximately equal to the S&P500 during this period.

On the other hand, Phalippou and Gottschalg (2009) analysed the VE dataset for the period 1980 to 2003 but reached a markedly different conclusion. The main differences between their sample compared to that of Kaplan and Schoar (2005) were the inclusion of EU funds and the focus of Phalippou and Gottschalg (2009) on funds that had been in existence for more than 10 years, which is the common fund term. Phalippou and Gottschalg (2009) observed that a significant portion of fund NAVs remained constant for extended periods and argued that Kaplan and Schoar (2005) had overstated PE performance because of the inflated residual values of "living dead" investments and sample selection biases. In this context, "living dead" investments refer to investments whose NAVs had remained unchanged for a period of three or more years following the end of the common fund term of 10-years. Phalippou and Gottschalg (2009) wrote these NAVs down to zero and found a PME of 0.92 suggesting that PE had underperformed the S&P500 during the sample period. Their reported PME fell further after adjustments for sample selection bias and systematic risks, bringing the authors to conclude that PE had underperformed the S&P500 by 6% per year during this period.

Recently, scholars have gradually gained greater access to data sourced directly from LPs (see e.g., the studies of Stucke, 2011; Higson and Stucke, 2012; Harris et al., 2014; Robinson & Sensoy, 2016; Braun et al., 2017; and Harris et al., 2023). Data sourced from multiple LPs reduces the likelihood of significant bias while data sourced from a single LP may face challenges of sample representativeness and may also exclude the prior funds of GPs in which the LP is not invested (Braun et al., 2017). This availability of data sourced directly from LPs has enabled researchers to evaluate the extent to which data shortfalls impacted the findings of earlier studies. For instance, Stucke (2011) investigated whether data issues may have affected the results reported in the studies of Kaplan and Schoar (2005) and Phalippou and Gottschalg (2009) by comparing the performance of the funds with constant NAVs to their true performance based on cashflow and NAV data provided by four LPs in these funds and found the performance reported by VE to be lower. He finds that, at some point during their lifetime, about 40% of the funds in the VE database cease providing performance updates and that this results in a systematic downward bias in performance. Furthermore, unlike Kaplan and Schoar's PME of 0.97 for buyouts, Stucke (2011) reported an overall PME of 1.09 for buyouts and concludes that the underperformance reported by prior studies was the result of biased data. Since Stucke (2011), a handful of papers (e.g., Higson & Stucke, 2012; Harris et al., 2014; and Brown et al., 2015) have confirmed that data issues have been the main reason for the inconsistent account of PE performance in the US and Europe.

Clearly, the controversy generated by the prior literature emanates from the use of NAVs and defective data (Harris et al., 2014; Stucke, 2011). PE returns can only be known with certainty once all portfolio companies have been exited and proceeds have been distributed to LPs. In the meantime, LPs must rely on interim performance consisting of returns generated by realised investments and GP-determined NAVs of the unrealised investments. NAVs are provided to LPs on a quarterly basis and are audited annually in a process that often also involves independent valuation agents. However, despite the changes to international accounting standards and industry guidelines that have increased the standardisation of valuation principles, there is broad discretion in selecting valuation methodologies and parameter inputs (Jenkinson et al., 2013). For one thing, GPs have been shown to value their investments conservatively during normal times and incorporate only a portion of the contemporaneous market information in their quarterly NAVs (Anson, 2007, 2013; Anson, 2002; Gompers & Lerner, 1997; Jenkinson et al., 2020). However, this sluggishness is lower in biannual and annual valuations with NAVs exhibiting significant increases during the fourth quarter, when they are audited (Anson, 2013; Emery, 2003; Jenkinson et al., 2020; Jenkinson et al., 2013). Interestingly, NAVs have also been reported to understate distributions by as much as 35% on average, which suggests that GPs might be “managing” valuations to make performance appear less volatile or to avoid giving LPs surprises at exit (Jenkinson et al., 2013).

Furthermore, the market practice for GPs to raise follow-on funds halfway through their current funds, might create an incentive to game valuations since LPs are known to use this information to inform their decisions about making commitments to funds. Indeed, the literature has suggested that some GPs inflate valuations during fundraising to improve the attractiveness of their follow-on funds, but that LPs are vigilant and unlikely to misallocate capital due to performance-gaming (Brown et al., 2019). Put simply, LPs have been shown to place a greater emphasis on realised returns, which are more credible and easier to verify than unrealised performance, and inflated valuations are associated with a lower probability of success in fundraising (Barber & Yasuda, 2017; Brown et al., 2019). Thus, it seems that, if anything, analysing unrealised values understates PE performance (Stucke, 2011; Jenkinson et al., 2013) and although returns can only be known with certainty once all investments have been exited, there may be much that can be learnt from analysing unrealised investments if scholars exercise caution and judgement (Harris et al., 2014). Of course, given the rapid growth in allocations to PE in recent times, excluding unrealised returns from academic discourse risks ignoring a significant portion of the PE universe, particularly in emerging markets.

In any event, the increasing availability of research-quality data on developed market PE has enabled scholars to reassess historic performance by comparing the data and collection methods of the large commercial databases. For instance, Harris et al. (2014) examined the performance of 1400 US funds obtained from Burgiss covering the period 1981 to 2008 and compared the PE performance to that derived from Cambridge Associates (CA), Preqin and VE. They discussed the differing methods of data collection used by each data provider, illustrating the advantages of data sourced directly from LPs. Burgiss and CA obtain data directly from GPs and LPs as a function of the various services they provide to LPs and use this data to create PE data sets that are anonymised[5], while Preqin sources its data via FOI requests to pension funds. Harris et al. (2014) reported that performance computed using Burgiss, Cambridge and Preqin was approximately equal and that, consistent with Stucke (2011), performance derived from VE showed a downward bias. Surprisingly, PMEs calculated using datasets from all the providers suggested that PE had outperformed the S&P500 in the 1990s and 2000s. However, unlike the VE data, Burgiss data also showed that PE outperformed the S&P500 in the 1980s. The authors concluded that the VE data set understated performance in the 1980s and that PE had consistently outperformed the S&P500 during the sample period. Altogether, there is a growing consensus in the post-Stucke (2011) literature that PE in developed markets has outperformed public markets for a long time (e.g., see Harris et al., 2014; Brown et al., 2015; Robinson & Sensoy, 2016; and Harris et al., 2023).

2.2.1 Private equity performance in Emerging Markets

Most of this prior literature on PE returns has focused on developed PE markets and ambiguities still pertain in academics and practitioners' understanding of PE performance, even in these extensively investigated markets. Consequently, examining PE in emerging markets presents significant opportunities to extend the frontier of insights on the characteristics of PE in general, and for emerging PE markets in particular. Indeed, only a handful of published studies have examined PE returns in emerging markets. For instance, Fang et al. (2018) analysed the fund level performance of a sample of 1500 buyout and VC funds raised in China during the period 1992 to 2013. The dataset was obtained from Zero2IPO, which is a commercial data vendor that sources investment level performance from public disclosures and surveys of GPs and their service providers. The above researchers constructed approximate absolute fund performance and reported that the median (average) fund generated an IRR of 22.6% (129.2%). Fund returns in China were found to exhibit greater skewness and dispersion

[5] Burgiss sources detailed cashflow data from over 200 LPs that use the Burgiss system for performance reporting and record keeping (Harris et al., 2014, 2012; Brown et al., 2015). CA provides investment services to LPs and GPs and receives data during the provision of those services (Higson & Stucke, 2012; Harris, 2014; Brown et al., 2015).

than has been reported for funds in developed markets, suggesting that returns are driven by extreme winners and losers. Fang et al. (2018) calculated adjusted returns by subtracting the annualised return on the Shanghai Composite Market Index over a funds' investment holding period and concluded that PE in China had outperformed public markets.

Gohil (2014) examined Indian fund level performance during the period 2007 to 2012 using a sample of 380 deal returns[6] obtained from Venture Intelligence, a commercial data provider, and other sources such as company websites. He analysed the performance of 22 funds that had at least two exited deals and reported average (median) PME of 1.83 (1.11) suggesting that PE funds in India had outperformed public markets. Recently, Kumar and Firoz (2023) compared how PE in India had performed relative to the NSE Nifty 50 using a sample of 318 deals, obtained from Venture Intelligence, exited over the period 2009 to 2019. They showed that the PE deals had achieved a mean (median) IRR of 26.37% (18.54%) compared to 9.94% (9.82%) realised by the Nifty 50. Furthermore, PE investments were reported to have a mean (median) MOIC of 3.46 (2.27) while the Nifty 50 had a multiple of invested cost 1.80 (1.62) over this period. Interestingly, the authors reported that 16.4% of the deals returned less than the capital invested during the decade sampled. Overall, they concluded that PE investments in India had outperformed public markets during this period.

Interestingly, Cumming et al. (2012) analysed the returns of 289 fully exited investments made in Southeast Asian countries between 1989 and 2009. The authors reported that the returns of PE deals completed in the region were positively skewed with good performers positively impacting average returns. In respect of the countries that had more that 10 observations, their sample revealed average (median) MOICs of 2.72 (2.10) in Australia, 11.98 (1.76) in China, 0.52 (0.06) in Hong Kong, 3.71 (3.00) in India, 3.86 (2.01) in Japan, 2.40 (2.72) in New Zealand. For the same countries, average (median) IRRs were 46% (37%) in Australia, 87% (33%) in China, -52% (-83%) in Hong Kong, 133% (76%) in India, 89% (55%) in Japan, 18% (24%) in New Zealand. The authors highlighted that the higher IRRs is some countries, such as India, were attributable to relatively shorter holding periods.

Lerner and Baker (2017) investigated the distribution of PE returns in emerging markets by analysing a total sample of 33 337 deals, consisting of 3 935 deals completed in emerging markets and 29 442 deals completed in developed market deals over the period 1987 to 2013. Interestingly, Asia accounted for most of the emerging market deals, with Africa contributing a mere 64 deals to the sample. The authors found that PE deals completed in emerging markets had realised a mean (median) IRR of 30.5% (7.6%) while deals in developed markets had a mean (median) IRR of 25.6% (10.4%). Furthermore, deals completed in emerging markets had a mean (median) MOIC of 1.96 (1.18) while

[6] The sample used by Gohil (2014) represented deals exited by 132 funds, of which 22 had more than two exits.

investments completed in developed markets realised a mean (median) MOIC of 2.36 (1.24). Unlike the findings reported by Fang et al. (2018) for PE in China, Lerner and Baker (2017) found that returns dispersion in emerging markets was no greater than in developed markets when measured using IRR or TVPI. In fact, they found the dispersion of TVPI to be consistently lower in numerous analyses and surmised that that the pressure to show exits might encourage GPs to crystalise returns rather than holding out for higher returns that might never materialise.

In Africa, Missankov et al. (2008) investigated the performance of PE funds in South Africa using a sample of eleven funds covering a period 1992 to 2006. Their sample consisted of cash flow and periodic valuation data from both fully realised funds and unrealised funds. The authors calculated the gross and net returns of the funds and Sharpe ratios for the sample set, which were compared to returns on total return indices of conventional asset classes such as real estate and fixed income. They reported PE returns ranging from 14.3% to 65.0%, a sample average of 35.7% per annum and a return of 35% for the aggregate portfolio of all sample funds. In addition, they found significant variation in the performance of funds, with the standard deviation of returns ranging between 8.0% and 28.1% with an average standard deviation of 13.7%, whilst the aggregate portfolio had a standard deviation of 22.4%. Above all, Missankov et al. (2008) reported that PE funds had returned an average 13.1% and 8.3% more than SA listed equities and small cap equities, respectively, while the aggregate portfolio outperformed by 18% and 16.8%, respectively. PE funds were also found to have returned the second-best risk-adjusted returns compared to the other asset classes during the period examined and, although significant differences were found between gross and net returns, PE still outperformed the other asset classes on a net return basis.

Altogether, the small number of studies that have analysed how PE in emerging markets, and Africa in particular, has performed relative to public markets demonstrate the need for more research if we are to understand the characteristics of PE returns in these regions.

2.3 Data and variables

The objective of this study is to investigate how PE in Africa has performed in general and relative to the public market using a data set consisting of exited PE investments that is obtained from an institutional investor on an anonymised and confidential basis. The data is collected as part of due diligence processes and includes information from GPs that attempted to raise capital from the investor, irrespective of whether it invested. An important aspect of the data set is that GPs that attempted to raise capital from the investor for a follow-on fund were required to provide data on their predecessor funds. The data set therefore contains an extensive listing of the exited deals of each GP as at the time of last interaction with the investor and the information is updated each time the GP interacts with the investor. Detailed information is available on the portfolio companies, which includes descriptive variables such as: the sector, geographic region of the company's operations, invested cost in US dollars, realised value in US dollars, and the date of initial investment and exit. The investment performance information consists of the IRR, cash multiple and public market equivalent, which are calculated by the author using the procedures described below.

In total, the sample consists of 250 portfolio exits made by 28 GPs across 52 funds covering the period 1996 to 2019. The portfolio company exits are diversified across several dimensions such as region, sector, and size of deals. In particular, the classification of portfolio companies into regions and sectors was completed by the GPs based on the major operations of each portfolio company and provided to the researcher by the investor from whom the data was obtained. The sample of exits represent deals completed in the following regions: North Africa (12%), East Africa (12%), West Africa (30.8%), Southern Africa (37.6%), and Pan-Africa (6.4%). In addition, portfolio exits are distributed across eight sectors, consisting of the: communication services, financial services, information technology, industrial services, consumer staples, consumer discretionary, materials, and other sectors. The mean (median) number of portfolio companies per sector is 31 (32), with a standard deviation of 9, and the three most represented sectors being financial services, consumer staples, and industrials.

There is substantial variation in the size of deals based on invested cost, with a mean (median) size of $13.2 ($8.2) million and standard deviation of $14.7 million. The smallest deal in the sample had an invested cost of $91 000 whilst the largest deal involves $76 million. Pan African deals have the largest mean (median) invested cost of $27.1 ($21.7) million and investments in East Africa are the smallest with a mean (median) invested cost of $8.2 ($4.0) million. Indeed, the large average size of Pan-African deals is consistent with the large size associated with companies that operate in multiple regions. In addition, the sector with the largest deals is the communication services sector, with a mean (median) invested cost of $19.2 ($10.5) million and the sector with the smallest deals is the IT sector, which has a mean (median) deal size of $5.5 ($2.3) million.

In terms of distribution of exits across time, the sample has a mean (median) of 12.5 (10.0) exits per vintage year, with the periods of peak global markets performance, e.g., the years 1998 to 2000 and 2005 to 2007, producing the highest number of exits. The mean (median) holding period for the deals in the sample is 5.24 (5.25) years and there is a time trend towards lower holding periods, which is consistent with an improving exit environment as increasing amounts of capital are dedicated to PE investment on the continent. In addition, the deals in the financial services sectors have the lowest holding periods, with a mean (median) of 4.66 (4.59) years, whilst communications services is the sector where deals are held the longest, with mean (median) holding periods of 5.73 (5.1) years. The variation in the holding periods across regions is negligible, indicating that GPs across the continent take roughly the same amount of time to realise value from their investments.

2.3.1 Sample selection bias

The fact that this data is sourced from a single LP does not raise issues in respect of representativeness because the data was collected as part of due diligence processes and therefore includes information on the exits of GPs that sought capital, irrespective of whether the GP was selected. This data does, however, have two potential biases (Braun et al., 2017). First, not all funds will have attempted to raise capital from the investor from which the data was sourced, and this may result in bias if certain types of funds avoided this investor. This is, however, unlikely an issue because of the relatively small number of LPs that have Africa focused investment programs, making it unlikely that there are GPs that would systematically avoid a potential LP. In addition, the investor from whom the data is sourced has a generalist mandate, which casts the net wide in terms of the types and locations of GPs it would have engaged. Second, the sample may involve possible survivorship bias because it might not include GPs that failed to raise a follow-on fund and therefore exited the market. This is, however, unlikely to result in significant bias because the deals of GPs that leave the market will still be part of the sample if they approached the investor to raise capital prior to their exit from the market. Therefore, there is very limited potential that this data suffers selection and survivorship bias.

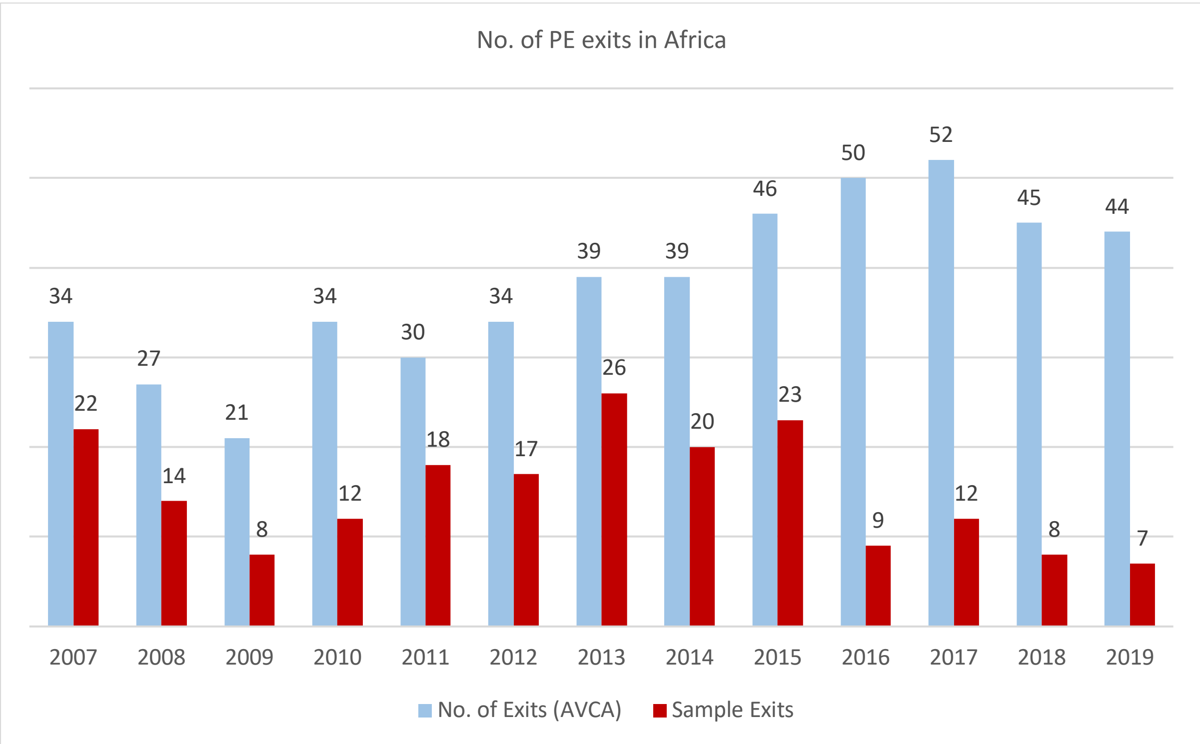

Figure 1: Sample representativeness

The representativeness of the sample is also assessed by comparison to the publicly available data on the number of exited deals reported by AVCA (see EY and AVCA, 2016; AVCA, 2021a). Given that the data released by Preqin (2018) does not specify the number of deals exited in the various regions of the continent, the AVCA reports are the most detailed source of information on the universe of deals that have been exited by PE firms in Africa. The data reported by AVCA on the number of exits in Africa starts in 2007 and, during the period 2007 to 2019, the sample used in this study has an annual average coverage of 42% compared to the number of deals reported by AVCA. The year with the highest number of sample exits has a coverage of 67% while the lowest has a coverage of 16% compared to the exits reported by AVCA. Furthermore, the distribution of sample exits across regions is similar across the two datasets, with 37.6% (49%) of the sample (AVCA[7]) exits coming from Southern Africa, 30.8% (28%) from West Africa, 12% (11%) from North Africa, 12% (10%) from East Africa, 0% (2%) Central Africa, and 6.4% (0%) from multi-region. Therefore, the author believes that the limited potential for survivorship bias, combined with the size of the sample and granularity of the data, makes it the most suitable data set made available to date to an academic researcher to examine PE returns in Africa.

2.3.2 Measurement of variables

This study examines gross returns which are a conceptually cleaner measure of performance as differences in fee structures across funds will have an impact on reported net returns (Braun et al., 2017). Recent studies have also shown that some LPs appear to consistently pay lower fees and suggest that this effect is partially explained by their size, experience, and past performance (Begenau & Siriwardane, 2024). Gross returns at the deal level are also of interest to LPs that have direct investment programs, including co-investments alongside GPs, which are usually not subject to the two-and-twenty fee structure (Braun et al., 2020; Cole et al., 2020; Fang et al., 2015). The analysis in this study uses the MOIC, IRR, and the PME to measure the performance of PE investments. The MOIC is defined as the ratio of the cash proceeds that were received from the portfolio company and the amount invested into the portfolio company. For instance, if the GP invested $30 into a portfolio company and received $90 in exit proceeds, then the MOIC will be 3x.

The IRR is defined as the discount rate that equates the net present value of cashflows to zero. An important shortcoming of the IRR measure is its assumption that dividend distributions received by LPs during the holding period are re-invested at the IRR rate, an exploit that might not be feasible in

[7] This share is based on the number of deals exited over the period 2007 to 2013 (see EY and AVCA, 2017). The split reported by AVCA for deals exited over the periods 2015 to 2020 is as follows: Southern Africa (36%), West Africa (23%), North Africa (17%), East Africa (16%), multi-region (16%), and Central Africa (2%) (AVCA, 2021).

practice (Phalippou, 2008). That is, LPs must immediately re-invest intermediate distributions at the IRR rate otherwise the reported IRR performance will overstate their experienced effective rate of return when IRR is high (Larocque et al., 2021; Phalippou, 2008). To alleviate this issue, prior studies have used a modified IRR that is computed using a re-investment rate of zero to measure the return that LPs have earned from the deal or fund itself (see, for example, Gohil, 2014; Lopez-de-Silanes et at., 2015; Ljungqvist et al., 2020; Larocque et al., 2021). Interestingly, these studies report median deal (fund) level spreads between the IRR and modified IRR of 4% (5.69%) and highlight that such spreads can only be fully experienced by LPs if they are able to immediately re-invest proceeds at the IRR rate (Larocque et al., 2021; Lopez-de-Silanes et al., 2015). This study computes IRR using the following formula:

$$\frac{PE\ MOIC}{(1+IRR)^t} - 1 \tag{1}$$

PE returns are compared with public markets by calculating the PME using the framework of Kaplan and Schoar (2005). The PME compares an investment in a PE deal to an investment in the MSCI Emerging Market Total Return Index (EMI) since the PE capital invested in Africa is predominantly sources from LPs with portfolios that are usually diversified across emerging markets and target the EMI returns (see, for example, Cole et al., 2020). The MSCI Emerging Frontier Markets Africa Index was also considered, but it starts in 2010 and so is available for less than half of the sample period while the EMI is available for the entire sample period. Furthermore, the Johannesburg Stock Exchange All Share Total Return Index (JSE All Share Index) and the Nigerian Stock Exchange All Share Total Return Index (NGX All Share Index) were used to calculate PMEs for the subsample of deals exited in South Africa and Nigeria, respectively. South Africa and Nigeria have the largest PE markets on the continent and source a significant share of PE capital from local investors who use local public market indices as benchmarks[8].

Like the PE measures, an MOIC is computed for the public market. The EMI MOIC is calculated as the ratio of the EMI Total Return Index points at the date the PE investment is exited divided by the EMI Total Return Index points on the date that the fund made the investment (Gohil, 2014). For example, if the EMI Total Return Index is 4000 on the date the PE investment was exited and 2000 on the date that the PE investment was made, then the EMI MOIC for the deal is 2x. The PME is then calculated as the ratio of the PE MOIC and the EMI MOIC as follows:

[8] For example, 59% (51%) of the PE capital raised in South Africa during 2023 (2022) was from LPs that are based outside of South Africa while 41% (49%) was sourced from local LPs (SAVCA, 2024).

$$\frac{PE\ MOIC}{EMI\ MOIC} \tag{2}$$

To calculate the IRR performance differential between the PE deals and EMI, the EMI IRR is calculated using the formula below, and subtracted from the PE IRR:

$$\frac{EMI\ MOIC}{(1+IRR)^t} - 1 \tag{3}$$

The literature has also indicated that the choice of vintage period, sector, and geography are important components of portfolio formation and have a significant impact on PE returns (Braun et al., 2017; Brown et al., 2022; Lossen, 2007). In this study, the vintage year is defined as the year in which an investment is made and the Herfindahl-Hirschman Index (HHI) is used to gauge diversification across sector and region when the exited investments are grouped into funds (Aigner et al., 2008; Lossen, 2007). The HHI is calculated by squaring the fraction of the capital invested in each category, summing these squared amounts, and finally subtracting this summed amount from 1. A value of 1 for the HHI indicated perfect diversification whilst a value of 0 indicated no diversification. In addition, the percentage loss was evaluated as the percentage of portfolio company exits that have an MOIC (PME) that is less than 1x.

2.4 Results

2.4.1 Absolute performance

Table 1 below summarises the performance of the sample of exited deals. The average (median) deal in the sample returned an IRR of 27.67% (14.62%) and a MOIC of 2.74 (1.90) gross of fees. There is substantial variation in performance as demonstrated by the maximum IRR (MOIC) of 1004% (43.94), the minimum of -100% (0), and the standard deviation of 111.96% (4.69). These indicate that the returns of PE investments are highly dispersed and positively skewed, suggesting that fund returns might be dependent on the success of a few investments. Indeed, when the deals are grouped into funds to calculate the realised fund performance, a median IRR (MOIC) of 17.31% (2.21) is obtained for the total sample of funds. The significantly higher average IRR of 39.1% (2.53) corroborates that performance is driven by better performing funds. These figures are similar in magnitude to those reported by Lerner and Baker (2017) for emerging markets (mostly Asia) deals, and Kumar and Firoz (2023) and Gohil (2014) for funds in India. Furthermore, compared to findings by Fang et al. (2018) and Lerner and Baker (2017), these figures suggest that returns in Africa might be less dispersed than deals in developed markets and PE funds in China.

There is significant variation in deal returns across and within regions. Deals exited in North Africa and Pan Africa have much higher average IRR performance than the other three regions, but the median IRR for these regions suggests that returns are skewed by good performers. Of course, these IRR returns also reflect the lower holding periods of deals completed in North Africa and Pan Africa compared to the other three regions. In fact, median IRR and MOIC indicate far less variation in performance than the average IRR would suggest and West Africa, which has the lowest IRR performance, has the highest average MOIC. It is worth pointing out that the lower IRR performance realised by West African deals reflects a higher loss ratio since the holding periods are similar in magnitude to those of East Africa and Southern Africa. Interestingly, the magnitude and variation of returns across the regions of Africa is consistent with those reported by Cumming et al. (2012) for deals exited in Southeast Asian countries.

TABLE 1: The performance of sample deals by region

Returns Measure	IRR			MOIC		
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
Total Sample	27.67%	14.62%	111.96%	2.74	1.90	4.69
Pan Africa	53.91%	12.55%	179.36%	1.90	1.56	1.26
East Africa	17.75%	15.01%	23.79%	3.51	1.86	6.35
North Africa	88.56%	19.01%	245.40%	2.17	1.93	1.79
West Africa	10.91%	12.73%	38.93%	3.42	2.07	6.90
Southern Africa	20.22%	14.25%	76.36%	2.27	1.88	2.15

Table 2 shows the returns and percentage loss of the sample of exits across time, where deal exits are placed in groups of three vintage years. Although there are no clear time trends in the evolution of performance, 1999 to 2001 and 2008 to 2010 were periods in which GPs achieved lower median performance than the other periods covered by the sample. Also, these periods have higher loss ratios where, on average, a third of the sample deals falling within the 1999 to 2001 and 2008 to 2010 vintage years returned less than their investment. Interestingly, these vintages coincide with periods of global market exuberance that were followed by global market downturns. Overall, this is suggestive of the presence of cyclicality in the returns of PE investments in Africa. Yet, as shown in Section 2.4.2 below, despite PE deals posting lower returns and higher loss ratios in these vintages than the other vintages covered by the sample, they still outperformed the MSCI Emerging Markets Index.

TABLE 2: Performance by Vintage Year

Vintage Year	Number of deals	Mean IRR	Median IRR	Mean MOIC	Median MOIC	% loss
1996 - 1998	28	8%	14%	2.46	2.13	14%
1999 - 2001	35	2%	11%	5.33	1.56	31%
2002 - 2004	33	87%	23%	3.35	2.40	18%
2005 - 2007	62	39%	16%	2.27	2.09	18%
2008 - 2010	54	7%	10%	1.93	1.48	28%
2011 - 2013	30	27%	18%	2.04	1.89	17%
2014 - 2016	8	12%	17%	1.54	1.84	38%

The performance differences across regions and vintage periods shown in Tables 1 and 2, respectively, are consistent with suggestions that portfolio formation decisions may have an impact on performance (see, for example, Brown et al., 2022; Lossen, 2007). Interestingly, varying levels of diversification emerge when the sample of exits are grouped into funds and the HHI is used to gauge diversification across region and sector. Diversification across sectors and region varies markedly across funds with means of 0.42 and 0.19 and standard deviations of 0.31 and 0.26, respectively. In addition, 33% (61%) of the funds in the sample have a diversification by sector (region) of 0, suggesting that these funds invest in or have exited deals in a single sector (region). When focusing on the funds that have 3 (4 or more) portfolio exits, the diversification across sector and region increases to 0.56 (0.67) and 0.23 (0.29) with standard deviations of 0.23 (0.09) and 0.27 (0.29), respectively. Similarly, the proportion of funds that have a diversification by sector and region of 0 decreases to 0% and 44% respectively. This suggests that the average fund in the sample is a regional fund with a generalist sector focus.

Removing the fund wrapper, 22% of the deals in the full sample returned less than their investment while 4% were written down to zero. Interestingly, the percentage of total sample deals that returned less than their investment is higher than the 16% reported by Kumar and Firoz (2023) for deals exited in India. Furthermore, East Africa has the lowest percentage of exits returning less than their investment at 12.9% and West Africa has the highest at 27.3%.

2.4.2 Private equity performance relative to the public market

Table 3 presents the average PMEs and shows that exited PE deals in Africa have outperformed the EMI overall and in each of the regions. The average (median) deal in the sample has a PME of 1.78 (1.37), which is significantly greater than 1.0. Simply put, a dollar invested in the average (median) deal returned 78% (37%) more than an equivalent investment in the EMI would have yielded. The median PME of 1.37 is similar in magnitude to the PME of 1.30 relative to the EMI reported by Cole et al. (2020) for the PE investments made by the International Finance Corporation in emerging and developing economies over the period 1990 to 2010. The figures are also roughly comparable to the average (1.81) and median (1.11) PME relative to the Nifty 50 reported by Gohil (2014) for PE funds in India. Similarly, the figures can be compared to the median (average) PMEs of 1.40 (1.92) relative to the Nifty 50 indicated by the results of Kumar and Firoz (2023) for PE deals exited through mergers and acquisitions in India. Nevertheless, it is worth pointing out that there is significant variation in the performance achieved by PE deals relative to the index. This is demonstrated by the spread between the minimum PME of zero, maximum PME of 36.5x, and standard deviation of 2.25x. In addition, 35.6% of all the sample deals returned less than the index and this percentage is evenly distributed across regions, with an average of 33% of the deals exited in each region underperforming the index.

Interestingly, Phalippou and Gottschalg (2009) calculated the impact of fees on PMEs based on numerous assumptions in respect of fee arrangements and reported that, based on conservative assumptions, fees reduce PMEs by 0.24. Their conservative fee structure assumed an annual management fee of 2% charged on committed capital throughout the life of the fund and a 20% carried interest above the hurdle rate of 8%. The conservative element in this fee structure is the annual management fee assumption, which is higher than commonly charged by funds. In comparison, the common fee structure involves a management fee of 2% that is charged on committed capital during the investment period, and changes to 2% of invested capital (which is usually lower) once the investment period expires. Using this conservative estimate to gauge the relative performance suggests that a dollar invested in PE deals in Africa has on average (median) returned 54% (13%) more than a dollar invested in the EMI on a net of fees basis over the sample period.

Notably, a similar picture emerges when the subsample of 113 investments exited in Nigeria and South Africa is used to gauge performance relative to their country-specific indices. For instance, the average PME of 3.55 (1.43) for investments exited in Nigeria (South Africa) is significantly above 1. This indicates that a dollar invested into PE investments in Nigeria (South Africa), on average, returned 255% (43%) more than an equivalent investment in the NGX All Share Index (JSE All Share Index) would have earned on a gross of fees basis. Applying the conservative estimate of Phalippou and Gottschalg (2009) suggests that a dollar invested in PE deals in Nigeria (South Africa) has on average (median) returned 231% (19%) more than a dollar invested in the NGX All Share Index (JSE All share Index) on a net of fees basis over the sample period.

TABLE 3: The performance of PE deals versus MSCI Emerging Market Index

Returns Measure	Excess IRR			PME		
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
Total Sample	19.03%	7.95%	109.71%	1.78	1.37	2.26
Pan Africa	45.16%	9.13%	177.55%	1.51	1.34	0.95
East Africa	8.23%	6.93%	25.50%	1.73	1.46	1.68
North Africa	75.26%	8.83%	241.74%	1.63	1.29	1.94
West Africa	1.31%	3.49%	38.08%	1.93	1.20	3.31
Southern Africa	14.15%	8.87%	73.29%	1.77	1.26	1.55

The average deal returned an excess IRR that is 19.03% greater than it would have if the capital had been invested in the EMI, while the median excess return is 7.95%. Table 3 shows that there is a lower level of dispersion in the excess IRR achieved by deals in the various regions compared to absolute performance. Specifically, the small gap between the average and median excess IRR achieved by deals exited in East Africa, Southern Africa, and West Africa indicates stable outperformance compared to North Africa and Pan African deals where relative performance appears to be driven by extreme wins and losses. Overall, besides the significantly lower excess IRR in West Africa, the median deal has realised similar relative excess IRR across all the regions.

Furthermore, Table 4 shows the development of the relative performance and percentage of deals that underperformed the index across time, where deal exits are placed in groups of three vintage years. Although there are no clear time trends in the evolution of performance, 1999 to 2001, 2002 to 2004, and 2008 to 2010 were periods in which deals achieved lower median relative performance than the other periods covered by our sample. Also, these periods have higher proportions of deals that underperform the index where almost half of the sample deals falling within 2002 to 2004, and 2008 to 2010 vintage years returned less than an equivalent investment in the index. These vintages coincide with the bursting of the dotcom and housing bubble and are suggestive of the presence of cyclicality in the returns of PE investments. This suggests that, in addition to its impact on absolute performance, economic cycles also affect the extent to which PE deals perform relative to public markets. The larger gap between average and median returns also indicates greater dispersion in returns during these times and that relative outperformance is driven by a few successful deals. Even so, except for the period 1999 to 2001, deals realised on the sample deals have consistently outperformed the index.

TABLE 4: The relationship between performance and vintage period

Vintage Year	Obs.	Mean Excess IRR	Median Excess IRR	Mean PME	Median PME	% loss
1996 - 1998	28	5%	10%	1.90	1.88	36%
1999 - 2001	35	-8%	-2%	2.29	0.92	51%
2002 - 2004	33	64%	0%	1.51	1.01	48%
2005 - 2007	62	30%	11%	1.78	1.64	23%
2008 - 2010	54	1%	4%	1.52	1.19	43%
2011 - 2013	30	25%	17%	1.94	1.80	17%
2014 - 2016	8	7%	11%	1.28	1.46	38%

This is investigated further in Table 5, which groups the sample of deals into funds and reports their performance relative to the index. With an average (median) PME of 1.81 (1.57), these figures suggest that funds in Africa significantly outperformed the EMI over the past two and a half decades. Moreover, the average (median) fund realised an annual return that is 38.81% (9.11%) more than an equivalent investment in the index would have yielded. As demonstrated in Table 5, this outperformance relative to the EMI is consistent across funds with different numbers of realised investments. It is worth pointing out that the average fund with four or more investments has an average of 7.84 exited companies and only two funds in this group have a post-2010 vintage. In other words, these funds are mostly fully realised, and their returns are unlikely to change because of additional exits.

TABLE 5: Fund performance versus MSCI Emerging Market Index

Returns Measure	Mean	Std. Dev.	25th Percentile	50th Percentile	75th Percentile
Funds with min. 2 exits (n = 41)					
Excess IRR	38.81%	147.59%	5.21%	9.11%	18.28%
PME	1,81	0,88	1,20	1,57	2,03
Funds with min. 3 exits (n = 37)					
Excess IRR	42.93%	149.56%	6.11%	10.72%	19.01%
PME	1,90	0,88	1,31	1,70	2,09
Funds with min. 4 exits (n = 25)					
Excess IRR	11.57%	10.64%	6.11%	9.11%	17.00%
PME	1.76	0.84	1.25	1.68	1.99

Interestingly, not only have top quartile funds outperformed the index, but so have median and average funds. Harris et al., (2014) reported similar results for US funds but the present study finds average and median PMEs that are significantly higher, suggesting that relative to their own benchmarks, the extent of outperformance realised by funds in Africa is greater that in the US. In the absence of evidence indicating better skill on the part of GPs in Africa, one might surmise that the higher relative performance is due to differences in the maturity of the PE industry in these jurisdictions and its consequent influence on competition for deals (e.g., see Braun et al., 2017; and Harris et al., 2023). Furthermore, the figures indicate that even bottom quartile funds have outperformed the index implying better relative performance than has been reported by prior studies examining emerging markets (e.g., Gohil, 2014; Lerner & Baker, 2017; and Fang et al., 2018). Specifically, the average bottom quartile fund in the sample realised a PME (excess IRR) of 1.03 (0.62%), 1.11 (2.22%), and 1.05 (1.33%) for funds that have a minimum of two, three, and four exits, respectively.

For further clarity, a parametric approach is used to compare PE and public markets performance. A two-sample t-test was conducted to test the difference in the means of the cash multiples and the IRRs of the sample deals and those of the MSCI Emerging Market Total Return Index. The p-values presented in Table 6 indicate that the mean cash multiples and the IRRs achieved by our sample deals are significantly different to, and are higher than, their public market equivalent at the 1% level. Furthermore, a two-sample t-test was also conducted to compare the mean returns at the fund level to their public market equivalent. The p-values provided in Table 6 show that the difference in mean IRRs is statistically significant at the 10% level whilst the difference in the mean cash multiples is significant at the 1% level. Therefore, on the tests of both the overall sample of deals and funds, it can be concluded that private equity in Africa outperformed the MSCI Emerging Market Index during the period 1996 to 2019.

TABLE 6: Private Equity versus Public Market performance means comparison test

Means tested	Observations	Two tailed p-value (IRR)	Two tailed p-value (MOIC)
PE deals vs. PME	250	0,0080	0,0002
Funds vs. PME	52	0,0705	0,0004
Funds (min. 2 exits)	41	0,0930	0,0020

In addition, Table 5 above illustrates that there is a substantial difference in the performance achieved by top and bottom quartile funds in Africa. When the cash multiple (IRR) is used as the measure of performance, the average gap between the top and bottom quartile funds is 3.32x (121%) and the p-values in the test of the difference in means is 0.005 (0.130). The p-value for the cash multiple comparison suggests that there is a statistically significant difference between the mean performance of top quartile and bottom quartile funds.

2.5 Conclusions

This chapter highlighted the scarcity of scholarly research examining PE performance in emerging markets and Africa in particular. The need for more research examining the characteristics of PE performance in Africa is made evident by the growth in assets being dedicated to the asset class on the continent. To determine the role that PE can play in a diversified portfolio, LPs need to understand how the asset class has performed over the long term in both absolute terms and relative to the public market. Furthermore, issues associated with the reliability of the data used in the earlier literature focused on developed PE markets underscore the need for studies that are based on data sourced directly from LPs. To this end, this chapter analysed returns on PE deals exited in Africa over the period 1996 to 2019 with the aim of determining how PE in Africa performed in absolute terms and relative to public markets.

The results suggest that PE in Africa outperformed the public markets by a sizable margin during the period 1996 to 2019. The figures indicate that, on average, a dollar invested in PE deals in Africa returned 78% more than a dollar invested in the MSCI Emerging Market Total Return Index during this period. Similar conclusions are reached when the sample deals are placed into the fund legal wrapping and performance is analyzed at the fund level. Indeed, the estimates suggest that, not only have top quartile funds outperformed the index, but so have the average, median, and bottom quartile funds - implying better relative performance than has been reported for PE in emerging markets. This appears to explain the recent increases in investor allocations to PE investments in Africa and implies that an allocation to PE may contribute positively to an allocator's overall portfolio return.

Nevertheless, although this chapter provided insights on how PE has performed over a period exceeding two decades, it has provided limited insights on the factors that drive PE returns in Africa. The GP characteristics and macroeconomic factors that drive PE investment duration and returns are a matter of interest to academics and practitioners and are investigated in Chapters 4 and 5 of this study, respectively. Furthermore, understanding the influence of GP experience on performance and whether GP performance is persistent is important to the practical capital allocation strategies of GPs on the continent. Indeed, how deal returns are related to the performance of prior deals concluded by the same GP would be useful to asset allocators as this has implications for the weight placed on prior performance in GP selection decisions. Performance persistence is thus investigated in the following chapter of this study.

Chapter 3: The persistence of private equity performance in Africa

3.1 Introduction

The long-term persistence in the performance delivered by financial intermediaries has been a central question in finance and one which has been studied extensively in the public markets. Whereas this literature has generally found persistent outperformance to be non-existent in mutual funds (see, for example, Carhart, 1997; Fama & French, 2010; Angelidis et al.; 2013), the growing consensus on the existence of persistence in private equity performance has been a distinguishing feature of the asset class (e.g., Kaplan & Schoar, 2005; Sensoy et al., 2014; Korteweg & Sorensen, 2017; Braun et al., 2017; Cavagnaro et al., 2019; and Harris et al., 2023). These observations of persistence have largely been interpreted to mean that GP outperformance is due to skill rather than luck (Korteweg & Sorensen, 2017; Nanda et al., 2020). Naturally, the ability to consistently outperform indicates that there is something unique and time-invariant about the qualities of GPs that can accomplish this feat (Ewens & Rhodes-Kropf, 2015). Hence, whilst research on public markets cautions that past performance is not a predictor of future success, findings of persistence in PE performance appear to support the conventional wisdom that investors should select GPs that have previously achieved top quartile performance.

However, recent studies suggest that persistence may be transient and difficult for LPs to exploit (Braun et al., 2017; Chung, 2012; Harris et al., 2023; Korteweg & Sorensen, 2017). For instance, Chung (2012) confirmed that current fund performance is a significant determinant of the performance of a follow-on fund but found no significant relationship with the second or third follow-on fund. Sensoy et al. (2014) showed that the persistent outperformance achieved by endowment funds, who were early investors in US and European PE, has disappeared and that this outperformance was attributable to greater access to performing VC funds before the dot-com crisis. Braun et al. (2017) found that top quartile performance is persistent during periods of low competition for deals but tends to disappear during periods of high competition. At the same time, Korteweg and Sorensen (2017) found performance to be noisy, making it difficult for investors to identify the GPs that have a potential to produce future top quartile performances and thus implying little exploitable persistence. Likewise, Harris et al. (2023) reported that the persistence observed in buyouts disappears when evaluated based on the information available to LPs at the time of making a commitment to a follow-on fund.

Of course, analysing persistence is not without its challenges and the prior literature has faced three important conceptual and data related challenges (Braun et al., 2017). First, most of the prior studies have considered persistence in performance across successive funds, which commonly have a 10-year term. Consequently, these studies have measured persistence at a low frequency and often with data that includes the values of unrealised investments (e.g., Kaplan & Schoar, 2005; Phalippou & Gottschalg, 2007; and Harris et al., 2023), which may be biased estimates of final values (Barber & Yasuda, 2017; Brown et al., 2019; Jenkinson et al., 2013). Second, fund level analyses benchmark by vintage year[9] and thus cannot precisely account for market conditions because the timing of investments will be different across funds (Braun et al., 2017). In addition, these analyses are limited in their ability to decompose the investment level factors that have an influence on persistence (Nanda et al., 2020). For instance, persistence could be attributable to a GP's choice of region and sectors, and the level of competition for deals in those regions and sectors. Third, the scarcity of PE performance data has meant that findings of persistence have mostly been reported in European and US markets and few attempts have been made to investigate the existence of persistent PE outperformance in emerging markets.

In view of the above, the objective of this chapter is to determine whether PE performance in Africa exhibits persistence and, if so, to explore its sources. To gain more granular insights on persistence and its sources, this chapter uses individual investments as the unit of analysis and focuses on fully realised PE investments made in Africa. There are two reasons for this choice: firstly, understanding how deal returns are related to the performance of prior deals concluded by the same GP is important to LPs because it has implications for the weight placed on past performance in GP selection decisions. Secondly, the findings of persistence in the literature have been reported in European and US PE and this author is only aware of one study, that by Gohil (2014), that examines persistence in an emerging market, namely India. Given their different stages of developments, it is unlikely that findings from the European and US PE markets can be generalised to PE in Africa. Furthermore, no prior studies have attempted to decompose the sources of persistence in emerging markets nor have any examined persistence in Africa. This chapter aims to fill this gap and to contribute to an improved understanding of the drivers of PE returns in emerging markets. Thirdly, analysing persistence at the investment level should allow for examination of the extent to which persistence can be attributed to portfolio construction - i.e., selecting the right region and/or sectors, market timing, and other GP specific factors. This approach has only been used by two other studies to analyse persistence in developed PE markets, namely those of Braun et al. (2017) and Nanda et al. (2020), and this chapter provides further empirical evidence, using this novel approach of enquiry on the investment level sources of persistence.

The findings of this chapter indicate that PE performance in Africa is persistent, thereby contributing new evidence from a minimally investigated region to the discussion on performance persistence.

[9] Usually defined as the year in which a fund makes its first investment.

Although there is an established literature consensus on the existence of persistence in the European and US literature (see, for example, Braun et al., 2017; Harris et al., 2023; Kaplan & Schoar, 2005; and Lerner et al., 2007), no prior attempts have been made to investigate persistence in Africa. The investigation of persistence at the deal level using the novel approach introduced by Braun et al. (2017) that enables a decomposition of the sources of persistence is thus a pioneering one in an emerging market. The findings provide empirical support to the conventional wisdom to back GPs that have previously achieved good performance, which has previously been without academic empirical backing in Africa. The findings also contribute new insights highlighting the importance of sector choice and the ability to achieve timeous exits as sources of performance persistence on the continent.

The remainder of this chapter proceeds as follows: Section 3.2 reviews the literature, Section 3.3 describes the conceptual approach, Section 3.4 discusses the selection of variables and methodology, Section 3.5 provides the results, and Section 3.6 concludes.

3.2 Literature review: theoretical and empirical considerations

The number of published papers studying private equity returns has grown rapidly since the early 2000s. Amongst these, the group investigating the persistence hypothesis have reported results that are controversial in the context of findings in other asset classes, e.g., mutual funds. Interestingly, whereas the literature has generally found persistent outperformance to be non-existent in mutual funds, findings of persistence in PE performance appear to have withstood academic scrutiny (Braun et al., 2017). In the mutual fund literature, the lack of persistence has been interpreted to mean that performance is attributable to luck rather than skill, which is puzzling from the economic point of view. That is, if performance is due to luck, why then do investors continue to place capital with active managers, rather than invest in lower cost passive strategies, and why do they dedicate significant resources to evaluating past performance in their selection processes (Berk & Green, 2004)? Hence, the central focus of the prior studies has been to determine whether GP performance is persistent over the long-term, and if so, understanding the factors that influence persistence.

Unlike mutual funds, PE markets are segmented from other capital markets and, as a result, are characterised by frictions (Gompers & Lerner, 2000). LPs cannot redeem their capital during the term of a fund and GPs tend to be contractually restricted to investing in unlisted companies located in specific regions. This essentially means that adjusting amounts invested in PE and redirecting capital to other asset classes or jurisdictions takes over ten years (Ljungqvist & Richardson, 2003). Gompers and Lerner (2000) argued that an exogenous increase in capital inflows into a given region would lead to greater competition for deals and result in an increase in the valuations of target companies. Indeed, when they evaluated this “money chasing deals” hypothesis on a sample of 4000 US VC funding rounds concluded in the period 1987 to 1995 they found a strong, positive, and economically significant relationship between valuations and changes in aggregate LP commitments to PE. Analogously, Berk and Green (2004) argued that fund managers underperform because they increase the size of their funds and thereby compete away their outperformance owing to decreasing marginal returns to scale. Accordingly, the absence of persistence points to a competitive supply of capital as investors rationally pursue returns and use track records as evidence of skill.

In their seminal paper, Kaplan and Schoar (2005) investigated the existence of persistence in PE using a sample of 746 US funds raised in the period 1980 to 2001 and reported strong evidence of economically significant persistence. Not only did they find persistence between the current and predecessor fund, but they also found persistence between the current and second previous fund. To illustrate, the authors found a 1% higher performance in a prior fund to be associated with a 54 basis points increase in the performance of the current fund. Moreover, the summed coefficients in their lagged structure implied that a 1% higher performance in the prior two funds is associated with 77 basis points increase in the performance of the current fund. Similarly, Phalippou and Gottschalg (2009) found the outperformance achieved by top quartile GPs to be persistent and their results were robust across different samples and after controlling for sample bias. Although data used by Kaplan and Schoar (2005) and Phalippou and Gottschalg (2009) has been found to be defective[10] (e.g., Stucke, 2011; Harris et al., 2014), their findings on persistence have been corroborated by the recent literature (e.g., Chung, 2012; Harris et al., 2014; Sensoy et al., 2014; Robinson & Sensoy, 2016; Korteweg & Sorensen, 2017; Braun et al., 2017; Cavagnaro et al., 2019; and Harris et al., 2023).

Furthermore, consistent with Berk and Green (2004), capital inflows into individual GPs and the industry have been found to be positively related to the performance of prior funds, suggesting that LPs are attracted to persistently good performance (Kaplan & Schoar, 2005; Barber & Yasuda, 2017; Harris et al., 2023). At the same time, the relationship between fund size and performance has been shown to be positive and concave, pointing to diminishing marginal returns to scale (Kaplan & Schoar, 2005; Harris et al., 2023). The diminishing returns to scale might occur because of the limited scalability of human capital since GPs do not hire additional partners proportionally to increases in the size of their funds (Gompers & Lerner, 2000; Kaplan & Schoar, 2005). Hence, top performing funds grow less than proportionally with their increase in performance compared to lower performing funds (Kaplan & Schoar, 2005; Sensoy et al., 2014; Harris et al., 2023), suggesting that these GPs voluntarily limit the growth of their funds and that this enables them to avoid diminishing marginal returns. Indeed, Harris et al. (2023) reported that fund size had no influence on the returns realised by US

[10] Chapter 2 of this study discusses the data shortcoming associated with the prior literature in greater detail.

buyout funds in the period 1982 to 2019, indicating that buyout funds had scaled their performance with size. On the other hand, although they found similar results for VC funds over the full sample period, they found weak evidence of a negative relationship in the pre-2000 period and postulated that VC funds may have overexpanded in the period leading up to the dotcom crisis.

Yet, rational economic theory teaches that any rents, i.e., outperformance, generated by funds should accrue fully to the GPs (Berk & Green, 2004). In other words, since compensation structures generally follow the standard two-and-twenty[11] with little variation across funds (Groh & Liechtenstein, 2011; Phalippou & Gottschalg, 2009), GPs would be expected to increase the size of their funds to extract a greater portion of the surplus. Hochberg et al. (2014) address this puzzle by proposing a learning and information hold-up model according to which LPs learn ‘soft’ information about a GP’s skill, whereas outsiders only observe ‘hard’ information such as realised and unrealised returns. They argued that ‘soft’ information is particularly important in PE where realised returns take many years to materialise and where fundraising for a subsequent fund typically takes place halfway through a current fund. Specifically, at the time of fundraising, the ‘hard’ information available to potential LPs mostly consists of interim performance based on estimates of the fair values of unrealised portfolio investments (see e.g., Jenkinson et al., 2013; Barber & Yasuda, 2017; and Brown et al., 2019). In this context, ‘soft’ information, such as the likelihood that the unrealised value will materialise, provides incumbent LPs with an informational advantage in determining whether the performance of a GP is due to skill or luck. This asymmetric information provides incumbent LPs with the bargaining power to hold up the GP when it raises the follow-on fund because their failure to re-invest would be interpreted by potential LPs as a negative “signal” about the GP’s skill.

This information hold-up model implies that the allocation of resources to due diligence investigations might not be socially wasteful after all. This is because interim performance is not sufficient to identify skill and explains the detailed ‘soft’ information required by LPs (e.g., investment decision processes, employee compensation, organizational culture, etc.) when evaluating GPs. It also provides for persistence to not be competed away because skilled LPs, that is, those that have an ability to identify skilled versus lucky GPs, should continue to consistently outperform (Korteweg & Sorensen, 2017). In fact, Lerner et al. (2007) examined 838 fund investments made by 352 LPs into mostly US based funds during the period 1991 to 1998 to determine whether there are systematic differences in the returns realised by different types of LPs from their PE investments. Interestingly, they found the performance

[11] Specifically, GPs are paid an annual management fee that is typically 2% of a fund’s total capital during the investment period and 2% of invested capital after the investment period. GPs also receive a 20% share of a fund’s profit, called carried interest, that becomes payable after LPs have received distributions that exceed their capital contributions and have earned an IRR that exceeds an agreed hurdle rate.

of funds selected by endowments to be 21% higher than those of the average LP. Moreover, the follow-on funds in which endowments reinvested were found to perform better than those in which they chose not to reinvest, whereas the reinvestments of other LPs did not exhibit similar patterns. These findings were reported to be robust after controlling for differences in investment objectives, risk profiles, and better access to older funds. Lerner et al (2007) interpreted this as indication that endowments are better than other LPs at utilising ‘insider’ or ‘soft’ information to forecast future performance.

In the same fashion, Sensoy et al. (2014) investigated the performance of LPs using a sample of 14 380 investments into 1 250 buyout and VC funds raised in North America, Europe, and ‘Asia and the rest of the world’ during the period 1991 to 2006. They confirm Lerner et al.’s (2007) finding of substantial outperformance by endowments in the period 1991 to 1998 and find that this outperformance was driven by the performance of VC funds during the technology boom. In addition, consistent with the GP hold-up model of Hochberg et al. (2014), endowments were found to be more likely to invest into older funds whose capital grew slower than their prior returns would predict. However, Sensoy et al. (2014) found that the outperformance enjoyed by endowments disappeared in the period 1999 to 2006 and that there was no longer significant variation in the returns realised by the different types of LPs. This suggests that the superior GP selection abilities of endowments have declined with time. For one thing, although Sensoy et al. (2014) found the funds in which endowments reinvested to have outperformed those in which they did not reinvest, the margin was smaller than in the period 1991 to 1998 and was not significantly different to the margin earned by other types of LPs. In essence, they attribute this decline in outperformance to the influx of capital into the asset class and the consequent increase in competition among GPs for deals as well as a declining ability for LPs to accrue rents by holding up GPs (Hochberg et al., 2014).

Numerous other scholars have also suggested that persistence is transient and difficult for LPs to exploit (see e.g., Chung, 2010; Braun et al., 2017; and Harris et al., 2023). For instance, Harris et al. (2023) investigated whether the persistence reported in previous studies had persisted, using data obtained from Burgiss for funds raised in the years 1982 to 2019. Consistent with the prior literature, they found substantial performance differences between top and bottom quartile performers, where buyout funds with a previous fund in the top quartile had an average IRR (MOIC) of 17.2% (2.00) compared to 8.9% (1.46) for those with a previous fund in the bottom quartile. Similarly, VC funds with a previous fund in the top quartile had an average IRR (MOIC) of 35.6% (4.08) compared to 2.6% (1.34) for those with a prior fund in the bottom quartile. Nevertheless, Harris et al. (2023) reported a decline in these performance differences in the post-2000 period for both buyouts and VC funds. In addition, they find strong evidence of performance persistence during the pre-2000 period and further reported that persistence has persisted in the post-2000 period. Interestingly, Harris et al. (2023) examined whether this persistence is exploitable by evaluating persistence based on the information available to LPs at the time of making a commitment to a follow-on fund. Clearly, although studies generally analyse persistence based on final performance, LPs typically commit to follow-on funds midway through the life of the prior fund and thus base their selection decision on interim performance. Viewed through this lens, persistence disappeared for buyouts raised in the post-2000 period but persisted for VC fund, although it was weaker than in the pre-2000 period.

On the other hand, Braun et al. (2017) investigated buyout persistence in a new way by using a sample of 7 568 portfolio investments exited by 865 buyout funds raised mostly in the US and Europe in the period 1979 to 2012. Their novel approach measured persistence across successive deals and was thereby able to control for investment level factors such as the region and sector choices. Indeed, they found current deals to have a strong positive correlation to the previous deals of the same GP and report significant GP fixed effects in the panel of sample deals. However, like Sensoy et al. (2014) and Harris et al. (2023), Braun et al. (2017) reported evidence of lower persistence in recent years and suggested that this bespeaks the increased commoditization of the asset class as more GPs enter the market and competition for deals increases. Moreover, they examined the “money chasing deals” hypothesis by region and sector and found persistence to be lower during periods of greater capital influx. They also found that the persistence of top quartile GPs continues during times of increased competition but is lower and does not persist beyond a few deals. Bottom quartile GPs on the other hand were reported to underperform during both periods of low and high competition.

At the same time, Korteweg and Sorensen (2017) analysed a sample of 1 924 funds raised in the period 1969 to 2001 by 831 GPs mostly in the US and Europe using a hierarchical linear model. They reported substantial long-term persistence in net-of-fees performance but found performance to be noisy, with limited investable persistence. Interestingly, they report that the driver of the noise in performance is VC funds, whose performance they attribute to luck rather than skill. In addition, smaller funds were found to have greater long-term persistence, especially for VC funds, and funds in the US had less long-term persistence than those in Europe and the “rest of the world”. Interestingly, funds in the rest of the world were found to exhibit the greatest level of persistence but, at the same time, had the most volatile returns. Like Braun et al. (2017) and Harris et al. (2023), Korteweg and Sorensen (2017) find that persistence has declined in the 2000s relative to the 1990s but, in contrast, find the decline to be driven by VC funds whereas substantial persistence exists in buyout funds.

Altogether, these findings suggest that skilled GPs, those that can persistently outperform, are scarce and are becoming even more so with time. They therefore have significant implications: first, they suggest that interim and past performance are not sufficient to identify skill and explain the importance placed by LPs on "soft" information (e.g., organisational culture, compensation, sourcing of deals, and decision-making processes) in their evaluations of GPs (Hochberg et al., 2014; Korteweg & Sorensen, 2017; Cavagnaro et al., 2019). Second, they confirm the existence of heterogeneity in LP skill, i.e., ability to identify skilled GPs, and highlight the scarcity of skilled LPs (e.g., Sensoy et al., 2014). Third, they suggest that selecting GPs may no longer be the mechanical process based on past performance the conventional wisdom suggests it to be, but one that requires substantial judgement and for which LP talent may be important (Cavagnaro et al., 2019). To illustrate, Cavagnaro et al. (2019) analysed the returns of 27 283 buyout and VC fund investments made by 1 209 LPs during the period 1991 to 2011 and found that skill in fund selection affects their returns. Indeed, they found that more LPs consistently outperform than would be expected merely by chance and that there are LPs that seem to be better at selecting higher performing GPs. Moreover, using a variant of the variance decomposition model of Korteweg and Sorensen (2017), they found that a one standard deviation increase in LP skill increases returns by one to two percentage points and report this effect to be higher for VC funds. Nevertheless, like Sensoy et al. (2014), Braun et al. (2017), and Harris et al. (2023), Cavagnaro et al. (2019) report that this effect has declined over time.

Therefore, these literature findings highlight the importance of understanding the persistence of PE performance in emerging markets. Of course, studies focused on developed markets have incidentally found persistence to be greatest and returns more volatile in the "rest of the world" (Korteweg & Sorensen, 2017). This author is aware of only one study, that of Gohil (2014), that has focused its investigation on persistence in an emerging market. Gohil (2014) analysed a sample of 380 deals exited by 22 funds in India in the period 2007 to 2012 obtained from numerous databases and company websites. He undertook a fund-level analysis by using the Mann-Whitney test to extract and classify funds that outperformed the median of the total sample and found 11 "good" funds. The returns of these funds were then compared to the mean and median returns for that year using the Mann-Whitney test to ascertain whether they consistently outperformed. He found that sample funds failed to consistently outperform both the mean and median returns and randomness tests attributed the returns generated by the sample funds to luck.

3.3 Conceptual framework

The literature review demonstrates that relatively few studies have investigated PE performance persistence, and that the existing literature has mostly analysed persistence by taking a fund level approach. Indeed, most of the prior studies compared the returns of funds to those of previous funds managed by the same GP following the method introduced by Kaplan and Schoar (KS) (2005)[12]. Put simply, the funds are sequenced by GP and persistence is analysed using a regression framework with a lagged structure, wherein significant lagged performance of previous funds indicates that the returns of the current fund depend on the returns of the previous funds. This baseline regression attributes persistence to GP skill, i.e., ability to identify portfolio companies with good prospects, provide value enhancing advice to portfolio companies, reduce agency issues, etc. Of course, persistence might also be influenced by, and the KS method controls for, variables such as GP experience, market conditions (e.g., vintage year and S&P 500), size of fund, and the type of fund (e.g., VC, early stage, or mezzanine funds). In addition, to analyse whether persistence is driven by the top or bottom performers, KS order the funds into terciles based on performance and compute the Markov probability that at least one subsequent fund will remain in the same group.

The fund level approach faces several challenges. Firstly, compared to mutual funds where persistence is typically tested based on annual returns, the PE fund level approach measures persistence at a very low frequency (Braun et al., 2017). In addition, fund level analyses often use unrealised NAVs since fund returns can only be known with certainly at the end of a fund's life, i.e., once all investments have been exited (e.g., Kaplan & Schoar, 2005; Phalippou & Gottschalg, 2009). Thus, interim changes in performance reflect audited GP appraisals of the value of the fund's remaining investments, which may be biased estimates of final values. For instance, these NAVs have been found to be conservative and to understate exit values to the tune of 35% (Jenkinson et al., 2013). They have also been reported to be inflated during fundraising and to gradually reverse once the follow-on fund has been raised (Jenkinson et al., 2013; Barber & Yasuda, 2017; Brown et al., 2019). Indeed, the prior literature findings on PE performance are replete with controversies emanating from the use of unrealised NAVs and related data shortcomings (e.g., see Stucke, 2011; Harris et al., 2014). Consequently, the approach adopted by the recent studies has been to limit evaluations to fully exited funds (e.g., Korteweg & Sorensen, 2017; Braun et al., 2017).

Second, as alluded to above, it is standard practice for GPs to raise a follow-on fund halfway through the current fund, which may result in spurious persistence because sequential funds are exposed to common economic and financial market conditions (Korteweg & Sorensen, 2017). Recently, Korteweg and Sorensen (2017) introduced a variant of the fund level analysis that uses a hierarchical linear model to distinguish three forms of persistence: long-term, investable, and spurious persistence. In this regard, long-term persistence refers to the potential for some GPs to produce consistently higher or lower returns. Investable persistence accounts for the difficulty of identifying the better performing

[12] See e.g., Phalippou & Gottschalg (2009); Chung (2012); Harris et al. (2014); and Harris et al., 2023.

GPs, where noisy returns imply lower investable persistence. The spurious correlation on the other hand captures the correlation that is due to the overlapping structure of successive funds. Compared to the KS model, this approach relies explicitly on the timing of funds rather than sequential numbering and accounts for the time gaps between funds (Korteweg & Sorensen, 2017). However, this model essentially decomposes returns into a time invariant GP effect and the period in which the investment is made (Nanda, 2020). At the same time, it does not allow the flexibility to evaluate the influence of investment level factors on persistence.

Of course, the detailed fund level data required to decompose the investment level factors that influence persistence has generally been unavailable to researchers (Braun et al., 2017), hence the predominance of fund level analyses in the literature. However, recent literature developments suggest that shifting the unit of analysis to the portfolio company presents an opportunity to extend the frontier of insights on persistence and its sources (e.g., Braun et al., 2017; Brown et al., 2020; and Nanda et al., 2020). Clearly, portfolio companies are crucial to understanding the forces that drive PE returns since they determine the performance of funds (Brown et al., 2020). Furthermore, investment level analyses also present an opportunity to bridge the gap between the fund level analyses of persistence with the strand of the literature that evaluate the specific action taken by GPs in portfolio companies (e.g., Gompers et al., 2016; Gompers et al., 2020; and Biesinger et al., 2020). This has the potential to provide a holistic understanding of persistence and its drivers by combining the insights from evaluating the determinants of portfolio company IRRs and PMEs with the context-rich analysis of the actions taken by GPs to drive value in portfolio companies.

These studies have identified four components of GP skill: the ability to select good investments, produce value creation plans for portfolio companies, work with management to implement value enhancing plans, and facilitate a high value exit (Gompers et al., 2016; Kaplan & Strömberg, 2009). Of course, making good investments is one way for the GP to generate returns and, to do this, the GP must source and select portfolio companies whose growth prospects are not fully reflected in transaction prices. The GP’s ability to source investments depends on the size and quality of its network and better-networked GPs are reported to achieve higher fund performance (Hochberg et al., 2007; Sørensen, 2007). Once a GP has sourced transactions, it must screen the opportunity set to eliminate the lower quality deals and then focus its resources on conducting due diligence and selecting investments from a shortlist of companies that are likely to generate the best returns (Fried & Hisrich, 1994; Gompers et al., 2016). Among the factors considered in this process are the management team’s capabilities, products and services, market attractiveness, competition, and the earnings growth potential (Block et al., 2019; Fried & Hisrich, 1994; Gompers et al., 2016; Gompers et al., 2020). Clearly, investment selection will be influenced by GP experience since more experienced

GPs would have learnt the skills required to evaluate investments through trial and error, a learning process that is difficult to undertake through any other education (Zarutskie, 2010).

Market timing is another way in which GPs can create value for their investors. When GPs raise funds from LPs, they receive capital commitments that can be drawn down to make investments at the GP's discretion at any time during the investment period. To be sure, the investment period is usually a period of five years and can be extended by an additional year with the prior approval of LPs. Essentially, this means that GPs have full discretion and decision-making powers over the timing of acquisitions and exits of portfolio companies (Brown et al., 2021; Jenkinson et al., 2022). As sophisticated market participants that are repeat players in making choices about the acquisitions and sales of companies (Ball et al., 2011), experienced GPs might perceive when market or sector valuations are low or high and time their acquisitions and exits of portfolio companies accordingly (Gredil, 2022; Ljungqvist et al., 2020). In addition, their active participation on portfolio company boards enables GPs to learn important private information that may give them an advantage in timing the valuation of the sectors in which they specialise (Gredil, 2022).

With respect to value creation plans, GPs utilise three main strategies: financial engineering, governance, and operational improvements (Kaplan & Stromberg, 2009; Gompers et al., 2016; Biesinger et al., 2020). Financial engineering refers to the allocations of equity participation rights to management to incentivise performance and optimisation of the capital structure in a manner consistent with the capital structure tradeoff and market timing theories (Gompers et al., 2016). With governance engineering, GPs provide governance oversight by implementing legal structures that provide control rights and board seats, which enables active monitoring of the portfolio company and improvement of governance. In operational engineering, GPs use their sector or operational experience to provide guidance or make decisions on strategy, pursuing growth enhancing strategies, replacing senior managers, etc. To illustrate, Biesinger et al.'s (2020) analysis of returns and contextual information from investment proposals of emerging market deals showed that the most popular action items were: operational improvements (84%), revenue growth (74%), governance engineering (48%), financial engineering (35%), and cash management (14%). In addition, they document that GPs use a combination of these strategies and that the ex-post combination of successfully executed strategies is the best predictor of returns.

For these reasons, this study utilises the novel approach introduced by Braun et al. (2017), wherein fully exited deals of each GP are sequenced according to their date and persistence is measured across successive deals made by GPs. This approach has several advantages. First, evaluating fully realised investments eliminates the potential biases that may arise from assessments of unrealised values

(Jenkinson et al., 2013; Barber & Yasuda, 2017; Brown et al., 2019). Second, the investment level approach measures persistence at a higher frequency than would be the case in a fund level analysis because the holding period of individual deals tends to be far shorter than a fund's life. Third, the investment level approach can control for some of sources of the idiosyncratic variability of a fund's individual investment, such as region, sectors, size of deal, holding period, market conditions, etc., which are smoothed in fund level analyses (Braun et al., 2017; Brown et al., 2020). This approach also affords greater precision in evaluating the influence of economic and market factors on persistence. Clearly, benchmarking timing by vintage year does not consider the fact that funds differ in their pacing of capital deployment and that different market conditions might be characterised by varying transaction prices.

3.4 Selection of variables and methodological framework

The objective of this chapter is to determine whether PE performance in Africa exhibits persistence and, if so, to explore its sources. The analysis is based on the sample of 250 deals exited by 28 GPs (see Chapter 2 of this study for a detailed description) and employs IRR as the main measure of performance because market timing is not captured by the PME (Jenkinson et al., 2022). At the same time, IRR is the measure used by LPs to benchmark the performance of their PE investments and is explicitly referred to in limited partnership agreements. This chapter focuses on the following GP and deal specific characteristics as the explanatory variables of interest: GP experience, investment size, sector, region, and vintage period fixed effects. The selection of these variables is guided by the theory and the suitability of each variable is exemplified by its use in the prior literature.

3.4.1 Selection of variables

PE performance is expected to be positively associated with the level of experience that a GP has accumulated through the practical trial and error of managing PE investments, a learning process that is difficult to undertake through any other education (Zarutskie, 2010). Several prior studies have reported a positive relationship between GP experience and returns at both fund and deal level (See, for example, Aigner et al., 2008; Braun et al., 2017; Gohil, 2014; Kaplan & Schoar, and 2005; Phalippou & Gottschalg, 2009). Regarding the variables used to proxy GP experience, some of the prior studies have controlled for chronological experience based on the number of years that have lapsed since a GP's first investment (Aigner et al., 2008; Gohil, 2014). Others have used the fund or deal sequence to capture the functional experience obtained through repeatedly engaging in the full process of investing (i.e., originating, managing, and exiting) in PE deals (see, for example, Kaplan & Schoar, 2005; Phalippou & Gottschalg, 2009; and Braun et al., 2017). These studies apply the logarithmic transformation because experience or knowledge is expected to have a diminishing impact on performance (Aigner et al., 2008). Guided by the prior studies, this study controls for the natural logarithm of the deal sequence, which is obtained by ordering the deals of each GP by their investment date and then counting the deal number since the first investment by a specific GP.

Theoretical arguments suggest that fund and deal size should have a negative impact on returns due to the limited scalability of human capital and the heterogeneity of GP skills, which makes it difficult to hire additional partners of the same quality (Kaplan & Schoar, 2005; Lopez-de-Silanes et al., 2015). However, although a great deal of empirical research has gone into examining the impact that size has on returns, these studies have focused on fund size and the results have been mixed. Fund size was found to have a positive impact on returns by Gottschalg et al. (2004), Phalippou and Zollo (2005), whilst it was found to have a negative influence by Aigner et al. (2008). Kaplan and Schoar (2005), Gottschalg et al. (2004) and Harris et al. (2014) reported a concave relationship, pointing to diminishing marginal returns to scale. At the deal level, Braun et al. (2017), Lopez-de-Silanes et al. (2015), and Brown et al. (2022) show a negative relationship between deal size and returns. Regarding the variables used to measure size, the fund level studies have mostly controlled for a fund's total capital commitments while the deal level research uses the dollar amount invested in each deal to capture the impact of size (Aigner et al., 2008; Braun et al., 2017; Kaplan & Schoar, 2005; Lopez-de-Silanes et al., 2015). These studies apply the natural logarithm of a fund's capital commitments or invested cost because size is expected to have a diminishing impact on returns (Aigner et al., 2008). This study uses the natural logarithm of the dollar amount invested in each transaction to measure size.

LPs benchmark performance based on IRR and raising a subsequent fund has been shown to be dependent on the performance of previous funds (Brown et al., 2019). The IRR is a time-sensitive measure of performance that has been shown to have a negative relationship with holding periods (Acharya et al., 2013; Cumming & Walz, 2010; Phalippou & Gottschalg, 2009). For this reason, longer holding periods are disconcerting to GPs and LPs because they reduce the prospects of outperforming the hurdle rate and tie up capital for longer (Dominic & Joseph, 2023). GPs share in the profits of the fund through carried interest only when the IRR of the fund exceed the hurdle rate and so are incentivised to exit timeously and at the best possible valuation (Jenkinson & Sousa, 2015). Clearly, LPs expect timeous exits to be one of the ways in which GPs add value. This study controls for the duration of each investment, which is measured by the time in years between the date of investment and exit.

Lastly, scholars have argued that, because GPs make sequential investments to form a portfolio, deal selection should not be viewed in isolation from the other choices made in portfolio construction (Brown et al., 2022). These studies have indicated that the choice of sector, geography, and vintage are important components of the portfolio formation decisions that are delegated to GPs and have a significant impact on performance (Braun et al., 2017; Brown et al., 2022; Errais & Gritly, 2022). Thus, controlling for sector, geography, and vintage year fixed effects isolates the impact that the choice of sector, region, and timing have on PE returns (Braun et al., 2017). Accordingly, this study controls for sector, region, and vintage year fixed effects.

Therefore, by controlling for GP experience, investment size, holding periods, sector, region, and vintage year fixed effects, this study seeks to examine if any of these variables that have been identified by the theory and prior empirical literature have any impact on persistence.

3.4.2 Methodological framework

To confirm whether PE performance in Africa is persistent, a set of initial regressions that use each of the IRR, MOIC, PME, and excess IRR as dependent variables, and the lagged performance as the independent variable are estimated. The sample used in this chapter has 222 deals for which the performance of the previous deal exited by the same GP is available. Following Braun et al. (2017), this baseline regression takes the following form:

$$y_{i,N} = \alpha + \beta_1 y_{i,N-1} + \varepsilon_{i,N}, \tag{4}$$

Where $y_{i,N}$ is the IRR of deal number N exited by GP i. In this regression, a significant β_1 coefficient means that the performance of the prior deal, $N-1$, predicts the performance of the subsequent deal, N, i.e., performance is persistent. As indicated in Section 3.3, this baseline regression attributes persistence to GP skill but does not distinguish the factors that have an influence on persistence. If this baseline regression indicates persistence, then additional regressions are estimated to control for the deal and GP specific variables that have been identified in the literature as having an influence on PE returns and to evaluate whether these induce any changes in β_1. These regressions take the following form:

$$y_{i,N} = \alpha + \beta y_{i,N-1} + \sum_{i=1}^{J} \beta x_i + \varepsilon_{i,N} \tag{5}$$

Where $y_{i,N}$ is the IRR of deal number N exited by GP i and x_i is a vector of the GP and deal specific characteristics, i.e., deal sequence, investment size, holding period, sector, region, and vintage fixed effects, that match each deal. The parameters are estimated using Ordinary Least Squares Regression (OLS) regression. The Breusch-Pagan test was used to examine the regression residuals and indicated the presence of heteroskedasticity. For this reason, and consistent with the prior studies (see, for example, Kaplan & Schoar, 2005; Phalippou & Gottschalg, 2009; Braun et al., 2017; and Steger et al., 2017), this chapter employs robust standard errors. Furthermore, the variance inflation factor (VIF) was estimated for each regression and did not indicate values that could cause problems of multicollinearity.

Notably, Chapter 2 of this study indicated that PE returns are positively skewed (also see, for example, Diller & Kaserer, 2009; Kaplan & Schoar, 2005; and Phalippou & Gottschalg, 2009), and tests of regression residuals using the Shapiro-Wilk test indicate the presence of non-normality. The Central Limit Theorem states that a sample's distribution converges to normality as its size increases. Empirical studies have also demonstrated that, for samples that are larger than 40 observations or for which the number of observations per explanatory variable is greater than 10, non-normality has no perceptible impact on results (see, for example, Barret & Goldsmith, 1976; Schmidt & Finan, 2019; Williams et al., 2013). Furthermore, the robustness and reliability of the results presented in this chapter are validated by the results of quantile regression (see Section 5.4), which does not rely on the assumptions of normality and/or homoskedasticity (John, 2015; Naifar, 2016; Waldmann, 2018). The results are presented in tables that provide the OLS coefficient estimates with robust standard errors reported in parenthesis.

3.5 Results

The results of the baseline regression are summarised in Table 7 and show that the coefficient on the lagged IRR is positive and statistically significant. Economically, the coefficient of 0.143 implies that a 1% higher performance in a prior deal is associated with a 14.3 basis points higher IRR performance. In contrast, the coefficients on the lagged MOIC and PME are not significant suggesting no association with the performance of the previous deal by the same GP. This finding of persistence in IRR (and Excess IRR) performance, combined with the absence of persistence in MOIC and PME returns, is suggestive of the importance of market timing and time in the market in PE returns on the African continent. The results contrast with those of Braun et al. (2017) who find deal level PME performance to be persistent.

TABLE 7: The persistence of deal-level performance

	IRR	MOIC	PME	Excess IRR
Performance of $Deal_{n-1}$	0.143* [0.079]	0.052 [0,060]	-0.053 [0.042]	0.141* [0.080]
Constant	18.189*** [5.895]	2.652*** [0.334]	1,880*** [0.215]	10,733* [5,571]
Observations	222	222	222	222
F-statistic	8.736	0.607	0.619	8.715
p of F-test	0.003	0.437	0.432	0.003
Adjusted R^2	0.034	-0,002	-0,002	0.034

Note: *p<0.10, **p<0,05, ***p<0.01

Following the results of Table 7, additional regressions are estimated to control for the deal and GP specific variables that likely have an influence on returns and to evaluate whether these induce any changes in β_1. The first of these regressions takes the form depicted by Equation 6 and includes investment size to control for variations in performance across different size segments, e.g., lower mid-market, mid-market, and large cap deals. Fund size, which determines the size of a GP's deals, has also been found to have an influence on performance (Kaplan & Schoar, 2005; Phalippou & Zollo, 2005). Deal sequence captures the influence of experience in the full process of investing in PE deals (say, identifying, selecting, managing, and exiting) on performance. The holding period on the other hand accounts for the influence that the passage of time has on performance.

$$y_{i,N} = \alpha + \beta_1 y_{i,N-1} + \beta_2 (LN\ Sequence)_i + \beta_3 (LN\ Deal\ Size)_i + \varepsilon_{i,N}. \qquad (6)$$

Model (1) of Table 8 shows that the coefficient on lagged performance does not change and remains significant when deal sequence and deal size is controlled for, suggesting that persistence cannot be attributed to experience or size segment. Interestingly, unlike the findings of Kaplan and Schoar (2005), Phalippou and Zollo (2005), and Braun et al. (2017), the nonsignificant coefficients on deal sequence and investment size suggest that GP experience and investment size do not have an influence on deal level performance on the African continent.

In Model (2), holding period is added and the coefficient on lagged performance substantially drops in size and loses its statistical significance, suggesting that IRR persistence is largely attributable to differences in the time taken by GPs to realise value. This is interesting given that GPs have been shown to use a combination of strategies to create value and that it is the ex-post combination of such successful strategies that is the best predictor of performance (Biesinger et al., 2020). Funds typically have a 10-year life, and so GPs have a finite amount of time in which to implement these strategies, suggesting that the choice of strategies and the time taken to successfully execute and realise a high value exit is an integral component of skill. This is investigated further in Table 10 by regressing the holding period on GP fixed effects to determine whether there are systematic differences in the time taken by GPs to realise an exit. The F-test of joint significance is significant at the 1% level and the GP fixed effects explain 16.1% of the variation in holding periods across sample deals. This might explain why LPs use IRR to evaluate the performance of their PE investments rather than time indifferent measures such as MOIC and PME.

TABLE 8: The sources of deal-level persistence, IRR

Dependent variable: IRR	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Performance of $Deal_{n-1}$	0.140*	0.095	0.140**	0.123	0,122	0.120	0.097
	[0.078]	[0.073]	[0.068]	[0.091]	[0,083]	[0.073]	[0.089]
LN Deal Sequence	6.789	1.591					
	[6.520]	[6.077]					
LN Invested Cost	-6.193	-5.433					
	[7.590]	[7.111]					
Holding Period		-10.463**					
		[4.389]					
Region fixed effects	No	No	Yes	No	No	Yes	Yes
Sector fixed effects	No	No	No	Yes	No	No	Yes
Vintage fixed effects	No	No	No	No	Yes	Yes	Yes
Constant	101.536	156.208	15.757***	7.181	3.184	-3.618	-12.587
	[115.374]	[129.094]	[4.827]	[7.206]	[5.711]	[12.344]	[18.927]
Observations	222	222	222	222	222	222	222
Adjusted R^2	0.034	0.106	0.042	0.045	0.031	0.038	0.053

Note: *p<0.10, **p<0.05, ***p<0.01

TABLE 9: The sources of deal-level persistence, excess IRR

Dependent variable: Excess IRR	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Performance of $Deal_{n-1}$	0.139*	0.093	0.139**	0,121	0.123	0,121*	0.099
	[0.078]	[0.075]	[0.069]	[0.093]	[0.082]	[0,073]	[0.088]
LN Deal Sequence	4.186	-0.881					
	[6.315]	[5.902]					
LN Invested Cost	-4.822	-4.049					
	[7.332]	[6.867]					
Holding Period		-9.915**					
		[28,890]					
Region fixed effects	No	No	Yes	No	No	Yes	Yes
Sector fixed effects	No	No	No	Yes	No	No	Yes
Vintage fixed effects	No	No	No	No	Yes	Yes	Yes
Constant	77.931	128.854	8.407*	-1.634	0.610	-6.410	-16.711
	[111.334]	[124.620]	[4.904]	[6.992]	[6,177]	[12.392]	[18.203]
Observations	222	222	222	222	222	222	222
Adjusted R^2	0.030	0,099	0.041	0.047	0.028	0.034	0.053

Note: *p<0.10, **p<0,05, ***p<0.01

Additional regressions are estimated to distinguish the extent to which persistence is influenced by the choice of sectors, regions, at a given time, which are crucial components of portfolio construction. Models (3), (4), and (5) of Table 8 summarise the regressions of IRR on lagged performance and each of the region, sector, and vintage year fixed effects, respectively. Model (3) shows that the choice of region has no influence on the size or statistical significance of lagged performance while Model (5) indicates that controlling for vintage year reduces the coefficient on lagged performance and it ceases to be significant. Of course, the finding pertaining to vintage period is unsurprising given that results in Chapter 2 showed variations in performance across different vintage periods. Model (6) controls for both region and vintage, and, again, lagged performance is statistically significant. Interestingly, when the same regression is run using excess IRR as the dependent variable, lagged relative performance remains significant at the 10% level (see Model 6 of Table 9). This suggests that, keeping the choice of region and vintage period constant, relative performance in a prior deal continues to be a predictor of future returns.

On the other hand, Model (4) of Table 8 shows that controlling for sector fixed effects reduces the size of the coefficient on lagged performance and it becomes statistical non-significant. This indicates that sector choice has a substantial influence on persistence. Interestingly, regressing each of IRR, MOIC, and PME on sector fixed effects yields an F-test of joint significance that is significant at the 11.5%, 36.1%, and 74.0% levels, respectively. Combined, this weakly suggests that the choice of sector modulates persistence through its influence on holding period, i.e., the ability of GPs to achieve a timeous exit. There are two possible explanations for this: first, value creation might take longer in certain sectors due to the time required to successfully implement value creation plans. For instance, this might be the case for sectors in which value creation is dependent on substantial physical infrastructure builds, e.g., the telecommunication services. Second, certain sectors might be characterised by fewer suitors, which would make it challenging for GPs to realise a high value exit - even in instances where value creation plans have successfully been implemented.

Table 9 repeats the analysis presented in Table 8[13] but evaluates persistence based on the excess IRR. The results summarised in Table 9 are quantitatively similar to those based on IRR and show that, when the influence of time in the market is considered, relative performance is also persistent. Simply put, these results suggest that the extent to which a GP performs relative to the market in a preceding deal can be used by LPs to forecast the relative performance of a succeeding transaction.

[13] The analysis presented in Tables 8 was also run based on MOIC and PME. The results indicated that MOIC has a significant positive association with GP experience and holding periods.

TABLE 10: Investigating persistence using GP fixed effects

	IRR	MOIC	PME	Excess IRR	Holding Period
Constant	16.750*** [4.575]	2.146*** [0.239]	1.453*** [0.149]	8,627* [4,412]	5.119*** [0,034]
GP fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	222	222	222	222	222
F-statistic	0.664	1.588	0.992	0.802	2.845
p of F-test	0.876	0.049	0.477	0,727	<0.001
Adjusted R^2	-0,036	0.058	-0.001	-0.021	0.161

Note: *p<0.10, **p<0,05, ***p<0.01

Finally, persistence is tested in a general way by removing lagged performance and instead adding GP fixed effects to evaluate whether there are systematic differences in the performance generated by GPs (Braun et al., 2017). Table 10 summarises the regression results. The F-tests of joint significance of the GP fixed effects are non-significant in all the regressions except when the MOIC is the regressand, wherein it is significant at the 5% level. These results indicate that the identity of the GP to some extent explains the heterogeneity in the MOIC realised by the GPs in our sample but does not explain the IRR, PME, or Excess IRR. Taken together, the results suggest that although the ability to achieve timeous exits largely explains the persistence of a GP's performance from one deal to the next, there are other time invariant GP factors beyond this that explain the heterogeneity in performance across GPs.

3.5.1 Persistence by quartile – A transition matrix approach

The evidence of persistence suggests that LPs can use the performance realised by a GP in a previous deal to forecast the performance of an ensuing transaction. However, it does not indicate whether it is the top or bottom quartile performers that drive persistence - which would enable an evaluation of whether a strategy to back GPs that have previously achieved top quartile performance is valid. To this end, this section computes Markov transition matrices to determine the probability that the subsequent deal of a GP remains in the same quartile as the previous transaction.

These transition matrices are calculated based on the IRR, MOIC, and PME using the following procedure (Kaplan & Schoar, 2005; Aigner et al., 2008): first, deals are ranked according to each of the three performance measures. Then, based on this ranking, the 25% best performing deals are assigned to the top quartile and the next are assigned to the third, second, and bottom quartiles, respectively. Thereafter, the subsequent deals managed by the same GP are determined and assigned to each of the four quartiles using the same procedure. Finally, the percentage of deals in the top quartile (as well as the third, second, and bottom quartile) that are followed by subsequent deals in each of the top, third, second, and bottom quartiles are computed. Thus, each row of the matrix represents the performance of the previous deals, and the columns represent the performance of the succeeding deals.

Table 11 reports the Markov probabilities based on the IRR performance and indicates significant persistence by GPs with preceding deals in the top quartile. The probability of achieving top quartile performance twice in a row is 41% and GPs with a preceding deal in the top quartile remain above the median 61% of the time. This is significant considering that the probability of realising top quartile performance twice in a row by chance should be 25%. In contrast, the probability of realising bottom or second quartile performance twice in a row is substantially lower and suggests that persistence is driven by top performers. To illustrate, GPs with a preceding deal in the bottom quartile remain in the bottom quartile 21% of the time while those with deals in the second quartile have a 27% probability of landing up in the same quartile twice in a row.

interestingly, GPs with deals in the third quartile remain in the third quartile 35% of the time but have the highest probability of landing up in the bottom quartile (30%). It is also worth pointing out that, although GPs that achieve top quartile IRR performance are marginally more likely to end up in the bottom quartile (21%) than in either of the third (20%) or second quartiles (18%), they seem to be the most consistent as they are the most likely to land up in the same quartile (41%) and outperform the median twice in a row (61%). These probabilities suggest that the conventional wisdom of sticking with top quartile GPs is applicable.

TABLE 11: Markov transition probabilities, IRR

		Subsequent deal quartile			
Precedent deal	IRR	Bottom Quartile	Second Quartile	Third Quartile	Upper Quartile
	Bottom Quartile	21%	36%	18%	25%
	Second Quartile	27%	27%	27%	18%
	Third Quartile	30%	18%	35%	16%
	Top Quartile	21%	18%	20%	41%

TABLE 12: Markov transition probabilities, MOIC

		Subsequent deal quartile			
Precedent deal	MOIC	Bottom Quartile	Second Quartile	Third Quartile	Upper Quartile
	Bottom Quartile	21%	29%	29%	21%
	Second Quartile	29%	29%	20%	21%
	Third Quartile	23%	22%	29%	25%
	Top Quartile	27%	20%	22%	32%

TABLE 13: Markov transition probabilities, PME

		Subsequent deal quartile			
	PME	Bottom Quartile	Second Quartile	Third Quartile	Upper Quartile
Precedent deal	Bottom Quartile	29%	31%	27%	14%
	Second Quartile	20%	29%	25%	25%
	Third Quartile	21%	22%	27%	29%
	Top Quartile	30%	18%	20%	32%

Although LPs evaluate performance based on IRR, it is also evaluated whether they can apply the conventional wisdom to relative performance by using a GP's previous PME performance to predict the relative performance of a succeeding deal. Table 13 reports the transition probabilities and indicates modest levels of persistence for GPs with preceding deals in the bottom and top PME quartiles. The probability of realising bottom quartile relative performance twice in a row is 29% and GPs with a preceding deal in the bottom quartile remain below the median 60% of the time. In contrast, GPs that achieve top quartile relative performance remain in the top quartile (above-median) 32% (52%) of the time but are the most likely to land up in the bottom quartile (30%). Interestingly, GPs with deals in the third quartile are more likely to achieve top quartile performance (29%) than land up in the same quartile twice in a row (27%). These GPs are also the most likely to achieve above-median performance and the least likely to land up below the median, suggesting that a strategy that focuses on GPs that have previously achieved top PME quartile performance might carry greater risk than one that invests into GPs that previously achieved third quartile performance.

In addition, the Markov probabilities of achieving top quartile performance twice in a row are higher when evaluated using IRR performance (see Table 11) compared to the MOIC (see Table 12) and PME (see Table 13). Indeed, this provides context to the regression results in Table 7 above. Still, based on the Markov probabilities, persistence is highest for GPs in the top quartiles even when evaluated using these measures. Furthermore, the top-quartile strategy is less risky when evaluated using the IRR with the probability of a top-to-bottom quartile flip being less than the likelihood of a third-to-bottom quartile flip. Compared to the Markov probabilities based on MOIC and PME, top quartile GPs are significantly more likely to land up in the same quartile and above the median than GPs with a preceding deal in the third quartile. Therefore, these transition probabilities suggest that LPs could use the IRR of previous deals to forecast future performance.

3.5.2 The influence of aggregate capital flows on persistence

This section evaluates the influence of aggregate capital flows on performance persistence. The prior literature has suggested that an exogenous increase in aggregate commitments flowing into a given region or market should increase competition for deals – the so called "money chasing deals" hypothesis" – and ultimately have a negative influence on returns (Gompers & Lerner, 2000). Furthermore, evidence supporting the money-chasing-deals hypothesis has been found by studies analysing PE performance in developed markets (e.g., Kaplan & Stromberg, 2009; Kaplan & Schoar, 2005; Harris et al., 2014; Robinson & Sensoy, 2016; and Braun et al., 2017). This section undertakes a similar exercise but focuses on the influence of capital inflows on performance and its persistence. Specifically, the money-chasing-deals hypothesis is investigated by regressing deal performance on lagged performance and the aggregate capital raised.

The figures used to measure aggregate capital inflows are the aggregate amount raised for investment in Africa that are published by the African Venture Capital and Private Equity Association (AVCA) and the Emerging Market Private Equity Association (EMPEA). Both AVCA and EMPEA provide the aggregate capital commitments raised by Africa focused funds that close during a given year. The data provided by AVCA is the most comprehensive for the PE segment in Africa, but the available time-series only goes as far back as 2007. It is therefore consolidated with the figures for Sub-Saharan Africa released by EMPEA for the period 2002 to 2006 to ensure that the capital flows cover most of the sample period. These capital flows are depicted in Figure 2 below.

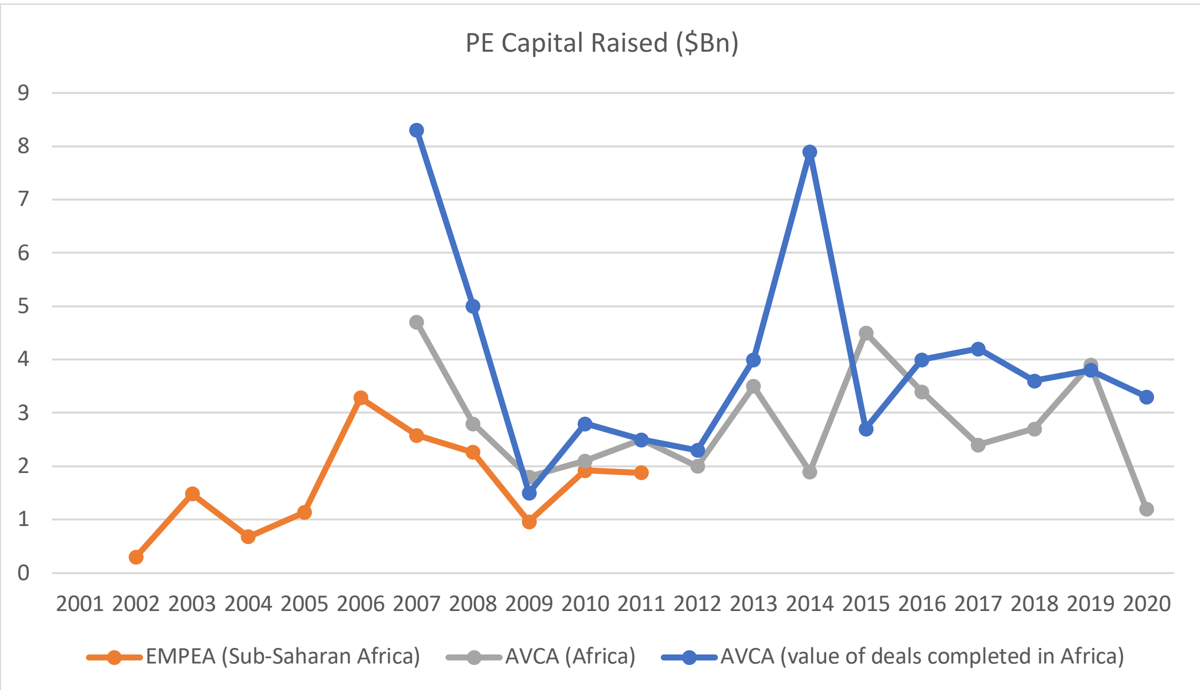

Figure 2: Fundraising and deals completed by PE funds in Africa, 2002 – 2020

The distinction between committed and invested capital is evident when the AVCA figures of the funds raised, and the deals completed in each vintage period are compared. Given this distinction, the sum of the aggregate funds raised in the previous three years should provide a more realistic measure of the amounts of capital chasing deals in any vintage year (Braun et al., 2017). Indeed, GPs have been shown to invest half of their capital in the first three years of the fund term and to take another three years until 90% of the fund is deployed (Ljungqvist & Richardson, 2003).

TABLE 14: Aggregate capital flows and deal-level persistence

	IRR	MOIC	PME	Excess IRR
Performance of $Deal_{n-1}$	0.129**	0.003	-0.051	0,132**
	[0.056]	[0.046]	[0.072]	[0.055]
LN Capital Flows	-11,388	-0.678**	0.182	-2,863
	[11.308]	[0.265]	[0.188]	[10.881]
Constant	44.549**	3.508***	1.451***	20.972
	[20.717]	[0.513]	[0.415]	[19.801]
Observations[14]	164	164	164	164
Adjusted R^2	0.028	0.029	-0.004	0.023

Note: *p<0.10, **p<0.05, ***p<0.01

The regression results are summarised in Table 14 and show that controlling for the growth in capital flows reduces the size of the coefficient on lagged IRR and Excess IRR performance, but they remain statistically significant at the 5% level. It is noteworthy that, in contrast to the 'money-chasing deals' hypothesis (e.g., see Kaplan & Stromberg, 2009; Kaplan & Schoar, 2005; and Harris et al., 2014), the coefficient on capital flows is non-significant in all but one regression. Overall, the results in Table 14 indicate that the increases in capital flows have a dampening effect on persistence, which is consistent with the findings of Braun et al. (2017).

Despite the similarities, the results are distinct from Braun et al. (2017) in one aspect that warrants further discussion. Whereas the results indicate a slight reduction in persistence with increasing capital flows, Braun et al. (2017) reported the disappearance of deal level persistence. This likely represents differences in the stages of development of the PE markets in the US and Europe compared to emerging markets. For one thing, Braun et al. (2017) chronicle substantial growth in capital flows and the intensifying competition in European and US private equity since the 1980s, whereas capital flows and PE deals in Africa were negligible before 2007. Therefore, given that PE in Africa is still at an early stage of development, the results of this study are likely more comparable to the results of the "low competition" state or the "early investment years (1979-2000)" of Braun et al.'s (2017) analysis.

[14] The sample size is lower due to the unavailability of data on capital flows before 2002.

Interestingly, although they evaluate persistence based on the PME, Table 14 reports coefficients on lagged performance that are similar in magnitude to their period of low competition.

3.6 Conclusions

The aim of this chapter was to evaluate whether the performance achieved by GPs in Africa is persistent and, if so, to examine the sources of such persistence. Although persistence has received increasing attention in the literature, most of these studies have focused on US and European markets and little work has gone into evaluating persistence in emerging markets. Moreover, these studies have mostly evaluated persistence at the fund level as granular deal level information has generally not been available to researchers. This study uses a unique sample of investments exited in Africa to investigate persistence and its sources. The results have practical implication for LPs.

The main findings are as follows: first, this chapter finds that the deal-by-deal IRR performance of GPs in Africa is persistent, suggesting that the returns of preceding deals can be used to forecast the performance of succeeding deals by the same GP. This deal-by-deal persistence is detected only in time-sensitive measures (IRR and excess IRR), and no such persistence is observed in the MOIC and PME performance. Furthermore, examining persistence in a more general way, the chapter documents the presence of time invariant factors that explain the heterogeneity in GP performance. Together, these findings suggest that the conventional wisdom of selecting GPs that have previously achieved good performance, which has previously been without scholarly empirical backing in emerging markets, is applicable when selecting GPs in Africa.

Second, the chapter explored the GP and investment level factors that have an influence on the observed deal-by-deal persistence and finds that controlling for GP experience and investment size negligibly reduces the size of lagged performance but has no influence on its significance. However, lagged performance drops substantially in size and ceases to be significant when the investment holding period is controlled for, indicating that the observed persistence is largely explained by the ability of GPs to timeously realise a high-value exit. Moreover, this chapter documents strong evidence of systematic differences in holding periods, i.e., the ability of GPs to timeously realise an exit, across GPs. This explains why LPs focus on IRR rather than time indifferent measures, such as MOIC and PME, to evaluate the performance of their private equity investments. These findings also accord with the intuition to select GPs that have demonstrable track records of achieving timeous exits, rather than unrealised performance.

Third, the chapter finds that persistence is not explained by the choice of region, which has a marginal impact on the coefficient on lagged performance. On the other hand, the size of the coefficient drops significantly and lagged performance ceases to be significant when we control for vintage and sector. Further tests are performed that suggest that the choice of sector modulates persistence through its interaction with holding periods. Altogether, these findings suggest that, in addition to backing funds that have previously demonstrated exits, it may be fruitful to seek that the succeeding deals or funds focus in the sectors in which the GPs have demonstrated a track record of timeous and high value exit.

Fourth, Markov probabilities based on IRR suggest that a strategy to back top quartile GPs is applicable when allocating to GPs on the continent. The probabilities indicate that, not only are GPs that previously achieve top quartile performance more likely to land up in the same quartile and above the median, a strategy that focuses on GPs that previously achieved top quartile IRR performance appears to be the least risky. In contrast, Markov probabilities based on PME suggest that a strategy that focuses solely on GPs that previously achieved top quartile performance might carry greater risk than one focused on third quartile managers. These probabilities indicate that a strategy that blends third and fourth quartile PME performers might also be fruitful to allocators if it is tailored to maximise the probability of achieving performance that is closer to the 75^{th} percentile whilst dampening the likelihood of landing up in the first or second quartiles.

Lastly, this study examines whether the increase in capital flows into African private equity has had an influence on persistence and finds that controlling for aggregate capital flows reduces the coefficient on lagged performance marginally, but that it remains statistically significant. This suggests that, although the increase in competition for deals that is evident in the growth in aggregate commitments has had a slightly dampening effect of persistence, the performance realised by GPs in Africa remains persistent.

Chapter 4: The determinants of PE holding periods in Africa

4.1 Introduction

Exit timing is amongst the most consequential decisions that a GP must make during the life of a fund. This is because PE performance is benchmarked based on IRR, which has a negative relationship with holding periods, and success in raising a follow-on fund is dependent on the realised performance of predecessor funds (Brown et al., 2019). GPs are paid carried interest only when the IRR of the fund exceeds a hurdle rate and so are incentivised to exit timeously and at the best possible price (Jenkinson & Sousa, 2015). Crucially, LPs make binding commitments at fund inception and delegate discretion on the timing of investments and exits to GPs, who are sophisticated market participants and may perceive when there are 'windows of opportunity' to crystalise good performance by exiting at high valuation multiples (Ball et al., 2011; Gredil, 2022; Jenkinson et al., 2022; Jenkinson & Sousa, 2015). Hence, the time-to-exit dynamic is an important issue to pay attention to because timeous distributions seem to be one of the ways in which LPs expect GPs to create value.

The optimal horizon required to implement value enhancement initiatives and realise an exit is dependent on numerous factors (Minardi et al., 2019). GPs use their industry and operational expertise to identify bolt-on acquisitions, develop a value creation plan, and provide support during its implementation by management (Kaplan & Strömberg, 2009). The most popular strategy combinations used in value creation plans by GPs in emerging markets incorporate operational improvements and revenue growth, and the ex-post combination of successful strategies has been shown to be the best predictor of returns (Biesinger et al., 2020). Of course, funds typically have a ten-year life, and so there is a finite amount of time in which to implement these strategies, highlighting that the choice of strategies and the time taken to successfully execute and realise a high value exit is an integral component of skill. Yet only a few studies have examined the factors that impact the investment duration despite its importance in understanding the liquidity properties of PE investments (see, for example, Jenkinson & Souza, 2015; Minardi et al., 2019; and Joenväärä et al., 2022).

Empirical evidence from recent research indicates that GP and portfolio company characteristics and market conditions are important determinants of the time taken to exit and the exit route (Gredil, 2022; Jenkinson et al., 2022; Jenkinson & Sousa, 2015; Joenväärä et al., 2022; Minardi et al., 2019). It also suggests that GPs do in fact time market valuations and, although successful in doing so, seem to be better at timing exits than acquisitions (Gredil, 2022; Jenkinson et al., 2022). Moreover, exit timing is said to predict more than half of subsequent dips in the public market returns, but that this predictive power disappears when GPs do not stand to earn carried interest (Gredil, 2022). However, scholars have also indicated that holding periods in some developed markets are increasing and that the growing number of GPs and amount of capital flowing to the asset class might be a contributing factor (Joenväärä et al., 2022). All of this has implications for LPs, as it suggests that the time-to-exit dynamic might be an important dimension of GP selection.

In view of the above, this chapter investigates the factors that impact the time taken to exit PE investments in Africa and explores the interplay between investment duration, market conditions and performance. There are three reasons that make this an important research topic: firstly, Chapter 3 of this thesis found evidence of persistence and indicated that this persistence is largely attributed to the ability of GPs to achieve timeous exit. The identification of investment duration as an important determinant of persistence, i.e., GP skill, suggests that the ability to achieve timeous exit may be an important dimension of GP selection (also see, for example, Brown et al., 2021; and Gredil, 2022). Therefore, understanding the drivers of investment duration is of practical important to the capital allocation strategies of LPs. Secondly, most of the prior studies examining this time-to-exit dynamic have focused on PE in the US and Europe (see, for example, Jenkinson & Souza, 2015; and Joenväärä et al., 2022) and this author is aware of only two studies, those of Minardi et al. (2019) and Dominic and Joseph (2023), that have analysed holding periods in emerging markets, specifically Brazil and India, respectively. Given their different stages of developments, it is unlikely that findings from the European and US PE markets can be generalised to PE in Africa. The importance of these issues to allocative efficiency indicates that extending this research to PE in Africa is long overdue (Asriyan et al., 2017; Gredil, 2022). This chapter responds to the call by Brown et al. (2021) for more research examining how delegating cash flow timing to GPs impacts the liquidity properties of PE investments, and thereby aims to contribute to filling this gap in the literature.

This chapter makes four main contributions. Firstly, this chapter presents the first research to examine the drivers of PE holding periods in Africa and, in doing so, contributes further evidence to the two studies, Minardi et al. (2019) and Dominic and Joseph (2023), that have analysed the time-to-exit dynamic in an emerging market. Secondly, it extends the literature discussion on whether the ability to achieve timeous exit constitutes a dimension of GP skill by presenting the first research that investigates holding period persistence. Notably, this study is the first to provide evidence indicating that investment duration is persistent, demonstrating that the ability to timeously realise an exit may be an important dimension of GP selection on the continent. Thirdly, it contributes to the broad discussion on how the maturing of the PE industry impacts investment duration (Jenkinson & Sousa, 2015; Joenväärä et al., 2022; Minardi et al., 2019). The recent literatures has documented increasing holding periods in developed markets, pointing to increasing competition as more capital flows to the industry as contributing factors (Jenkinson & Sousa, 2015; Joenväärä et al., 2022). In contrast, this study contributes evidence indicating that the holding periods of PE deals in Africa have declined over time in line with an improving exit environment as more capital is dedicated to the asset class on the continent. Lastly, this study contributes new insights on how market conditions influence the exit behavior of GPs on the continent by documenting that GPs in Africa time their exits to take advantage of favorable market conditions.

The rest of this chapter proceeds as follows: Section 4.2 reviews the literature, Section 4.3 discusses the selection of variables, Section 4.4 presents the methodology and results, and Section 4.5 concludes.

4.2 Literature review: theoretical and empirical considerations

4.2.1 Market conditions, liquidity, and performance

Prior studies have suggested that credit market conditions influence the use of leverage and the pricing of buyout transactions, and consequently impact equity returns (Axelson et al., 2013; Axelson et al., 2009; Franzoni et al., 2012). According to the trade-off theory, portfolio companies should borrow until the tax advantages of debt equal the costs of potential financial distress (Myers, 2001). If this is so, then leverage will be related to company characteristics because profitable companies with stable cashflows would take on more debt to efficiently utilise the allowable tax deduction on their interest expenses. However, fluctuations in credit spreads tend to be driven by local supply and demand shocks rather than company characteristics (Collin-Dufresne et al., 2001), and so GPs may exploit changes in the cost of debt relative to equity by taking on more debt than equity during hot credit markets (Baker & Wurgler, 2002). This timing of market conditions by GPs should lead to a procyclical investment process where there is overinvestment during these favorable credit markets and underinvestment in bad times (Axelson et al., 2009).

The literature suggests that a small number of economic variables, such as credit conditions and competition, tend to predictably sway the PE returns generating process by influencing the behavior of GPs (Axelson et al., 2013; Ljungqvist et al., 2020). For instance, Axelson et al. (2013) examined the capital structure of buyout deals completed in Europe and the US and found the quantity of leverage used in buyouts to have no relationship with company characteristics such as industry, earnings volatility, and cashflow as implied by the trade-off theory. Instead, they showed that credit market conditions were the most robust predictor of leverage, with leverage peaking during “hot” credit markets and declining in tight credit markets. They also report buyout pricing to be negatively related to interest rates, even after controlling for listed company multiples, indicating a tendency for GPs to pay higher prices when credit market conditions are good. Moreover, the amount of leverage used on the deals of a fund was reported to be negatively related to the returns on that specific fund relative to the market return.

Furthermore, Ljungqvist et al. (2020), who analysed the investment behavior of US buyout funds, showed that experienced GPs increase the pace of drawdown and consequently earn higher returns when investment opportunities improve, the cost of capital falls, and competition eases. First-time GPs were, on the other hand, found to be significantly less responsive to market conditions but this sensitivity increases after some initial successes. The authors argue that in an environment of imperfect competition for PE capital, experienced GPs earn a higher return because they respond to positive economic shocks by accelerating the investment pace before new funds can be formed. Conversely, experienced GPs will reduce their investment pace and take longer to be fully invested when there is greater competition for deals to avoid overpaying.

Similarly, Franzoni at al. (2012) shows that PE investments are impacted by the same liquidity risk factors as listed equity and surmise that the diversification benefits that can be obtained by investing PE may be lower than previously thought. They suggest that the use of leverage to finance transactions may be the link PE returns to market liquidity akin to Brunnermeier and Pedersen's (2009) theory that posits a positive relationship between funding liquidity, i.e., the availability of capital, and market liquidity. This implies that times with low market liquidity should coincide with periods in which GPs find it challenging to refinance debt and so may be forced to liquidate investments at lower valuations or refinance at higher interest rates. Franzoni et al. (2012) test this conjecture using the Pastor and Stambaugh (2003) market liquidity factor and report a positive relationship between investment level returns and market liquidity during the holding periods. Their coefficient estimates indicated that a one standard deviation deterioration in market liquidity decreases PE performance by 11.4%. Furthermore, their multiple regression analysis showed a significant negative relationship between PE returns and funding liquidity, as proxied by credit standards, and that controlling for funding liquidity reduced the coefficient on market liquidity by a half, suggesting that funding liquidity is the link between returns and market liquidity.

There have also been suggestions of a relationship between the role played by PE as a liquidity allocation mechanism and its returns (Robinson & Sensoy, 2016). The liquidity adjusted Capital Asset Pricing Model (CAPM) proposed by Acharya and Pedersen (2005) proposes three channels through which liquidity risk can influence returns: the first is the covariance between the liquidity of the asset class and market liquidity, the second is the covariance between an asset's returns and market liquidity, and the third is the covariance between the liquidity of an asset and market returns. Of course, illiquidity aversion implies that investors will require a premium to hold an asset that pays low returns when the market is illiquid and is illiquid when the market is illiquid (Robinson & Sensoy, 2016). From the LP perspective, liquidity risk stems from the irrevocability of capital commitments combined with the cession of discretion to GPs to make capital calls whenever they deem fit. Accordingly, LPs face the risk of capital calls being made at a time when they are difficult to fulfil and may face consequential contractual remedies if they default.

Robinson and Sensoy (2016) investigate whether funds with countercyclical capital calls earn a premium to compensate for the risk of providing funding to illiquid investments made in bad times. They analysed the cashflows of 837 buyout and VC funds raised in the US and Europe over the period 1984 to 2010 and found both capital calls and distributions to be procyclical, being high when the public market price-dividend ratios are high and credit spreads are low. They showed a 10% increase in market price dividend ratios to be associated with a 15% (66%) increase in the net quarterly cashflows to buyout (VC) funds and that, out of a broad set of market cycle variables, the market price-dividend ratio and credit spreads accounted for almost all the predictive power for capital calls and distributions. Furthermore, the authors found that the average fund whose capital calls are below the median in terms of procyclicality achieved a 36% higher cash multiple and a 15% higher PME.

Ultimately, this begs the question of whether LPs can time their PE allocations to avoid the cyclicality of returns. Brown et al. (2021) investigated this using a sample of 1 826 buyout and 1 845 VC funds raised mostly in Europe and the US over the period 1987 to 2013 and found modest benefits to potential strategies that adjust commitments based on the aggregate fundraising cycle. They reported a countercyclical (procyclical) commitment strategy focused on buyout funds to return a MOIC of 1.86 (1.74) and a PME of 1.17 (1.09) compared to a MOIC of 1.80 and PME of 1.15 for a neutral strategy. The authors argued that exploiting these timing benefits may be complicated by agency frictions emanating from the internal organisational structures of LPs that could make it challenging to adhere to a “disciplined” allocation strategy. They also demonstrate that the efficacy of timing allocations, and its desired cashflow effects, is further hampered by investment and exit decisions being the purview of GPs. Conversely, they showed that commitment strategies that focused on GP selection provide greater performance benefits, particularly where there is a higher weighting on experienced GPs and larger funds. Overall, the modest benefits and challenges involved in timing LP commitments indicates that investment and exit timing abilities may be an important dimension of GP selection (Brown et al., 2021; Gredil, 2022).

4.2.2 The determinants of exit decisions

The literature suggests that GPs take advantage of favorable market condition by shortening their investment holding periods (Cao, 2011; Giot & Schwienbacher, 2007; Minardi et al., 2019). Of course, favorable conditions might create incentives for GPs to pursue 'quick flips', which result in less time being made available to implement the value creation plans. That being said, the relationship between returns and holding periods is positive and concave (Cao, 2011), indicating that GPs need to hold investments long enough to implement value creation initiatives but not so long that they become a 'drag' on IRR (Minardi et al., 2019). The empirical evidence has mostly found that, although a frequent occurrence during hot markets conditions (Cao, 2011; Minardi et al., 2019), exits achieved within 12 months constitute a small proportion of exits (Strömberg, 2008). At the same time, such quick flips have been shown to achieve the highest returns (Lopez-de-Silanes et al., 2015).

The popular exit routes for European and US GPs are sales to trade players, other PE funds or 'secondaries', and IPOs (Jenkinson & Sousa, 2015; Strömberg, 2008). Furthermore, the timing and choice of exit route, which likely interact, are significantly influenced by market conditions and GP and portfolio company characteristics (Jenkinson & Sousa, 2015; Joenväärä et al., 2022). Interestingly, the substantial commitments made to developed markets PE prior to the financial crisis have seemingly caused a fundamental shift in exit dynamics that has seen GPs become willing to pay more for portfolio companies and resulted in a significant increase in the proportion of exits through secondaries (Jenkinson & Sousa, 2015). For instance, compared to 24% in Stromberg's (2008) sample of mostly European and US deals exited over the period 1970 to 2007, Jenkinson and Souza (2015) showed that secondaries made up 43% of the exits in Europe during the period 2000 to 2014. In contrast, secondary sales made up only 13% of exits in Africa while sales to trade players and IPOs made up 44% and 4% respectively over the period 2007 to 2013 (EY & AVCA, 2016).

Tellingly, Jenkinson and Souza (2015) indicate that experienced GPs tend to exit to their younger counterparts, who make these acquisitions later in the life of their funds than primary purchases. They suggest that secondary purchases may be a quick way for GPs to invest the remainder of their committed capital towards the expiry of a fund's investment period. What is more, exit decisions may to some degree be motivated by a GP's desire to raise a subsequent fund, which could be at odds with the interests of LPs. The authors show that IPOs, a signal of high ability or skill, are used as an early exit route and suggest that if an IPO cannot be achieved timeously, then GPs may prefer a quick exit via a secondary sale to crystalize a high IRR to raise the next fund. Of course, this exposition is akin to the grandstanding hypothesis which suggests that younger GPs have an incentive to take their portfolio companies public earlier to establish a track record and raise the next fund soon thereafter

(Gompers, 1996). As a result, they may be willing to bear the cost of underpricing because exits are crucial to establishing a reputation and fundraising success. Indeed, the prior studies indicate that companies exited by novice GPs tend to be younger and exhibit greater underpricing (Amor & Kooli, 2020; Gompers, 1996; Lee & Wahal, 2004).

Consistent with this motif, Joenväärä et al. (2022) show that average holding periods in Europe have lengthened following the global financial crisis and suggest that this may be due to increased competition. They explore the determinants of holding periods using a sample of European buyouts exited over the period 2000 to 2015 and indicate a negative relationship with revenue growth and the industry aggregate number of SME buyouts at entry. Like Cao (2011), Giot and Schienbacher (2007), and Minardi et al. (2019), Joenväärä et al. (2022) also show that holding periods are shorter during favorable market conditions. However, discrepant with the grandstanding hypothesis, they indicate that on average first time GPs hold their investments for 5 to 11 months longer than their established counterparts. Holding periods were also shown to be positively related to the number of newly formed GPs and amount of capital raised by buyout funds, indicating that increased competition may be contributing to the lengthening of holding periods. They surmise that longer holding periods may be the new normal and that LPs should factor this into their financial models.

Regardless, others suggest that the participation on portfolio company boards enables GPs to learn private information that ostensibly gives them an advantage in timing the valuation of the sectors in which they specialise (Gredil, 2022; Jenkinson et al., 2022). Gredil (2022) demonstrates that the distributions made to LPs predict subsequent dips in the relevant public market sectors and that 52% to 69% of this predictive power is due to superior information. Interestingly, he shows that an industry level long-short trading strategy based on the signal from distributions of PE funds would yield significant outperformance and suggests that LPs that have investments in PE funds could use this information to improve the overall performance of their portfolios. Similarly, Jenkinson et al. (2022) shows that on average GPs exit when market multiples are 0.32 times higher than at the time of entry. Both Gredil (2022) and Jenkinson et al. (2022) find that GPs are better at timing exits and surmise that this may be due to the greater latitude that GPs have in choosing the timing of exits. Overall, the extant literature suggests that delegating the timing of exits to GPs does indeed create value for LPs and highlights the importance of exit timing as a component of GP skill.

4.3 Variables selection

The objective of this chapter is to investigate the drivers of holding periods in Africa and to examine the relationship between market conditions, investment duration, and investment level returns. The analysis is based on the sample of 250 deals exited by 28 GPs (see Chapter 2 of this study for a detailed description) and employs the holding period as the dependent variable. The analysis in this chapter focuses on the following market conditions as the explanatory variables of interest: average annual real GDP growth rate in Africa, average corporate credit spreads in emerging markets, the change in the price-to-earnings multiple of the MSCI Emerging Market Index, and aggregate capital commitments flowing to PE funds in Africa (see Table 15 in Chapter 4 and Section 3.5.2 of Chapter 3 for detailed descriptions). Furthermore, it controls for investment level characteristics, namely GP experience, investment size, region, and sector fixed effects. The selection of these variables is guided by the theory and the suitability of each variable and is exemplified by its use in the prior literature.

4.3.1 Market conditions

The literature indicates that cash distributions to LPs are procyclical (Robinson & Sensoy, 2016), suggesting that holding periods can be expected to have a negative association with GDP growth. These studies have also suggested that GDP growth should have a positive association with deal level returns because, like public companies, the financial performance of PE portfolio companies is impacted by economic conditions (Valkama et al., 2013). In their fund level analyses, Aigner et al. (2008) controlled for the average annual real GDP growth rate between the year of investment and the end of the fund life, Gresch and von Wyss (2011) used the average annual real GDP growth rate during the average length of fund life for funds of the same vintage year, and Steger (2017) used the change in the real GDP growth rate between the average over the first three years and the average during last three years of a fund's life. The deal level studies of Valkama et al. (2013) used the average nominal GDP growth between the quarter of entry and the quarter of exit, while Errais and Gritly (2022) used the compound annual growth rate between the year of entry and exit of each investment. This chapter uses the average real GDP growth in Africa between the year of entry to the year of exit.

TABLE 15: Macroeconomic and stock market variables description

Variable	Definition	Source
Business Cycle Variables		
Corporate Bond Yield	Emerging Market USD Aggregate Corporate Bond Index	Bloomberg
Credit Spreads	Emerging Market USD Aggregate Corporate Bond Index Option Adjusted Spread	Bloomberg
GDP Growth p.a.	Real GDP Growth in Africa	IMF
Stock Market Variables		
P/E Multiple	MSCI Emerging Market Index 12-month trailing Price-Earnings Ratio	Bloomberg
MSCI Emerging Market Returns	MSCI Emerging Market Total Return Index	Bloomberg

Holding periods are expected to have a positive relationship with credit spreads, which tend to be lower when liquidity is abundant (Robinson & Sensoy, 2016), because PE transactions tend to be partially financed through third-party debt. In addition, the extant literature has indicated that times with high credit availability create “windows of opportunity” to exit timeously and at the best possible price (see, for example, Franzoni et al., 2012; Axelson et al., 2013; Jenkinson & Souza, 2015). In their investigation, Franzoni et al. (2012) controlled for the average credit spreads over the investment holding period, Jenkinson and Souza (2015) controlled for the monthly interest margins on leveraged loans in European buyouts during the holding period, and Joenväärä et al. (2022) proxied credit availability using the quarter change in the credit spreads in the quarter before exit. This chapter controls for the average corporate credit spreads in emerging markets between the month of investment entry and the month of exit.

Holding periods are expected to have a negative association with public market multiples, which tend to be high when liquidity is abundant (Robinson & Sensoy, 2016). In the literature, public market multiples are also considered to be an indirect measure of the investment climate or investment opportunities in the PE sector and have been shown to be positively related to PE performance (Gompers & Lerner, 2000; Guo et al., 2011; Ljungqvist et al., 2020; Steger, 2017). In his fund level analysis, Steger (2017) controlled for the change in the price-to-earnings multiple between the average over the first three years and the average during the last three years of a fund’s life, while Phalippou and Zollo (2005) controlled for the average price-to-earnings multiple during the year that an investment is exited. In the deal level studies, Guo et al. (2011) controlled for the change in the EV-to-EBITDA multiple between the quarter preceding the deal announcement and the month of exit. Guided by the prior studies, this chapter uses the change in the price-to-earnings multiple of the MSCI Emerging Market Index between the month of entry and the month of exit.

The prior studies focused on European and US PE markets have indicated that increasing aggregate capital commitments have a significant impact on exit routes and are positively associated with investment holding periods (see, for example, Jenkinson & Souza, 2015; and Joenväärä et al., 2022). The extant literature has also suggested that an increase in aggregate capital commitments flowing into a given region or market should lead to higher competition for deals and lower returns (see, for example, Gompers & Lerner, 2000; Kaplan & Schoar, 2005; and Diller & Kaserer, 2007). At the fund level, Harris et al. (2014) controlled for the ratio of the sum of the annual capital committed to US funds in the year preceding the current and previous vintage year and the US stock market capitalisation. Similarly, Robinson and Sensoy (2016) used the total capital committed to funds of the same type as a percentage of the US stock market capitalisation. On the other hand, the deal level study by Braun et al. (2017) controlled for the ratio of the aggregate commitments raised by funds in the three previous years and the GDP over the prior three years. In line with these earlier studies, this chapter controls for the total capital raised by the PE funds in Africa in the previous three years that include the year of investment acquisition (also see Section 3.5.2 of this study).

4.3.2 Deal and GP specific characteristics

This chapter controls for the following deal and GP specific characteristics that are expected to have an influence on holding periods: the holding periods of prior deals, GP experience, and investment size. There are numerous prior studies that have reported evidence of PE performance persistence at the fund level (see, for example, Kaplan & Schoar, 2005; Phalippou & Gottschalg, 2009; and Harris et al., 2023) while deal level returns persistence has been reported by the studies of Braun et al. (2017), Nanda et al. (2020), and Chapter 3 of this study. Findings of persistence have been interpreted as indication of skill since the ability to consistently outperform suggests that there is something unique and time invariant about the GPs that can accomplish this feat (Ewens & Rhodes-Kropf, 2015). Interestingly, Chapter 3 of this study found evidence of returns persistence and indicated that this persistence is largely attributed to the ability of GPs to achieve timeous exit. The identification of investment duration as an important determinant of persistence, i.e., GP skill, suggests that the ability to achieve timeous exit may be an important dimension of GP selection (also see, for example, Brown et al., 2021; Gredil, 2022). To better understand the influence of investment duration on persistence, this chapter evaluates whether holding periods are persistent by applying the conceptual framework introduced by Braun et al. (2017) to investigate holding periods persistence. To do this, this chapter controls for the holding period of the previous deal completed by the same GPs (also see Section 3.3 of this study).

The literature has indicated that GP experience may be an important determinant of holding periods (see, for example, Franzoni et al., 2012, Gompers, 1996; and Jenkinson & Souza, 2015). However, the hypotheses advanced by the literature in respect of the direction of the relationship between holding periods and GP experience are ambiguous. On the one hand, holding periods are expected to have a negative association with the level of experience that a GP has accumulated through the practical trial and error of exiting PE investments, a learning process that is difficult to undertake through any other education (Zarutskie, 2010). On the other hand, the grandstanding hypothesis suggests that younger GPs have an incentive to exit earlier than their experienced counterparts to establish a track record and raise the next fund soon thereafter (Gompers, 1996). Regarding the variables used to proxy GP experience, some of the prior studies have controlled for chronological experience based on the number of years that have lapsed since a GP’s first investment or the PE firm’s founding (see, for example, Aigner et al., 2008; Gohil, 2014; Jenkinson & Souza, 2015; Joenväärä et al., 2022; Minardi et al., 2019). Others have used the fund or deal sequence to capture the functional experience obtained through repeatedly engaging in the full process of investing (i.e., originating, managing, and exiting) in PE deals (see, for example, Kaplan & Schoar, 2005; Phalippou & Gottschalg, 2009; Braun et al., 2017). These studies apply the logarithmic transformation because experience or knowledge is expected to have a diminishing impact on performance (Aigner et al., 2008). This chapter controls for the natural logarithm of the deal sequence.

Furthermore, the prior studies have suggested that holding periods have a negative relationship with deal and fund size (Jenkinson & Sousa, 2015; Minardi et al., 2019). It is also noteworthy that the interaction between fund size and GP experience may introduce potential ambiguities in the conjectured relationship between investment size and duration. Larger deals have greater visibility and tend to be managed by experienced GPs that may be able to exit quicker because of better networks with potential suitors accumulated through greater practical experience in exiting PE investments (Franzoni et al., 2012; Jenkinson & Sousa, 2015; Minardi et al., 2019; Zarutskie, 2010). On the other hand, smaller deals tend to be managed by novice GPs that have an incentive to exit early to build a track record and raise the next fund (Gompers, 1996). Regarding the variables used to measure size, the prior studies have mostly controlled for the natural logarithm of a fund's total capital commitments and the natural logarithm of the dollar amount invested in each deal to capture the impact of size (Braun et al., 2017; Brown et al., 2015; Franzoni et al., 2012; Joenväärä et al., 2022; Minardi et al., 2019). Following the prior literature, this chapter uses the natural logarithm of the dollar amount invested in each transaction to measure size.

The recent literature has also argued that, because GPs make sequential investments to form a portfolio, deal selection should not be viewed in isolation from the other choices made in portfolio construction (Brown et al., 2022). These studies have indicated that the choice of sector, geography, and vintage are important components of the portfolio formation decisions that are delegated to GPs and have a significant impact on performance (Braun et al., 2017; Brown et al., 2022; Errais & Gritly, 2022). Thus, controlling for sector, geography, and vintage year fixed effects isolates the impact that the choice of sector, region, and timing have on holding periods (Braun et al., 2017). Guided by the prior studies (see, for example, Jenkinson & Souza, 2015; Joenväärä et al., 2022; Minardi et al., 2019), this study controls for sector, region, and vintage fixed effects.

Therefore, guided by the theory and prior literature, the variables described above are used to investigate the drivers of holding periods in Africa.

4.4 Methodology and results

4.4.1 Descriptive statistics

The evolution of holding periods over the sample period is presented in Figure 3. In contrast to the findings of Jenkinson and Souza (2015) and Joenväärä et al. (2022), the figure clearly demonstrates a trend towards lower holding periods, which are consistent with an improving exit environment as increasing amounts of capital are dedicated to PE investment on the continent (see Figure 1). The holding periods have declined from 5.6 years for the average investment made before the global financial crisis (GFC) to 4.4 years for investments made after the crisis compared to an increase from 4.7 years to 5.8 years reported by Joenväärä et al. (2022). Notably, Joenväärä et al. (2022) compared the holding periods of deals exited before and after the GFC and suggested that, because investments exited after the crisis had been held for longer, GPs should use the higher forecast period of six years when evaluating new investments. However, this finding could, to some extent, be driven by longer holding periods attributable to investments made before the crisis but only exited after the GFC. The result of the current study indicates that the standard forecast horizon of five years, see, for example, Gompers et al. (2016), remains relevant when evaluating new investments in Africa.The average holding period for the full sample of exits used in this study is 5.2 years and is consistent with the full sample average duration of 5.3 years reported by Joenväärä et al. (2022) for European deals.

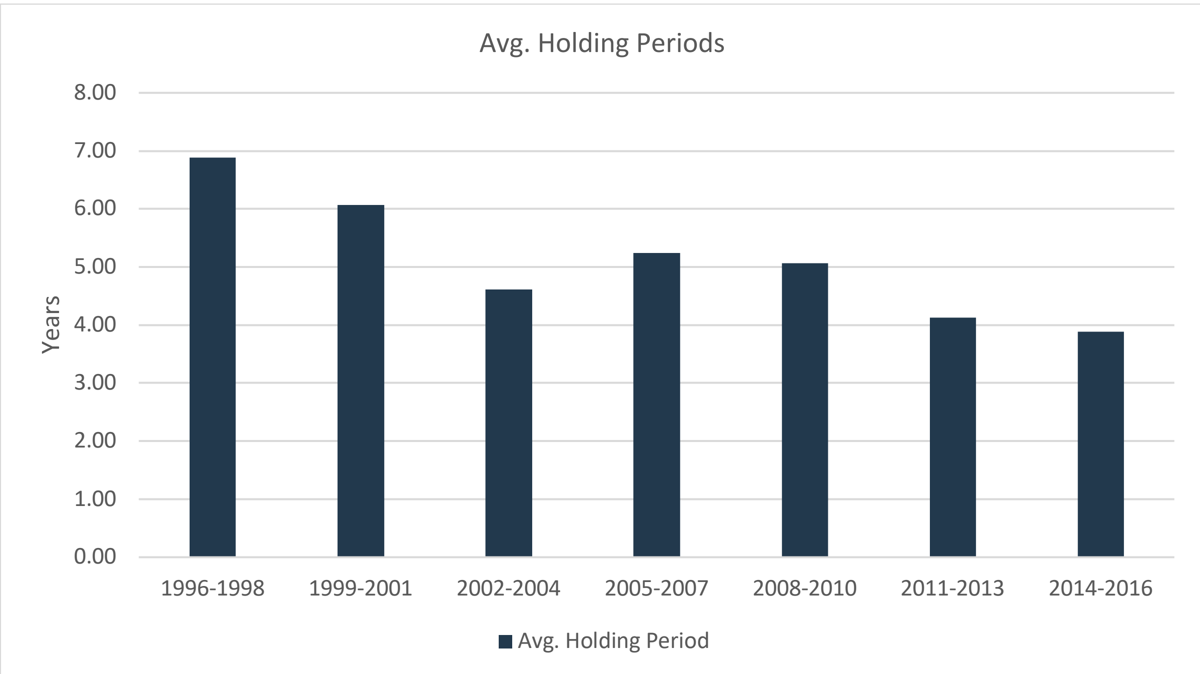

Figure 3: The average holding periods of sample deals by vintage year

Table 16 provides the summary statistics of the deal and market conditions over the holding periods of the exited deals. The deals are grouped into subsamples and the last column of the table reports the difference in the sub-samples using the Wilcox rank-sum (Mann-Whitney) test. The results indicate that the difference in the holding periods of investments made before and after the GFC is significant at the 1% level. In addition, investments made after the crisis have been larger and coincide with increasing competitions for deals. The table also indicates significant differences in market conditions between the two periods with the post-crisis period being characterised by lower GDP growth and credit spreads. The differences in the aggregate industry commitments and the macroeconomic conditions pre- and post the crisis are significant at the 1% level.

TABLE 16: The summary statistics of deal and market conditions during the holding period

	Pre-GFC				Post-GFC				
Variable	**N**	**Avg.**	**Std. Dev.**	**Med**	**N**	**Avg.**	**Std. Dev.**	**Med**	**Z**
Deal Characteristics									
Holding Periods	176	5.6	2.6	5.5	74	4.4	1.9	4.4	-3.687***
Deal Size (USDm)	176	11.9	13.8	7.0	74	16.4	16.4	10.77	2.750**
Market Characteristics									
GDP	176	5.0%	0.5%	4.9%	74	4.1%	0.4%	4.2%	-10.280***
Corp. Credit Spread	110	4.4%	1.2%	4.7%	74	3.9%	0.5%	3.9%	-4.409***
∆ P/E Multiple	73	-0.24	4.23	-0.88	74	-0.03	3.92	0.84	0.972
EM Index IRR	176	10.0%	13.1%	6.5%	74	5.5%	8.6%	4.1%	-3.123***
Aggr. Commitments ($)	113	5.6	3.4	5.1	74	7.7	1.5	6.7	4.883***
	Exit within 5-years				**Exit after 5-years**				
Variable	**N**	**Avg.**	**Std. Dev.**	**Med**	**N**	**Avg.**	**Std. Dev.**	**Med**	**Z**
Deal Characteristics									
IRR	121	52.7%	154.5%	20,2%	129	2.5%	31.6%	9.6%	5.075***
PME	121	1.8	1.6	1,6	129	1.9	3.2	1.2	2.016**
Deal Size	121	12.7	13.2	9,1	129	13.2	16.0	8.2	0.145
Market Characteristics					129				
GDP	121	4.7%	0.7%	4,6%	129	4.7%	0.4%	4.8%	0.340
Corp. Credit Spread	100	4.1%	2.3%	3,7%	84	3.6%	1.3%	3.6%	-3.952***
∆ P/E Multiple	79	0.35	4.2	0,9	68	-0.7	3.8	-1.0	2.094**
EM Index IRR	121	10.0%	15.8%	5,3%	129	7.4%	6.9%	6.1%	-0.083
Aggr. Commitments ($)	103	6.1	2.8	6.6	84	6.9	3.1	6.7	-1.600

Note: *p<0.10, **p<0.05, ***p<0.01

GPs generally expect to hold investments for five years and use this as the standard forecast horizon when evaluating new investments (Gompers et al., 2016; Joenväärä et al., 2022). Hence, Table 16 also groups the exited deals into those exited within and after five years and indicates that there are important differences between the deals exited within and after five years. First, deals exited within five years have on average achieved higher IRRs but lower PMEs compared to those exited within five years. This further highlights the significance of investment duration because LPs benchmark performance based on IRR. Second, Table 16 indicates no significant differences in the cheque sizes, GDP growth, and public market returns during the holding periods of investments exited within five years and after five years. Lastly, portfolio companies exited within five years tend to have been held during favorable credit market conditions and in which public markets experience valuation multiple expansion.

4.4.2 Determinants of holding periods

The summary statistics indicate that the holding periods of African PE investments may vary with deal characteristics and market conditions. This is explored further by running regressions to test the deal characteristics and market conditions that have an impact on holding periods. The importance of understanding the determinants of holding periods is apparent in the impact they have on IRR. Furthermore, Chapter 3 of this study indicated that deal-by-deal persistence was largely attributable to the time taken by GPs to realise value. To better understand the influence of holding periods on persistence, this section also evaluates whether deal-by-deal persistence is present in holding periods using the conceptual framework adopted in Chapter 3. Accordingly, the deals are sequenced by GP and holding period persistence is analysed using a regression framework with a lagged structure, wherein significant lagged duration of the previous deal indicates that the duration of the current deal depends on the duration of the previous deal, i.e., duration is persistent. The regressions take the following form:

$$y_{i,N} = \alpha + \beta y_{i,N-1} + \sum_{i=1}^{J} \beta x_i + \varepsilon_{i,N} \tag{6}$$

Where y_i is the holding period of deal number i and x_i is a vector of the GP and market variables, i.e., deal sequence, investment size, GDP growth, credit spreads, the change in the public market P/E multiple, aggregate capital flows, region, sector, and vintage fixed effects, that match the timing of each deal. Given that macroeconomic variables tend to be correlated with one another, the correlations were checked to avoid multicollinearity. The variance inflation factor (VIF) was estimated for each regression and did not indicate values that could cause problems of multicollinearity. Furthermore, the Breusch-Pagan test was used to examine regression residuals and indicated the presence of heteroskedasticity in two regressions and, for this reason, robust standard errors are employed. Similarly, the Shapiro-Wilk test indicated that the residuals are normally distributed in all but one regression. The robustness and reliability of the results presented in this section are validated by the results of logistic regression (see Section 4.4.3), which does not rely on the assumptions of normality and/or homoskedasticity. The results are presented in Table 17 and provide the OLS coefficient estimates with robust standard errors reported in parenthesis.

Specifically, Models (1) and (2) control for each category of variable separately while Model (3) controls for both categories. Model (4) and (5) control for only those variables that are statistically significant in any of Models (1) to (3). The equations explain between 4,1% and 22% of the variation in investment duration. With respect to the variables of interest, the coefficient on lagged holding periods is positive and statistically significant across all the models and remains significant even after controlling for sector and region fixed effects (see Models 5)[15]. Economically, the coefficients imply that a 1-year increase in the holding period of the prior deal increases holding periods by approximately two months. This suggests that the ability to consistently realise investments timeously is due to skill and complements the results in Table 10 (Chapter 3), which indicated the presence of time invariant factors that explain the heterogeneity in investment duration across GPs.

TABLE 17: The determinants of holding periods

Dependent variable: Holding Period	(1)	(2)	(3)	(4)	(5)
Holding period of $Deal_{n-1}$	0.189***		0.221***	0.180***	0.177***
	[0.066]		[0.070]	[0.056]	[0.059]
LN Deal Sequence	-0.386**		-0.161	-0.187	-0.188
	[0.191]		[0.172]	[0,152]	[0.147]
LN Invested Cost (size)	0.095		-0.001		
	[0.139]		[0.143]		
GDP Growth		-1.216***	-1.215***	-1.513***	-1.605***
		[0,288]	[0.297]	[0.243]	[0.266]
Credit Spreads		0.459*	0.478*	0.732***	0.773***
		[0.260]	[0.248]	[0,217]	[0,228]
∆ P/E Multiple		-0.086	-0.069		
		[0.052]	[0.052]		
Capital Flows		-0.219**	-0,261**	-0,380***	-0.373***
		[0,118]	[0.118]	[0,078]	[0,082]
Region fixed effects	No	No	No	No	Yes
Sector fixed effects	No	No	No	No	Yes
Vintage fixed effects	No	No	No	No	No
Constant	3.491*	9.767***	9.234***	10.749***	12.032***
	[2.079]	[1.830]	[3.279]	[1.839]	[2.087]
Observations	222	126	126	161	161
Adjusted R^2	0.058	0,094	0.141	0.210	0,222

Note: *p<0.10, **p<0.05, ***p<0.01

The coefficient on LN Deal Sequence is negative and statistically significant in Model (1), suggesting that investment duration declines with experience. Although congruent with Joenväärä et al. (2022) who find that novice GPs tend to hold investments for longer, this result contrasts with the

[15] Vintage period fixed effects were not included due to VIF statistics increasing to close to three.

grandstanding hypothesis which suggests that young GPs have an incentive to exit early to establish a track record and raise a follow-on fund. Nonetheless, the coefficient on LN Deal sequence ceases to be significant in Models (3), (4), and (5), but the negative sign is weakly suggestive of the same relationship. In addition, as expected from the Mann-Whitney test in the summary statistics, the coefficient on LN Invested Cost is not statistically significant in any of the models. This contrasts with Joenväärä et al. (2022), who indicate that larger European funds tend to have lower holding periods.

The coefficient on GDP growth is negative and statistically significant at the 1% level in all the models to which it is added, suggesting that portfolio investments held during good times tend to be exited quicker. Economically, the coefficients imply that a 1% increase in GDP growth reduces the duration of portfolio investments by approximately one-and-a-half years (see Model 5). Likewise, the coefficient on credit spreads is positive and statistically significant in all the models in which it is added, indicating that high credit spreads increase investment duration. Of course, credit spreads reflect the stages of the business cycle and so high credit spreads typically coincide with an underperforming economy and vice versa (Phalippou & Zollo, 2005).

Regarding changes in public market valuation over the holding period, the negative (albeit statistically non-significant) coefficients weakly suggest that increasing public market valuation multiples tend to be accompanied by lower holding periods. In addition, the coefficient on aggregate industry commitments is negative and significant in Models (2), (3), (4), and (5), which is consistent with an improvement in the exit environment as more capital is being dedicated to the asset class. This contrasts with Joenväärä et al. (2022) who found holding periods to be positively associated with the amount of capital flowing to European buyout funds. These differences in findings likely reflect the different stages of development of the PE industries in Europe compared to Africa and evince the importance of research that focuses on PE in emerging markets if we are to truly understand their idiosyncratic characteristics.

4.4.3 The factors that impact the likelihood of exit success

GPs generally expect to hold investments for five years and use this as the standard forecast horizon (Gompers et al., 2016). The summary statistics have also indicated that investment exited within five years tend to achieve significantly higher IRRs than those held for longer than five years. This section explores this further by using logistic regression to analyse the deal and market variables that have an impact on the probability of achieving an exit within this standard forecast horizon. Logistic regression models the log-likelihood of a binary outcome event as a linear combination of multiple explanatory variables and takes the following form:

$$P[Exit\ success = 1] = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k)}} \tag{7}$$

Where the binary variable "Exit success" takes the value of 1 when an investment is exited within 5 years and 0 otherwise. The coefficient estimates provide the change in log-odds of achieving exit success given a unit change in the independent variables. The results are presented in Table 18 and provide the coefficient estimates with standard errors reported in parenthesis. Models (1) and (2) control for each category of variable separately where LN Invested Cost and the change in PE multiples have been excluded due to their statistical non-significance across all specifications in Tables 17[16]. Then, Models (4) and (5) examine the exit market conditions by using GDP growth during the year of exit and credit spreads during the month of exit. The models explain between 4.9% and 16.2% of the variation in exit success.

TABLE 18: The likelihood of exit success

Dependent variable: Exit Success	(1)	(2)	(3)	(4)	(5)
Holding period of Deal$_{n-1}$	-0.149**		-0.214***		-0.221***
	[0.058]		[0.080]		[0.066]
LN Deal Sequence	0.101				
	[0.149]				
GDP Growth		0.831**	0.978**	0.319**	0.360**
		[0.368]	[0.396]	[0.144]	[0.149]
Credit Spreads		-0.572***	-0.637***	0.192**	0.221**
		[0.213]	[0.225]	[0.084]	[0.087]
Capital Flows		0.203**	0.247**	0.174***	0.177***
		[0.091]	[0.097]	[0.049]	[0.050]
Constant	-0.555	-2.537	-2.114	-3.149***	-2.288**
	[0.500]	[1.964]	[2.043]	[0.969]	[1,005]
Observations	222	161	161	215	215
Prob > Chi^2	0,017	0.010	<0.001	<0,001	<0,001
Pseudo R^2	0,048	0.090	0,149	0.105	0.172

Note: *p<0.10, **p<0.05, ***p<0.01

Consistent with the OLS regression results, the negative and statistically significant coefficients on the lagged holding periods in Models (1), (3), and (5) indicate that GPs that have previously achieved lower holding periods are more likely to achieve exit success, i.e., exit success is persistent. At the same time, holding investments during times with a performing economy, low credit spreads, and increasing aggregate commitments to PE increase the likelihood of exit success. In addition, the results in Table 18 are consistent with the suggestions that favorable market conditions create 'windows of opportunity' for timeous and high value exits (Axelson et al., 2013; Jenkinson & Sousa, 2015). This is evidenced by the significant negative coefficients on credit spreads in Models (2) and (3) and

[16] LN Invested Cost and change in P/E multiples were also tested in similar specifications of the logistic regressions and were statistically non-significant in all specifications.

significant and positive GDP growth over the holding period (Models 2 and 3) during the month of exit (Models 4 and 5).

Interestingly, although remaining statistically significant, the sign of the coefficient on credit spreads becomes positive in Models (4) and (5), suggesting that higher credit spreads at the time of exit increase the odds of exit success. The change in the sign of the coefficient on credit spreads might be due to market timing leading to exits close to the peak of the business cycle. This would be consistent with Gredil's (2022) suggestion that access to private information obtained through participation on portfolio company boards provides GPs with an advantage in timing the market. Indeed, Chapter 2 of this thesis indicated that periods of peak global markets performance, e.g., the years 1998 to 2000 and 2005 to 2007, produced the highest number of exits in the sample. The results also suggest that market conditions are the more important factor in determining the time-to-exit. That is, consistent with Jenkinson and Souza (2015), the regressions that include only market conditions have higher explanatory power in both Table 17 and Table 18.

Furthermore, consistent with Brunnermeier and Pedersen (2009), the results in Tables 17 and 18 suggest that times of low funding liquidity coincide with periods when GPs on the continent find it challenging to exit or are forced to hold portfolio investments for longer. In this context, funding liquidity refers to the availability of bank credit to finance transactions and the willingness of LPs to make commitments, which measures liquidity in the PE sector itself (Robinson & Sensoy, 2016). These results are also consistent with Robinson and Sensoy's (2016) finding that the distributions made by PE funds are procyclical.

4.4.4 The interplay between duration, market conditions, and investment success

The sections above have indicated that market conditions have a significant impact on duration, which invites an evaluation of the influence on performance. Accordingly, this section uses a survival analysis framework to understand the interplay between the holding periods, market conditions, and performance. Survival analysis originates from the engineering sciences and is used extensively by economists studying poverty and unemployment spells (Giot & Schwienbacher, 2007). In the PE literature, survival analysis has been used to investigate exit dynamics (Amor & Kooli, 2020; Giot & Schwienbacher, 2007; Hochberg et al., 2007; Jenkinson & Sousa, 2015; Minardi et al., 2019), investment behavior (Ljungqvist et al., 2020), and the factors that impact the time taken to raise a fund (Barber & Yasuda, 2017; Gejadze et al., 2017).

The hazard model measures the conditional instantaneous probability of an event occurring within a specified period given that it has not occurred at that point in time (Jenkinson & Sousa, 2015), which is known as the hazard function:

$$\lambda(t) = \lim_{\Delta t \to 0} \left(\frac{PR(t \le T < t + \Delta t | T \ge t)}{\Delta t} \right) = \frac{F(t)}{S(t)} \tag{8}$$

Where, F(t) is the failure function and S(t) is the survival function. In this study, the hazard rate gives the conditional probability that an investment will be exited successfully given that it has not been exited successfully at that point in time. Duration is measured from the date that an investment is made to the date of exit, with years used as the time scale. The dependent variable is made up of two components: the investment duration and a binary variable indicating the occurrence of an event or censoring. The binary variable "investment success" takes the value 1 if an investment is exited at an IRR that is greater than the sample median and the deals that have not achieved investment success are right censored.

$$\lambda(t) = \lambda_0(t) \cdot e^{(\beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k)} \tag{9}$$

The hazard function, $\lambda(t)$, is estimated using the Cox proportional hazard model, which is a semi-parametric model that does not require the hazard function to be specified (Jenkinson & Sousa, 2015). The hazard rates are dependent on a set of explanatory variables, where $\lambda_0(t)$ is the baseline hazard when all the explanatory variables are equal to zero, $X_1, X_2 + \cdots + X_k$ are the explanatory variables, i.e., the holding period of the previous deal exited by the same GP, the deal sequence, GDP growth, credit spreads, and capital flows, and the $\beta_1 + \beta_2 + \ldots + \beta_k$ are the coefficients representing the change in the log hazard for a one unit change in the explanatory variables. The results are presented in Table 19.

An important assumption of the Cox proportional hazard model is that the effect of the explanatory variables on the hazard function is constant over time. The proportionality assumption is tested for each regression using a hierarchical regression approach to check whether there are significant improvements in the model fit when interactions of the covariates with time are introduced to the models presented in Table 19 (Dekker et al., 2008; Van Dijk et al., 2008). Accordingly, the hazard function is estimated using the Cox regression model with time-varying covariates:

$$\lambda(t) = \lambda_0(t) \cdot e^{(\beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k + \gamma_1 X_1 g(t) + \gamma_2 X_2 g(t) + \ldots + \gamma_k X_k g(t))} \tag{10}$$

Where the β_k and γ_k are the coefficients on the time-fixed and time-varying covariates (Zhang et al., 2018). The results presented in Table 20 show that introducing the time-varying terms in Models (7), (8), and (9) does not significantly improve the model fit compared to Models (2), (3), (4). In contrast, the introduction of interaction terms to Models (6) and (9) significantly improves the model fit, which indicates a violation of the proportionality assumption. Moreover, although the model fit does not improve when interaction terms are introduced in models (7), (8), and (9), it is noteworthy that the interaction of capital flows and time is significant in Models (7) and (8). Therefore, the remainder of this section focuses on the results presented in Table 20.

TABLE 19: Hazard model analysis

Dependent variable: Investment Success	(1)	(2)	(3)	(4)	(5)
Holding period of Deal$_{n-1}$	-0.078*		-0.150**		-0.094**
	[0.043]		[0.049]		[0.045]
LN Deal Sequence	0.225**		0.092		0.224*
	[0.113]		[0.113]		[0.115]
GDP Growth		1.047***	1,139***	0.243***	0.242***
		[0.255]	[0.254]	[0.092]	[0.089]
Credit Spreads		-0,908***	-0.900***	0.057	0.073
		[0.166]	[0.162]	[0.054]	[0.055]
Capital Flows		0.203***	0.235***	0.089***	0.085***
		[0.059]	[0.060]	[0.030]	[0.030]
Wald Chi^2	10.487	42.933	54.136	10.348	22.421
Prob > Chi^2	0.005	<0.001	<0.001	0.016	<0.001
Observations	222	161	161	215	215

Note: *p<0.10, **p<0.05, ***p<0.01

TABLE 20: Hazard model analysis with time-varying covariates

Dependent variable: Investment Success	(6)	(7)	(8)	(9)	(10)
Holding period of Deal$_{n-1}$	-0.424***		-0.229**		-0.403***
	[0.098]		[0.114]		[0.101]
LN Deal Sequence	-0.409*		-0.024		-0.363
	[0.247]		[0.268]		[0.251]
GDP Growth		1.848***	1.710***	0.390**	0.415**
		[0.638]	[0.618]	[0.198]	[0.193]
Credit Spreads		-1.171***	-0.996***	-0.063	0.023
		[0.364]	[0.358]	[0.126]	[0.111]
Capital Flows		0.534***	0.491***	0.142**	0.122*
		[0.150]	[0.152]	[0.030]	[0.071]
Holding period of Deal$_{n-1}$*T_COV	0.080***		0.030		0.072***
	[0.020]		[0.029]		[0.021]
LN Deal Sequence*T_COV	0.159***		0.043		0.148***
	[0.056]		[0.064]		[0.056]
GDP Growth*T_COV		-0.209	-0.159	-0.030	-0.048
		[0.179]	[0.178]	[0.041]	[0.042]
Credit Spreads*T_COV		0.067	0.015	0.028	0.013
		[0.111]	[0.111]	[0.025]	[0.024]
Capital Flows*T_COV		-0.079**	-0.063*	-0.012	-0.009
		[0.034]	[0.035]	[0.015]	[0.016]
Wald Chi^2	20.962	6.080	5.528	2.889	19.650
Prob > Chi^2	<0.001	0.108	0.355	0.409	0.001

Observations	222	161	161	215	215

Note: *p<0.10, **p<0.05, ***p<0.01

Models (6) and (7) control for each category of variable separately where LN Invested Cost and the change in PE multiples have been excluded due to their statistical non-significance across all specifications in both Tables 17 and 18. LN Invested Cost and change in P/E multiples were also tested in similar specifications of the logistic regressions and were statistically non-significant in all specifications. In addition, Models (9) and (10) use GDP growth during the year of exit and credit spreads during the month of exit to examine how market condition impact investments success rates. As expected, Models (6) and (10) show that the holding periods of prior deals and GP experience (LN Deal sequence) have a significant association with investment success rates. *Ceteris paribus*, longer holding periods in prior deals decrease the probability of investment success, with this effect becoming weaker over time (Models 6 and 8), while experience has a negative baseline effect that is increasing over time (Model 6 and 10).

Furthermore, the results indicate that GDP growth, credit spreads, and aggregate capital flows are important determinants of investment success rates with all three of these variables being significant at the 1% level in Models (7) and (8). In Model (7), the coefficients on GDP growth and credit spreads imply that a 1% increase in economic performance increases the investment success rates by 5.35[17] times while a 1% increase in credit spreads decrease the investment success rates by 68.99%[18]. At the same time, a USD1bn increase in aggregate capital commitments, i.e., PE market liquidity, increases the chance of investment success by 70.5%, but this effect becomes 7.6% weaker over time. Interestingly, comparing the results of Models (7) and (9) in Tables 18 and 20 indicates that, although exit market conditions are an important determinant of timeous exit and investment success (e.g., also see Cao, 2011 and Minardi et al., 2019; and Jenkinson & Souza, 2015), market conditions over the entire investment duration appear to be an equally important predictor of timeous exit and investment success.

The results presented in Table 20 support Jenkinson and Souza's (2015) 'windows of opportunity' hypothesis. Specifically, the significant coefficients on credit spreads and aggregate capital commitments are consistent with favourable credit conditions enabling GPs to exit at higher prices (e.g., also see Axelson et al., 2013) and higher LP commitments making secondary sales more profitable. It is also noteworthy that the coefficients on LN Deal Sequence in Model (10) indicate that experienced GPs tend to achieve greater investment success rates than their younger counterparts as

[17] That is, $e^{1.848} - 1$

[18] $1 - e^{-1.171} \times 100$

investment success rates increase over time with experience. Clearly, these results are incompatible with young GPs engaging in the kind of attention seeking investment behavior predicted by the grandstanding hypothesis. Instead, they support the proposition that experienced GPs have better abilities in originating and exploiting investment opportunities (Giot et al., 2014; Gompers et al., 2008). The results in Table 20 are also consistent with Ljungqvist et al.'s (2020) finding that the PE returns generating process varies predictably with a few economic variables that include aggregate industry commitments and credit spreads.

4.4.5 Conclusions

The aim of this chapter was to investigate the factors that have an impact on the duration of PE investments in Africa. The prior literature examining the time-to-exit dynamic has focused on PE in Europe and the US and PE in emerging markets has received little attention. The importance of these issues to allocative efficiency indicate that it is important to extend this research to PE in Africa. Therefore, this chapter examined the factors that impact the duration of PE investments in Africa. In doing so, it answers the call by Brown et al. (2021) for more research examining the impact that ceding of cash flow timing to GPs has on the liquidity properties of PE investments.

The main findings are as follows: first, this study finds that the duration of PE deals in Africa is persistent on a deal-by-deal basis, suggesting that the duration of the previous investment can be used to forecast the duration of subsequent deals by the same GP. This finding aligns with the presence of time invariant GP factors that explain holding periods found in Chapter 3 and suggests that the ability to timeously exit investments is due to skill. Furthermore, this is consistent with the findings in Chapter 3 that deal-by-deal performance persistence is attributable to the ability to timeously exit investment and indicates that the ability to timeously exit may be an important dimension of GP selection. Second, the results in this chapter indicate that the holding periods of PE deals on the African continent have decreased over time consistent with an improving exit environment as more capital is dedicated to PE on the continent. This underscores the importance of research that is focused on PE in Africa if we are to understand its idiosyncratic characteristics.

Third, the results in this chapter indicate that investment duration is countercyclical and so holding periods are lower for investments held when the economy is performing, and credit spreads are low. Consistent with Brunnermeier and Pedersen (2009), Franzoni et al. (2012), and Robinson and Sensoy (2016), the significant relationships found between holding periods and credit spreads and aggregate industry commitments indicates that funding liquidity is an important source of PE liquidity risk on the continent. Fourth, the results suggest that performance is heavily dependent on GDP growth, credit spreads, and aggregate capital flows. Specifically, favorable economic conditions and increasing aggregate industry commitments increase the likelihood above-median IRR performance. These results suggest that GPs in Africa time their exits to take advantage of favorable market conditions. Overall, the results indicate that the ability to timeously exit investment is an important component of GP skill and that the selection decisions of LPs should pay due consideration to whether the track records of GPs demonstrate abilities in making value enhancing decisions regarding the time to exit.

Chapter 5: Macroeconomic drivers of PE returns in Africa

5.1 Introduction

The recent interest rate hikes have seemingly marked an end to the era of 'easy money' and returned macroeconomic conditions to the center of narratives about PE returns[19]. However, although there is extensive research that has been conducted on the relationship between macroeconomic conditions and public market returns, only a handful of studies have investigated the influence of macroeconomic conditions on PE performance. The extant literature has mostly focused on the impact of macroeconomic conditions on fund-level returns in developed PE markets (see, for example, Aigner et al., 2008; Diller & Kaserer, 2009; Ljungqvist et al., 2020; Phalippou & Zollo, 2005; and Steger, 2017) and the impact of macroeconomic factors on portfolio company level returns has received little attention (Errais & Gritly, 2022; Phalippou & Zollo, 2005; Valkama et al., 2013). This is despite portfolio companies being crucial to understanding the forces that drive PE performance because they determine the performance of funds (Brown et al., 2020). There is therefore a need for more research that investigates the macroeconomic factors that impact the performance of PE investments because understanding the drivers of return is important to the capital allocation decisions of LPs.

In view of the above, this chapter examines the combined impact of deal, GP, and macroeconomic conditions on deal level returns on the continent of Africa using quantile regression to consider the impact of these variables at different levels of performance. In doing so, it ties together several themes and phenomena that have emerged throughout this thesis. Specifically, Chapter 3 of this thesis found evidence of performance persistence and indicated that this persistence was largely explained by the ability of GPs to achieve timeous exit. The identification of investment duration as an important determinant of persistence, i.e., GP skill, suggested that the ability to achieve timeous exit may be an important dimension of GP selection. Building on these findings, Chapter 4 investigated the drivers of holding periods and found evidence of holding period persistence. It also documented a strong link between holding periods, market conditions, and the likelihood of investment success. Therefore, this chapter builds on the prior chapters by investigating the link between GP factors such as persistence and market conditions, as well as their impact on the performance of deals that realise different levels of performance.

[19] For example, the SAVCA conference that was held on the 28th February 2024 hosted a panel composed of representatives of South African pension funds that was titled "Get to know your investor: A glimpse into the LP mindset right now in light of the global macroeconomic climate (high interest rates, high inflation, high risk environment); Common misconceptions on LPs; Moving forward in an uncertain environment".

There are several reasons that make this a research topic worth pursuing: first, the focal point in the few prior studies that have analysed the factors that impact deal level returns has mostly been deal and GP level factors (see, for example, Braun et al., 2017; and Nanda et al., 2020) and a few studies, such as those of Valkama et al. (2013) and Errais and Gritly (2022), have focused on the combined impact of deal and macroeconomic factors on deal level performance. Second, the prior studies have mostly analysed the drivers of returns using classical linear regression (see, for example, van Niekerk & Krige, 2009; and Braun et al., 2017). Essentially, the linear regression model does not consider that the impact of deal, GP, and macroeconomic factors could differ for portfolio companies that realise different levels of performance (Valkama et al., 2013). The findings of persistence in Chapter 3 of this study suggest that LPs may seek to understand whether there are differences in the impact of deal, GP, and macroeconomic factors on investments that achieve bottom compared to top quartile performance.

Third, most of the studies that have examined the impact of macroeconomic conditions have focused on fund level returns in the European and US PE markets (see, for example, Phalippou & Zollo, 2005; Aigner et al., 2008; Diller & Kaserer, 2009; Steger, 2017; and Ljungqvist et al., 2020). Given their different stages of developments, it is unlikely that findings from the European and US PE markets can be generalised to PE in emerging markets. Moreover, fund level studies benchmark the period over which macroeconomic factors impact returns based on vintage year because the distribution of investments over the fund life is usually not available to researchers (Braun et al., 2017). There is also significant discretion in how vintage year is defined, wherein vintage may be defined as either the year a fund is closed or the year a fund makes its first investment. Hence, deal level analysis enables a better matching of the period during which individual investments are exposed to the macroeconomic variables of interest. It also controls for the idiosyncratic variability across individual portfolio companies that is smoothed in fund level analyses (Braun et al., 2017; Brown et al., 2020).

Fourth, only two studies have analysed the factors that impact PE returns in Africa, namely the studies of van Niekerk and Krige (2009) and Errais and Gritly (2022). Van Niekerk and Krige (2009) analysed a relatively small sample (46 deals) in a single country, South Africa, and Errais and Gritly (2022) used a sample of deals completed by a single GP. Furthermore, the impact of macroeconomic conditions on deal level PE returns in Africa remains unclear because these studies excluded most of the macroeconomic variables that have been found significant by the earlier fund level studies. For example, van Niekerk and Krige (2009), and Errais and Gritly (2022) each controlled for one macroeconomic variable.

This chapter makes four main contributions. First, it builds on the two prior studies that have examined deal level PE returns in Africa, namely the studies of van Niekerk and Krige (2009) and Errais and Gritly (2022), by using the largest sample to date that consists of deals completed by multiple GPs in multiple regions of the continent. Notably, it extends the literature on the macroeconomic determinants of PE returns in Africa by controlling for the macroeconomic factors that are identified in the literature but excluded by van Niekerk and Krige (2009) and Errais and Gritly (2022). Second, it contributes further evidence to the few studies that analysed the impact of macroeconomic conditions on PE deals at different levels of performance (see, for example, Valkama et al., 2013). Third, it adds to the findings of Chapter 3 of this study and Braun et al. (2017) by presenting the first research that controls for the combined effect of deal, GP, and macroeconomic factors on deal level persistence. Finally, this study builds on Chapter 3 and the prior literature investigating the 'money chasing deals' hypothesis (see, for example, Gompers & Lerner, 2009; Kaplan & Schoar, 2005; Harris et al., 2014; and Robinson & Sensoy, 2016) by presenting the first deal-level research that allows for the supply of PE capital to have a differential impact on investments that realise top and bottom quantile performance and controls for the extent to which the increased capital supply may be triggered by improved economic conditions and outlook for the PE sector.

The rest of this chapter proceeds as follows: Section 5.2 reviews the literature, Section 5.3 describes the variables and outlines the methodology, Section 5.4 presents the results, and Section 5.5 concludes and discusses the implications for LPs.

5.2 Literature review: theoretical and empirical considerations

Prior studies have identified several business cycle variables that may have an impact on PE returns, namely: GDP growth, corporate bond yields, credit spreads, and public market valuations (see, for example, Phalippou & Zollo, 2005; Diller & Kaserer, 2009; Valkama et al., 2013; and Ljungqvist et al., 2020). This literature has suggested that, like public companies, the financial performance of PE portfolio companies is impacted by economic conditions and so, PE returns should have a positive association with GDP growth (Valkama et al., 2013). Similarly, corporate bond yields and credit spreads reflect the cost of debt and thus capture the cost of financing transactions (Phalippou & Zollo, 2005). Furthermore, the practice of using market-based valuation multiples obtained from comparable public companies to value PE portfolio companies should lead to a positive relationship between PE returns and public market valuations (Steger, 2017). Public market valuation multiples are also considered to be an indirect measure of the investment climate or investment opportunities in the PE sector (Gompers & Lerner, 2000; Ljungqvist et al., 2020). Overall, the prior studies suggest that a few macroeconomic variables tend to predictably sway the PE returns generating process by influencing the behavior of GPs (Ljungqvist et al., 2020).

The extant literature has mostly focused on the relationship between macroeconomic variables and fund level PE returns in the US and Europe and their findings have been mixed. For instance, Phalippou and Zollo (2005) examined the business cycle and stock market determinants of fund level PE returns using the Venture Economics dataset covering a sample of 539 buyout and 166 VC funds raised in the US and Europe over the period 1980 to 2003. They found that PE returns were negatively related to interest rates and returns on put options but were positively related to GDP, stock market performance, and to returns on call options over the life of the fund. Interestingly, Phalippou and Zollo (2005) also found that investments acquired when interest rates and credit spreads are high achieved lower performance. Likewise, Aigner et al. (2008) examined the returns of 358 funds raised in North America and Europe over the period 1974 to 2007 and found returns to be negatively related to interest rates but positively related to GDP and stock market returns over the life of the fund. These researchers argued that the negative relationship between interest rates and returns can be attributed to the use of debt to partially finance equity stakes. Furthermore, they reported that returns were negatively related to GDP growth and stock market performance during the vintage year, suggesting that performance is lower when investments are acquired during times of higher GDP growth and stock markets performance.

In contrast, Diller and Kaserer (2009) analysed the returns of a sample of 321 buyout and 456 VC funds raised in Europe over the period 1980 to 2003 and found returns to be negatively related to the annualised GDP growth rate over the fund life. Furthermore, although the authors reported PE returns to be negative related to stock market returns during the vintage year, they found no relationship with stock market returns over the life of a fund. Nonetheless, Steger (2017) analyzed a sample of 78 funds raised in Europe and North America over the period 1993 to 2011 and corroborated the positive relationship between returns and GDP growth over the life of the fund. Like Diller and Kaserer (2009), Steger (2017) found no significant relationships between PE and stock market returns over the fund life but reported a positive relationship with stock market valuations. He also reports that funds that start investing when bond yields are high underperform.

Gresch and von Wyss (2011) compared the influence of macroeconomic conditions on buyout and VC funds to their influence on fund-of-funds raised in the US and Europe over the period 1979 to 2010. Like Phalippou and Zollo (2005) and Aigner et al. (2008), they found fund returns to be positively related to GDP, stock market returns, and negatively related to corporate bond yields over the life of the fund. Unlike Phalippou and Zollo (2005) and Steger (2017), Gresch and von Wyss (2011) also found that buyout funds that start investing during times of high GDP growth achieved lower performance and that returns were not related to stock market performance at the time funds start investing. Moreover, the performance of buyout funds was reported to be higher when funds start investing during times with high corporate bond yields. The returns of fund-of-funds on the other hand were reported to be minimally affected by macroeconomic conditions with GDP, at the time they start investing, being the only variable that has a statistically significant influence on their returns. Gresch and von Wyss (2011) suggest that this could be due to fund-of-funds having greater diversification across vintages and portfolio companies.

Nevertheless, analysing the impact of macroeconomic conditions on performance at the fund level faces important data related challenges. Apart from Phalippou and Zollo (2005), these fund level analyses have mostly measured the period over which macroeconomic factors impact returns based on vintage year and the end of a fund's life because the distribution of investments over the fund life has generally not been known to researchers (Braun et al., 2017). In addition, there is great discretion in the how vintage year is defined, where vintage may be defined as either the year a fund is closed or the year a fund makes its first investment (Braun et al., 2017). Compared to fund level studies, the main advantage of deal level analyses is that they can control for the idiosyncratic variability across individual investments, which is smoothed in fund level studies (Braun et al., 2017; Brown et al., 2020). Furthermore, the deal level approach also allows a better matching of the period during which individual portfolio investments were exposed to the macroeconomic variables of interest. Indeed, understanding the factors that impact portfolio company level performance are important to understanding the forces that drive PE returns since they determine the performance of funds (Brown et al., 2020).

There are a few studies that have analysed the impact of macroeconomic conditions on performance. For instance, Valkama et al. (2013) investigated the combined effects of deal, industry, and macroeconomic factors that impact returns using a sample of 321 deals exited in the United Kingdom over the period 1995 to 2004. Using quantile regression, they found performance to be positively related to GDP growth, the growth of the industry's GDP contribution index, and stock market returns. Regarding the deal specific variables, returns were found to be positively related to leverage and the use of performance-based equity incentive schemes for portfolio company management, while no association was found with GP experience. Bolt-on acquisitions by portfolio companies during the holding period and portfolio company size were also found to have a positive impact on returns. Interestingly, the authors also examined the differences in the impact on average versus top performing investments and found that the leverage, equity incentives, and industry growth effects increase in size from low to high performance quantiles.

Similarly, Errais and Gritly (2022) used quantile regression to investigate the GP and deal level factors that have an influence on returns based on a sample consisting of 74 unrealised and 156 realised deals completed by AfricInvest in 24 African countries over the period 1995 to 2020. They found returns to be negatively related to GDP growth and to have no significant relationships with the ease of doing business index. Of the GP and deal level factors, the type of exit, i.e., strategic buyer, secondary sale, or sale back, was reported to have a significant influence on returns while co-investing with LPs was found to have a significant positive influence on both IRR and MOIC. On the other hand, van Niekerk and Krige (2009) investigated the deal-specific characteristics that influence PE returns in South Africa by analysing a sample of 46 exited investments covering the period 1992 to 2007. They found that short-term interest rates, the only macroeconomic variable examined, did not have a significant impact on returns. Furthermore, the growth of earnings and changes in the earnings multiple were found to be the only variables that have a statistically significant influence on returns and explained 49% of the variation in deal returns.

An important aspect of these deal level studies is their examination of the combined impact of deal, GP, and macroeconomic factors on performance. This is because the fund level studies tended to analyse the impact of fund and GP factors separately from macroeconomic conditions (see, for example, Kaplan & Schoar, 2005; Phalippou & Zollo, 2005; Harris et al., 2014; and Steger, 2017). Regardless, apart from Valkama et al., (2013), the existing deal level studies have excluded most of the macroeconomic variables that have been identified in the fund level literature (see, for example, van Niekerk & Krige, 2009; Guo et al., 2011; Braun et al., 2017; and Errais & Gritly, 2022). For instance, van Niekerk and Krige (2009) only control for interest rates, Errais and Gritly (2022) control for GDP growth, and Braun et al. (2017) capture broad macroeconomic conditions by controlling for vintage period fixed effects. Therefore, there remains a need for more research that examines the combined impact of deal, GP, and macroeconomic condition on PE performance to improve our understanding of the drivers of PE returns. This chapter contributes to filling this gap.

5.3 Variables selection and methodological framework

5.3.1 Description of variables

The objective of this chapter is to examine the relationship between macroeconomic conditions and PE performance in Africa, and to explore the combined impact of deal, GP, and macroeconomic conditions on deal returns. The analysis is based on the sample of 250 deals exited by 28 GPs (see Chapter 2 of this study for a detailed description) and employs IRR as the measures of performance. It focuses on the following macroeconomic conditions as the explanatory variables of interest: average annual real GDP growth rate in Africa, average corporate credit spreads in emerging markets, the change in the price-to-earnings multiple of the MSCI Emerging Market Index over the investment holding period, and the aggregate capital flows into the PE sector in Africa (see Table 15 in Chapter 4 and Section 3.5.2 of Chapter 3 for detailed descriptions). The selection of these variables is guided by the theory and the suitability of each variable is exemplified by its use in the prior literature.

5.3.1.1 Macroeconomic and Industry variables

The prior studies have suggested that GDP growth should be positively associated with deal level returns because, like public companies, the financial performance of PE portfolio companies is impacted by economic conditions (Valkama et al., 2013). In fact, GDP growth has been shown to have a significant impact on both fund and deal level performance (Aigner et al., 2008; Errais & Gritly, 2022; Gresch & Von Wyss, 2011; Steger, 2017; Valkama et al., 2013). In their fund level analyses, Aigner et al. (2008) controlled for the average annual real GDP growth rate between the year of investment and the end of the fund life, Gresch and von Wyss (2011) used the average annual real GDP growth rate during the average length of fund life for funds of the same vintage year, Steger (2017) used the change in the real GDP growth rate between the average over the first three years and the average during last three years of a fund's life. The deal level studies of Valkama et al. (2013) used the average nominal GDP growth between the quarter of entry and the quarter of exit while Errais and Gritly (2022) used the compound annual growth rate between the year of entry and exit of each investment. This chapter uses the average real GDP growth in Africa between the year of entry to the year of exit.

PE returns are expected to have a negative association with corporate bond yields and credit spreads because the equity stakes purchased by GPs tend to be partially financed through third party debt (Aigner et al., 2008; Phalippou & Zollo, 2005). The fund level studies have found higher corporate bond yields and spreads to have a significant negative impact on returns (Gresch & Von Wyss, 2011; Phalippou & Zollo, 2005; Steger, 2017). Specifically, Phalippou and Zollo (2005) controlled for the average corporate BAA yields and spreads at entry and over the life of the fund, Gresch and von Wyss (2011) used the average corporate BAA spread during the average length of fund life for funds of the same vintage year, and Steger (2017) used the change in corporate BAA yields and spreads, calculated as the difference between the average over the first three years and the average during last three years of a fund's life. Although no significant relationships were found, the deal level analysis by Valkama et al. (2013) controlled for average credit spreads during the month of entry. This chapter uses the average corporate credit spreads in emerging markets between the month of investment entry and the month of exit.

On the other hand, deal level returns are expected to have a positive association with public market valuations due to the practice of using market-based valuation multiples obtained from comparable public companies to value PE investments (see, for example, IPEV, 2022). Public market valuation multiples are also considered to be an indirect measure of the investment climate or investment opportunities in the PE sector (Gompers & Lerner, 2000; Ljungqvist et al., 2020). In his fund level analysis, Steger (2017) controlled for the change in the price-to-earnings multiple between the average over the first three years and the average during the last three years of a fund's life while Phalippou and Zollo (2005) controlled for the average price-to-earnings multiple during the year that an investment is exited. In the deal level studies, Guo et al. (2011) controlled for the change in the EV-to-EBITDA multiple between the quarter preceding the deal announcement and the month of exit. Van Niekerk and Krige (2009), Valkama et al. (2013), and Errais and Gritly (2022) did not control for public market valuations in their analyses. Guided by the earlier studies, this chapter uses the change in the price-to-earnings multiple of the MSCI Emerging Market Index between the month of entry and the month of exit.

The "money chasing deals hypothesis" suggests that an increase in aggregate capital commitments flowing into a given region or market should lead to higher competition for deals and lower returns (Gompers & Lerner, 2000). This money chasing deals phenomena has been corroborated by numerous studies that have reported a negative relationship between aggregate capital commitments, i.e., liquidity in the PE industry itself, and PE returns (see, for example, Braun et al., 2017; Harris et al., 2014; Kaplan & Schoar, 2005; and Robinson & Sensoy, 2016). At the fund level, Harris et al. (2014) controlled for the ratio of the sum of the annual capital committed to US funds in the year preceding the current and previous vintage year and the US stock market capitalisation. Similarly, Robinson and Sensoy (2016) used the total capital committed to funds of the same type as a percentage of the US stock market capitalisation. On the other hand, the deal level study by Braun et al. (2017) controlled for the ratio of the aggregate commitments raised by funds in the three previous years and the GDP over the prior three years. In line with these earlier studies, this chapter controls for the total capital raised by the PE funds in Africa in the previous three years that include the year of investment acquisition (also see Section 3.5.2 of this study).

5.3.1.2 Deal and GP characteristics

This chapter controls for the following deal and GP specific characteristics: prior performance, GP experience, and investment size. Numerous studies have reported evidence of PE persistence at the fund level (see, for example, Kaplan & Schoar, 2005; Phalippou & Gottschalg, 2009; and Harris et al., 2023) while deal level persistence has been reported by the studies of Braun et al. (2017), Nanda et al. (2020), and Chapter 3 of this study. Findings of persistence have been interpreted as indication of skill since the ability to consistently outperform suggests that there is something unique and time invariant about the GPs that can accomplish this feat (Ewens & Rhodes-Kropf, 2015). The fund level studies investigate performance persistence by controlling for the IRR of the previous fund managed by the same GP, wherein a significant coefficient indicates persistence. This chapter follows the approach introduced by Braun et al. (2017) and controls for the IRR of the previous deal completed by the same GP (also see Chapter 3 of this study).

Naturally, PE performance is expected to be positively associated with the level of experience that a GP has accumulated through the practical trial and error of managing PE investments, a learning process that is difficult to undertake through any other education (Zarutskie, 2010). Several prior studies have reported a positive relationship between GP experience and returns at both fund and deal level (Aigner et al., 2008; Braun et al., 2017; Gohil, 2014; Kaplan & Schoar, 2005; Phalippou & Gottschalg, 2009). Regarding the variables used to proxy GP experience, some of the prior studies have controlled for chronological experience based on the number of years that have lapsed since a GP's first investment (Aigner et al., 2008; Gohil, 2014). Others have used the fund or deal sequence to capture the functional experience obtained through repeatedly engaging in the full process of investing (i.e., originating, managing, and exiting) in PE deals (see, for example, Kaplan & Schoar, 2005; Phalippou & Gottschalg, 2009; and Braun et al., 2017). These studies apply the logarithmic transformation because experience or knowledge is expected to have a diminishing impact on performance (Aigner et al., 2008). Guided by the prior studies, this chapter controls for the natural logarithm of the deal sequence, which is obtained by ordering the deals of each GP by their investment date and then counting the deal number since the first investment by a specific GP.

The literature has also advanced theoretical arguments predicting diminishing returns to scale and points to the limited scalability of human capital as the linchpin (Kaplan & Schoar, 2005; Lopez-de-Silanes et al., 2015). Nonetheless, the empirical evidence has been mixed, with a handful of studies reporting a negative relationship (Aigner et al., 2008; Braun et al., 2017; Lopez-de-Silanes et al., 2015), others reporting a positive relation (Kaplan & Schoar, 2005; Phalippou & Gottschalg, 2009), and some suggesting a concave relationship (Kaplan & Schoar, 2005). Regarding the variables used to measure size, the fund level studies have mostly controlled for the natural logarithm of a fund's total capital commitments while the deal level research uses the natural logarithm of the dollar amount invested in each deal to capture the impact of size (Aigner et al., 2008; Braun et al., 2017; Kaplan & Schoar, 2005; Lopez-de-Silanes et al., 2015). Following the prior studies, this chapter uses the natural logarithm of the dollar amount invested in each transaction to measure size.

Therefore, guided by the theory and prior literature, the variables described above are used to examine the impact of macroeconomic conditions on deal level returns in Africa. Furthermore, by including the control variables, this chapter extends the extant literature by exploring the combined combined effect of deal, GP, and macroeconomic factors on performance persistence.

5.3.2 Methodology

The prior studies mostly analysed the drivers of returns using classical linear regression, which estimates the average returns for a given value of the independent variables (Valkama et al., 2013). Essentially, the linear regression model does not consider that the impact of macroeconomic conditions could differ for portfolio companies that realise different levels of performance. Yet, the results presented in Chapter 3 of this study indicated that PE performance is persistent, and that this persistence is driven by top quartile performers. Hence, LPs may seek to understand whether there are differences in the impact of macroeconomic conditions on investments that achieve bottom compared to top quartile performance. For this reason, this chapter employs quantile regression to examine the relationship between macroeconomic conditions and PE returns as well as explore the combined impact of deal, GP, and macroeconomic conditions.

Introduced by Koenker and Basset (1978), the quantile regression model is an extension of ordinary least squares (OLS) estimation. As highlighted in Chapters 3 of this study, the OLS regression model estimates the conditional mean response of the dependent variable to a unit change in the value of the explanatory variables. The OLS estimation takes the following form:

$$y_i = \alpha + \sum_{i=1}^{J} \beta_i x_i + \varepsilon_i \tag{10}$$

Where y_i is the deal level IRR, x_i is a vector of the deal, GP, and macroeconomic conditions, and ε_i is an error term that is assumed to be normally distributed and homoscedastic. The OLS regression model computes the parameter estimates by minimising the sum of squared residuals. In contrast the quantile regression model estimates the relationship between the dependent and independent variable at different points in the distribution of the dependent variable. The quantile regression model takes the following form:

$$Q_\tau(y_i) = \beta_0(\tau) + \beta_1(\tau)x_{i1} + \cdots + \beta_p(\tau)x_{ip} + \varepsilon_{ip} \tag{11}$$

Where y_i is the deal-level IRR, x_i is a vector of deal, GP, and macroeconomic variables, and $\beta_p(\tau)$ is the vector of parameters associated with quantile level τ, and ε_{ip} is the error terms for quartile level τ. Unlike the OLS regression model, quantile regression does not assume any parametric distribution for the dependent variable, nor does it assume homoskedasticity (Naifar, 2016; Rodriguez & Yao, 2017). Furthermore, the $\beta_p(\tau)$ are estimated by minimising the sum of weighted absolute residuals (Koenker & Bassett Jr, 1978):

$$\min_{\beta_0(\tau),\ldots,\beta_p(\tau)} \left(\sum_{y_i \geq \beta_0(\tau)+\sum_{j=1}^{p} x_i\beta_p(\tau)} \tau \left| y_i - \beta_0(\tau) - \sum_{j=1}^{p} x_{ij}\beta_j(\tau) \right| + \sum_{y_i < \beta_0(\tau)+\sum_{j=1}^{p} x_i\beta_p(\tau)} (1-\tau) \left| y_i - \beta_0(\tau) - \sum_{j=1}^{p} x_{ij}\beta_j(\tau) \right| \right) \tag{12}$$

An advantage of quartile regression is that it is more robust than OLS in cases of outliers, skewed distribution, and nonlinearities in the relationships with independent variables (Huang et al., 2017; John, 2015; Waldmann, 2018). Importantly, quantile regression relaxes the assumption that the explanatory variables have the same impact on the upper and lower tails of the performance distribution as they do on the mean PE performance (Le Cook & Manning, 2013). Macroeconomic variables tend to be correlated with one another and so the correlations were checked to avoid multicollinearity. In this regard, the variance inflation factor (VIF) was estimated for each regression and did not indicate values that could cause problems of multicollinearity. The results are presented in Tables 21 and 22 below, which include the ordinary least square estimation for comparison. These tables provide coefficient estimates with standard errors reported in parenthesis.

5.4 Results

5.4.1 The impact of macroeconomic conditions, deal, and GP factors on PE returns

Table 21 presents the median regression statistics, where Model (1) to (4) are the main models that inform the analysis in this section. Specifically, Models (1) and (2) control for macroeconomic and deal/GP variables separately while Models (3) and (4) combines both categories. In addition, Model (5) presents the OLS regression statistics and controls for both categories of variables. Models (1) to (4) explain between 2.4% and 5.7% of the variation in median IRR while Model (5) explains 13.2% of the variation in mean performance. The explanatory power of the median regressions controlling only for the macroeconomic conditions (Model 2) is higher than the median regression controlling only for deal and GP factors (Model 1). Regarding the macroeconomic variables of interest, the coefficient on GDP growth is positive and statistically significant across all the models in which it is included as an explanatory variable. Economically, the coefficients imply that a 1% increase in GDP growth increases the median deal IRR by approximately 15.5% (see Model 3). These results suggest that investments held during good times outperform and are consistent with the findings of Guo (2011) and Valkama (2013).

The coefficient on the credit spreads is negative and is statistically significant across all the models in which it is included as an explanatory variable. This result indicates that performance is better when investments are held during times with low credit spreads and is consistent with the findings of Aigner (2008), Gresch and von Wyss (2011), and Phalippou and Zollo (2005). In contrast, the results do not indicate a significant relationship between the change in price-to-earnings multiple during the holding period and returns. Still, the sign of the coefficient is positive, which is expected given the practice of using market-based valuation multiples obtained from comparable listed companies. Interestingly, the coefficient on capital flows is statistically nonsignificant in the median regression Models (2) and (3) but is statistically significant in the OLS regression Model (5).

TABLE 21: The determinants of median deal level PE returns

Dependent variable: IRR	(1) Q50	(2) Q50	(3) Q50	(4) Q50	(5) OLS
IRR of $Deal_{n-1}$	0.107***		0.078***	0,085***	0,059
	[0.014]		[0.018]	[0,018]	[0.056]
LN Deal Sequence	2.153		0.976		4.481
	[1.860]		[2.483]		[7.794]
LN Invested Cost (size)	1.757		0.492		-7.650
	[1.392]		[2.045]		[6.417]
GDP Growth		17.601***	15.519***	9.931**	53.687***
		[5.302]	[4.957]	[3,815]	[15.559]
Credit Spreads		-9.947***	-7.449***	-4.624**	-26.100**
		[3.024]	[2.655]	[2.239]	[8.333]
Δ P/E Multiple		0.594			
		[0.675]			
Capital Flows		1.508	1.632		8.219**
		[1.503]	[1.228]		[3.853]
Constant	-18.900	-27.935	-44.310	-10.063	-54.878
	[21.086]	[28.437]	[45.144]	[21.869]	[141.688]
Observations	222	126	161	161	161
Pseudo R^2/ OLS Adjusted R^2	0.024	0,037	0,057	0,045	0,132

Note: *p<0.10, **p<0.05, ***p<0.01

Regarding the deal and GP specific factors, the coefficient on lagged IRR is positive and statistically significant at the 1% level in median regression Model (1). This result shows that deal level returns are persistent after controlling for GP experience and investment size and supports the robustness of the findings of persistence in Chapter 3 of this study. Furthermore, Models (3) and (4) indicate that, although the size of the effect drops slightly, the lagged IRR remains statistically significant at the 1%

level even after controlling for GDP growth, credit spreads, and capital flows. This result builds on the findings in Chapter 3 of this study and adds to Braun et al. (2017) by indicating that deal performance is persistent even after controlling for macroeconomic conditions. Therefore, this suggests that the observed persistence cannot be attributable to favourable market conditions.

Model (5) replicates the analysis in Model (3) using OLS instead of median quantile regression and produces largely similar results in respect of the business cycle variables of interest. However, there are some important differences. For instance, as expected, the OLS regression coefficient on GDP is positive and statistically significant while the coefficient on credit spreads is negative and statistically significant, but the magnitudes of both coefficients is substantially larger than in the median regression statistics. The coefficient on capital flows becomes larger in magnitude and statistically significant while the coefficient on lagged IRR becomes smaller and loses its statistical significance. The differences in results is unsurprising when comparing the mean to the median response of an independent variable with a skewed distribution (Valkama et al., 2013).

The robustness of the results presented in Table 21 is also supported by the findings in Chapter 4 of this study. In that chapter, hazard analysis was used to elucidate the interplay between investment duration, market conditions, and investment success, where the dependent variable took the value of one if the IRR exceeded the sample median (see Section 4.4.4). GDP growth and capital flows were found to be positive predictors of above-median performance whilst higher credit spreads and the holding period of the preceding deal were shown to decrease the chances of above-median performance (see Table 20). The findings in this chapter are also congruous with Ljungqvist et al.'s (2020) finding that the PE returns generating process varies predictably with a few economic variables that include aggregate industry commitments and credit spreads.

5.4.2 The factors that impact PE investments at different levels of performance

The corroboration of the findings of persistence using median quantile regression invites an evaluation of whether there are differences in the impact of the combined macroeconomic, GP, and deal level factors on investments that achieve bottom compared to top quartile performance. Models (6) to (8) in Table 22 report the quantile regression results of the bottom (0.25), median (0.50), and top (0.75) performance quantiles. Interestingly, Models (6) to (8) explain between 5.7% and 12.0% of the variation in IRR, with the explanatory power increasing from the bottom to top quantiles. With respect to the macroeconomic variables of interest, the results indicate that the coefficient on GDP growth is positive, increasing in size from low to top quantile performers, and statistically significant only in the median and top quartile regressions. This is consistent with the suggestion by Valkama et al. (2013) that, although a performing economy tends to benefit most businesses, other deal specific factors such as operating in an industry with better growth dynamics may lead to differential effects when comparing low and top quartile performers.

TABLE 22: The determinants of bottom, median, and top quantile PE returns

Dependent variable: IRR	(6) Q25	(7) Q50	(8) Q75	(9) OLS
IRR of $Deal_{n-1}$	0.027	0.078***	0.146***	0.059
	[0,024]	[0.018]	[0.018]	[0.056]
LN Deal Sequence	0.334	0.976	2.711	4.481
	[3.340]	[2.483]	[2.472]	[7.794]
LN Invested Cost (size)	4.351	0.492	-3.452*	-7.650
	[2.750]	[2,045]	[2.035]	[6.417]
GDP Growth	9.350	15.519***	23.447***	53.687***
	[6.668]	[4.957]	[4.934]	[15.559]
Credit Spreads	-2.113	-7.449***	-9.413***	-26.100***
	[3.371]	[2.655]	[2.643]	[8.333]
Capital Flows	-0.218	1.632	5.164***	8.219**
	[1.651]	[1.228]	[1.222]	[3.853]
Constant	-103.095*	-44.310	-20.284	-54.878
	[60.719]	[45.144]	[44.929]	[141.688]
Observations	161	161	161	161
Pseudo R^2/ OLS adjusted R^2	0.060	0.057	0.120	0.132

Note: *p<0.10, **p<0.05, ***p<0.01

Similarly, the coefficient on credit spreads is negative, the effect is increasing in magnitude from low to top quantile performers and is statistically significant for the median and top quantile regressions. Interestingly, the coefficient on capital flows is negative and nonsignificant in the bottom quantile regression but turns positive in the median and top quantiles and is statistically significant only in the top quantile performers. Combined with the results in Chapter 4 of this study (see results in Tables 17, 18, and 20), these results are consistent with improving liquidity conditions in the PE sector itself enabling top quantile GPs to exit timeously and therefore increases the deal level performance. Overall, the significant coefficient on capital flows for top quantile performers implies that top performers benefit from an improving exit environment as more capital is dedicated to the asset class on the continent.

The results in Table 22 build on the prior findings of the ‘money chasing deals’ phenomenon (see, for example, Gompers & Lerner, 2009; Kaplan & Schoar, 2005; Harris et al., 2014; and Robinson & Sensoy, 2016) by showing a more nuanced picture when the empirical setting allows for a differential impact on investments that realise top and bottom quantile performance and controls for a combination of other deal, GP, and macroeconomic factors. This approach is consistent with the argument made by Diller and Kaserer (2009) that, because the ‘money chasing deals’ phenomenon indicates a mismatch in the supply and demand for PE capital, its examination is enhanced by an account of the extent to which increasing LP commitments may be due to higher demand for PE capital triggered by an improved outlook for the sector. Overall, when controlling for market conditions, the results do not support the ‘money chasing deals’ hypothesis and thereby indicate that the PE sector on the African continent was not oversupplied with capital during the period sampled.

Regarding the GP and deal specific factors, the coefficient on lagged performance is positive, increasing in size from low to high quantiles, and is only significant in the median and top quantile regressions. These findings indicate that not only do top quantile performers remain persistent when controlling for macroeconomic conditions but so do median performers. These results are consistent with the Markov transition probabilities presented in chapter three of this study and indicate that the observed persistence was driven by the third and top quartiles. On the other hand, the coefficient on cheque size is decreasing in size from bottom to top quantile performers and is only significant in the top quantile regression. This result indicates that large investments underperform relative to smaller ones and is consistent with Lopez-de-Silanes et al. (2015) who attribute the diseconomies in investment size to the greater human resource requirements associated with managing larger transactions.

5.5 Conclusions

This chapter highlighted the scarcity of scholarly research that examines the impact of macroeconomic conditions on PE returns. The need for more research that improves our understanding of the macroeconomic factors that influence returns is made evident by the importance of the issue to the capital allocation decisions of LPs. Furthermore, the data challenges associated with analysing the impact of macroeconomic conditions at the fund level underscore the need for more studies that examine this issue at the deal level. To this end, this chapter investigates the combined impact of deal, GP, and macroeconomic factors on deal level performance in Africa, and its findings have implications for the capital allocation strategies of LPs.

The main findings are as follows: firstly, the results indicate that GDP growth has a strong positive impact on deal level returns while credit spreads have a negative association with performance. The results are consistent with the findings of procyclicality reported by the fund level studies (e.g., Phalippou & Zollo, 2005; Aigner et al., 2008; and Ljungqvist et al., 2020). They also complement the findings in Chapter 4 of this study that indicated that holding periods are lower and the likelihood of above-median performance is higher for investment held when the economy is performing, and credit spreads are low and vice versa. Combined, these results imply that not only are LPs less likely to receive distributions during a challenging economy, but they are also more likely to realise a lower performance from their PE investments and vice versa.

Secondly, the analysis of the combined impact of deal, GP, and macroeconomic factors indicates that deal-level performance remains persistent even after controlling for deal, GP, and macroeconomic variables. This suggests that the observed deal-by-deal persistence cannot be attributed to investment size, GP experience, and macroeconomic conditions and is consistent with the findings of time invariant GP factors that explain the heterogeneity of GP performance in Chapter 3. These results build on the findings of Chapter 3 and Braun et al. (2017) that show that deal level performance remains persistent after controlling for deal and GP factors. Furthermore, they complement Chapter 3 in their support of the conventional wisdom to back GPs that have previously achieved good performance.

Thirdly, the chapter examined whether the deal, GP, and macroeconomic conditions have a differential impact on low compared to high performing investments and found that the impact of GDP growth is larger on high performing investments than on low performers. Similarly, the magnitude of the negative relationship between returns and credit spreads was found to be larger for higher performing investments. On the other hand, unlike the 'money-chasing-deals' hypothesis, the results show that capital flows have a significant positive impact on top quantile performers and a nonsignificant influence on low and median performers. These results complement the findings of Chapter 4 that indicated a positive relationship between liquidity in the PE sector itself and the likelihood of above-median performance. Combined, these findings suggest that top performers take advantage of improving liquidity conditions by exiting timeously and therefore realise higher performance.

Overall, the findings of this chapter highlight the importance of macroeconomic conditions as a driver of PE returns and imply that LPs should pay due consideration to whether the track records of GPs demonstrate abilities in successfully navigating different market conditions. This is particularly important because strategies that seek to avoid cyclicality by timing LP commitments are difficult to implement in practice since LPs delegate the investment decision-making powers to GPs (Brown et al., 2021). Indeed, the differential impact that deal, GP, and macroeconomic factors have on bottom compared to top quantile performers indicates that LPs may benefit from focusing on selecting skillful GPs that have demonstrated an ability to realise persistently good performance across different business cycle conditions.

Chapter 6: Conclusions and recommendations

This chapter provides a summary of the main points at issue in this study, highlighting the main findings, and their implications for Limited Partners. This chapter is therefore structured as follows: Section 6.1 provides a summary of the main findings, Section 6.2 discusses their implications for LPs, Section 6.3 discusses the study's contribution, and Section 6.4 recommends areas for future research.

6.1 Summary of the study and its findings

This study highlighted the scarcity of scholarly research examining PE performance in emerging markets and Africa in particular. The need for more research examining the characteristics of PE performance in Africa is made evident by the growth in assets being dedicated to the asset class on the continent (Preqin, 2018). Understanding the risk factors associated with PE returns in emerging markets and whether LPs can expect adequate compensation for accepting such risks is important to optimal asset allocation. Furthermore, the issues associated with the reliability of the data used in the literature focused on developed PE markets underscore the need for studies that are based on data sourced directly from LPs. To this end, this study analysed the returns of 250 portfolio investments made by 28 GPs across 52 funds in Africa over the period 1996 to 2019, obtained directly from an institutional investor, to address the following research questions: how does PE on the continent perform relative to public markets? Is the performance achieved by GPs on the continent persistent? What determines PE investment holding periods on the continent? What is the impact of macroeconomic conditions on PE performance in Africa? In doing so, this study contributes new evidence to research on the characteristics of PE in Africa and its findings have practical implications for the strategies of LPs allocating to PE funds on the continent.

The first aim of this study was to examine how PE on the continent has performed relative to public equity. To do this, public market equivalent returns were calculated, which represent the return that an investor would have received if an equivalent investment had been made in the MSCI Emerging Market Index. The findings suggest that PE in Africa has outperformed public markets by a sizable margin. The figures indicate that, on average, a dollar invested in PE deals on the continent returned 78% more than a dollar invested in the Index on a gross of fees basis. Moreover, not only have top quartile funds outperformed the index but so have average, median, and bottom quartile funds - implying better performance than previously reported for PE in emerging markets. These findings explain the recent increases in investor allocations to PE investments on the continent and suggest that allocations to PE have contributed positively to portfolio returns.

The second aim of this study was to investigate whether the GP performance on the African continent is persistent and to decompose the factors that have an influence on persistence. To do this, the study used the novel approach introduced by Braun et al. (2017), wherein fully exited deals of each GP are sequenced according to their date and persistence is measured across successive deals made by the same GP. The findings indicate that the deal-by-deal IRR performance achieved by GPs on the continent is persistent, which suggests that the returns of preceding deals can be used to forecast the performance of succeeding deals by the same GP. Markov probability matrices indicate that this persistence is driven by third and top quartile performers. However, persistence drops substantially in magnitude and ceases to be statistically significant when controlling for each of sector and investment holding periods, suggesting that persistence may be due to the choice of sector and the ability to timeously realise a high value exit. Indeed, findings indicate that the choice of sector modulates persistence through its interaction with holding periods.

The third aim of this study was to investigate the factors that have an influence on investment holding periods in Africa. The findings indicate that investment holding periods are persistent on a deal-by-deal basis. Together with the presence of time invariant GP factors that explain holding periods, these findings suggest that the ability to timeously realise value is attributable to skill and implies that investment duration may be an important dimension of GP selection. Interestingly, in contrast to the increasing holding periods documented by studies focused on developed PE markets, the results of this study show that the holding periods of PE deals in Africa have declined over time in line with an improving exit environment as more capital is dedicated to the asset class on the continent. Moreover, the results suggest that holding periods are countercyclical and so are lower for investments held when the economy is performing, credit spreads are low, and aggregate industry commitments are increasing. The findings also show that favorable economic conditions and increasing aggregate industry commitments increase the likelihood of above-median IRR performance. This suggests that GPs on the continent time their exits to take advantage of favourable market conditions.

The fourth aim of this study was to investigate the impact of macroeconomic conditions on PE returns and to examine the combined impact of deal, GP, and macroeconomic factors on performance. The results indicate that GDP growth has a strong positive impact on deal level returns while credit spreads have a negative association with performance. The investigation of the combined impact of deal, GP, and macroeconomic factors indicates that deal-level returns remain persistent for median and top quantile performers even after controlling for deal, GP, and macroeconomic variables. Furthermore, the impact of GDP growth is larger on high performing investments than on low performers while the magnitude of the negative relationship between returns and credit spreads is larger for higher performing investments. Notably, unlike the 'money-chasing-deals' hypothesis, the results indicate that capital flows have a significant positive impact on top quantile performers and a nonsignificant influence on low and median performers. Combined with the findings of aim four, this suggests that top performers take advantage of improving liquidity conditions by exiting timeously and therefore realise higher performance.

6.2 Practical implications for LPs

The findings of this study have important implications for LPs contemplating the role that PE can play in a diversified portfolio and evaluating strategies for allocating to PE funds on the continent. First and foremost, LPs that are considering an allocation to PE are interested in whether they can expect compensation for the risk associated with PE compared to freely traded public equity. The findings of this study indicate that a dollar invested in PE on the continent has on average (median) outperformed a dollar invested in public equity by 78% (37%) on a gross-of-fees basis. Interestingly, Phalippou and Gottschalg (2009) calculate the impact of fees on PMEs based on numerous assumptions in respect of fee arrangements and reported that assuming a conservatively[20] higher fee structure than commonly charged by funds reduces PMEs by 0.24. Using this conservative estimate to gauge the relative performance suggests that a dollar invested in PE deals on the continent has on average (median) outperformed a dollar invested in the MSCI Emerging Market Index by 54% (13%) on a net-of-fees basis. Overall, this implies that an allocation to the asset class may contribute positively to an allocator's overall portfolio return.

When an LP decides to invest into PE, the challenge becomes which funds to back (Goyal et al., 2021). Regarding the identification of GP skill, the findings of deal-by-deal performance persistence indicate that the conventional wisdom of selecting GPs that have previously achieved good performance may be applicable when selecting GPs on the continent. At a practical level, this implies that the returns realised on preceding deals can be used to forecast the performance of succeeding investments by the same GP. The results have also highlighted the importance of sector choice and timeous exit in explaining persistence, suggesting that LPs benefit from selecting GPs that have demonstrable track records of achieving timeous and high value exits in their focus sectors. Notably, the Markov probabilities based on IRR indicate that a strategy to back top quartile GPs may be applicable when allocating to GPs on the continent. For LPs that use relative performance to inform selection decision, the Markov probabilities based on PME suggest that a strategy that focuses solely on GPs that previously achieved top quartile performance might carry greater risk than one focused on third

[20] This fee structure assumes a management fees of 2% charged on committed capital throughout the life of the fund and a 20% carried interest above the hurdle rate of 8%.

quartile managers. These probabilities suggests that a strategy that blends third and fourth quartile PME performers might also be fruitful to allocators if it is tailored to maximise the probability of achieving performance that is closer to the 75th percentile whilst dampening the likelihood of landing up in the first or second quartiles.

The liquidity properties of PE investments are an important consideration in determining the role that PE can play in a diversified portfolio because LPs make binding commitments at fund inception and delegate discretion on the timing of investments and exits to GPs. Indeed, the finding of holding period persistence affirms the importance of the ability to timeously realise exits as a dimension of GP selection. Notably, the findings indicate that investment holding periods are countercyclical, implying that LPs are less likely to receive cash back from exits during challenging times, i.e., when they need it most. This suggests that LPs should be mindful of the contributions that PE makes to the overall liquidity profile of their diversified portfolios. At the same time, the significant relationships between market conditions and the likelihood of exits with above-median performance suggest that GPs time their exits to coincide with favorable market conditions. This highlights that strategies on timely exits are crucial and implies that LPs should pay due consideration to whether the track records of GPs demonstrate persistent abilities in evaluating market conditions and making value enhancing decisions about the timing of exits.

Likewise, understanding how the asset class contributes to the systemic risk exposure of an LP’s total portfolios is important to determining the role that PE can play in a diversified portfolio. In this regard, the findings of this study highlight the importance of macroeconomic conditions as a driver of PE returns and imply that LPs should pay due consideration to whether the track records of GPs demonstrate abilities in successfully navigating different market conditions. This is particularly important because strategies that seek to avoid cyclicality by timing LP commitments are difficult to implement in practice since LPs delegate the investment decision-making powers to GPs (Brown et al., 2021). Furthermore, the differential impact that deal, GP, and macroeconomic factors have on bottom compared to top quantile performers indicates that LPs may benefit from focusing on selecting skillful GPs that have demonstrated an ability to realise persistently good performance across different business cycle conditions. In addition, the findings indicate that PE in Africa is not oversupplied with capital, implying that LPs have limited reason to be concerned about the impact of “too much money chasing too few deals”. In fact, they indicate that top quantile performers benefit from an improving exit environment as more capital is dedicated to the asset class on the continent. Notably, the findings indicate that larger deals have underperformed relative to smaller ones, implying that LPs should be circumspect where GPs seek to raise much larger follow-on funds that target larger transactions.

6.3 Contributions of the study

This study makes a significant original contribution to the literature on PE performance. The contributions of this study are fivefold. First, this study contributes to the strand of the literature that compares PE performance to public markets by presenting the first research to use the public market equivalent method to show that PE in Africa has outperformed listed equity. The existing PE literature has mostly focused on the US and European PE markets (see, for example, Kaplan & Schoar, 2005; Phalippou & Gottschalg, 2009; Harris et al., 2014; and Harris et al., 2016) and few studies have analysed relative performance in emerging markets (see, for example, Missankov et al., 2008; Gohil et al., 2014; Fang et al., 2018; and Kumar & Firoz, 2023). Due to the scarcity of data on PE performance, there is only one study, namely that of Missankov et al. (2008), that has attempted to compare PE returns in Africa to public markets. Missankov et al. (2008) analysed returns at the fund level in a single country, South Africa, using a relatively small sample (11 funds) over the period 1992 to 2006. This study builds on Missankov et al. (2008) by using the largest sample to date that consists of fully exited deals completed in multiple regions of Africa over two decades to compute public market equivalent returns. It also amplifies the country specific analysis of Missankov et al. (2008) by calculating PMEs to assess relative performance in Nigeria and South Africa and finds that PE investments exited in Nigeria and South Africa have outperformed relative to the NSE and JSE respectively. The findings that PE in Africa has outperformed public markets contribute new evidence from a minimally investigated region to the discussion on the value added by PE funds relative to public markets.

Second, this study extends the strand of the literature investigating the GP and deal specific factors that have an influence on PE performance in Africa. The GP and fund specific factors that have been identified as important by the prior literature that focused on PE in Europe and the US include fund size (Aigner et al., 2008; Gottschalg et al., 2003; Harris et al., 2014; Harris et al., 2023; Kaplan & Schoar, 2005), GP experience (Barber & Yasuda, 2017; Diller & Kaserer, 2009; Gompers et al., 2009; Kaplan & Schoar, 2005), and fund specialisation (Aigner et al., 2008; Brown et al., 2022; Ljungqvist & Richardson, 2003; Lossen, 2007). Only two prior studies have investigated the GP and fund specific factors that impact PE returns in Africa (Errais & Gritly, 2022; Van Niekerk & Krige, 2009). Van Niekerk and Krige (2009) examined portfolio investments exited in South Africa and found EBITDA growth and multiple expansion to be the most important drivers of returns while deal size was found to have no impact. Errais and Gritly (2022) analysed the returns on portfolio investments made by a single GP and found that this GP's experience and deal size had a limited influence on returns, but that sector choice was a significant driver of performance. The findings in this study that GP experience has a limited impact on performance and that larger deals have underperformed relative to smaller ones provide further clarity using the returns of investments exited by numerous GPs in multiple regions of the continent.

Third, this study contributes new evidence from a minimally investigated region to the debate on performance persistence. Its investigation of deal level persistence in Africa using the novel approach introduced by Braun et al. (2017) that enables a decomposition of the sources of persistence is a pioneering one in an emerging market. Although there is an established literature consensus on the existence of persistence in the European and US literature (Braun et al., 2017; Harris et al., 2023; Kaplan & Schoar, 2005; Lerner et al., 2007), there is only one study that has examined persistence in an emerging market, namely that by Gohil (2014), but it has done so at the fund level. The findings of persistence in this study provide empirical support to the conventional wisdom to back GPs that have previously achieved good performance, which has previously been without academic empirical backing in Africa. The findings also reveal unique insights highlighting the importance of sector choice and the ability to achieve timeous exits as sources of performance persistence on the continent.

Fourth, this study adds depth to the discussion on whether the ability to achieve timeous exit constitutes a dimension of GP skill by innovatively applying the novel approach introduced by Braun et al. (2017) to probe the persistence of holding periods. In doing so, it presents the first research to uncover evidence indicating that investment duration is persistent, demonstrating that the ability to timeously realise an exit may be an important dimension of GP selection. Furthermore, it contributes evidence from a minimally investigated region to the broad discussion on how the maturing of the PE industry impacts investment duration (see, for example, Jenkinson & Souza, 2015; and Joenväärä et al., 2022). Recent studies have documented increasing holding periods in developed markets, pointing to increasing competition as more capital flows to the industry as contributing factors (Jenkinson & Sousa, 2015; Joenväärä et al., 2022). In contrast, this study reveals evidence indicating that the holding periods of PE deals in Africa have declined over time in line with an improving exit environment as more capital is dedicated to the asset class on the continent. Notably, this study contributes new insights on how market conditions influence the exit behavior of GPs on the continent by documenting that GPs in Africa time their exits to take advantage of favorable market conditions.

Fifth, this study amplifies the understanding of the impact of macroeconomic conditions on PE returns in Africa by revealing a nuanced picture based on a multifaceted exploration of the combined impact of deal, GP, and macroeconomic factors on returns in an empirical setting that allows for a differential impact on investments that realise top and bottom quantile performance. The findings highlight the importance of macroeconomic conditions as a driver of PE returns and thereby provide new insights that have practical significance for LPs allocating to PE in Africa. The analysis also enriches the prior literature investigating the 'money chasing deals' hypothesis (see, for example, Kaplan & Schoar, 2005; Gompers & Lerner, 2009; Diller & Kaserer, 2009; Harris et al., 2014; and Robinson & Sensoy, 2016) by presenting the first deal-level research that allows for the supply of PE capital to have a differential impact on investments that realise top and bottom quantile performance and controls for the extent to which the increased capital supply may be triggered by improved economic conditions and outlook for the PE sector. The findings uncover that, unlike developed PE markets, PE on the continent was not oversupplied with capital over the period 1996 to 2019 and reveals that top quartile GPs have taken advantage of improved liquidity conditions in the PE sector. Overall, the findings affirm that LPs should pay due consideration to whether the track records of GPs demonstrate abilities in successfully navigating different market conditions.

6.4 Recommendations for future work

The current study examined the returns of exited investments and found that PE in Africa outperforms public markets and is persistent. As data on the quarterly NAVs of exited investments becomes available, future research could explore, in the context of PE in Africa, the extent to which interim valuations reflect final value and whether performance is persistent when evaluated based on interim performance (see, for example, Hüther, 2022; and Harris et al., 2023). The importance of these issues to the capital allocation strategies of LPs is made evident by the fact that LPs use interim performance to inform their decisions about making commitments to follow-on funds. This is because GPs raise follow-on funds halfway through their current funds and at that point the information available is interim performance, which uses the NAVs of unrealised investments as estimates of final value. Exploring these questions would contribute insights on the decision-usefulness of interim performance when selecting GPs on the continent.

Furthermore, this study has indicated varying levels of diversification across sectors and regions when deals are grouped into funds (see Chapter 2). An important aspect that warrants further research attention is the impact that specialisation has on PE returns in Africa. Theoretical arguments have suggested that accumulated industry, geography, and development-stage specific expertise should provide an advantage to specialist GPs (Gejadze et al., 2017; Gompers et al., 2009; Knill, 2009; Le Nadant et al., 2018; Lossen, 2007). Specifically, specialised expertise should be advantageous in selecting investments, reducing principal-agent conflicts, and in providing value-enhancing input to portfolio companies (Bartkus & Kabir Hassan, 2009; Lossen, 2007). The choice of sectors and geographies is also an important component of portfolio formation that is delegated to GPs and its impact on fund level returns is of interest to LPs (Brown et al., 2022). Yet, this topic has received limited attention in the international literature and the results thus far have been mixed. Therefore, future research could use HHI indices to investigate the impact of sector, and geographic concentration on fund returns in Africa.

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