Size and Performance: Evidence on Brazilian Multimarket Funds

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Abstract- This study aims to evaluate the effect of size on performance of Brazilian multimarket funds. The final sample is comprised by 231 funds covering 7,997 monthly observations in the period from January, 2009 to March, 2014. We employed multivariate regression analysis, with pooled data. Our research model also includes the following control variables: management fee, performance fee, and age. The main results show that size represents an important variable to address performance of investment funds in Brazil, and there are arguments about an optimal size for funds that operate in this market.

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I. Introduction

From the early 1990s, with the opening of the Brazilian economy, there was a gradual increase in the number of investment funds. Among the advantages of investment funds we can highlight their role as a financial intermediary, the diversification and the professional management provided to retail investors. Investment funds have a direct influence on economic policy, comprising savings and even country infrastructure investments (Babalos et al., 2015; Eid Junior & Rochman, 2015). In Brazil, there were among 13,500 investment funds (January, 2016) registered at *Comissão de Valores Mobiliários* (the Brazilian Security and Exchange Commission).

The relationship between fund's size and their performance has gained notoriety in recent research, but there are divergent results found in previous studies. For example, the following relationships were found: an U-shaped relationship (Ding et al., 2015); an inverted U-shaped relationship (Tang et al., 2012); a negative relationship (Chen et al., 2014); and a positive relationship (Milani & Ceretta, 2012; Malaquias & Eid Jr., 2014).

Given the importance of investment funds, the increase in the number of funds and the small number of studies on the subject in Brazil, *this study aims to evaluate the effect of size on performance of Brazilian multimarket funds.* We intend to explore this effect using quartiles intervals. Therefore, we classified the funds as big or small in comparison with the size of the fund itself, along its period of existence. This procedure permits an indicative about an optimal size of investment funds. Our quantitative model also considers four variables of control: age of the funds, management fee, performance fee, and year.

We also consider the importance of our results for the Smart Money literature (Gruber, 1996; Wermers, 2003; Gharghori et al., 2007; Varga, 2012). In Brazil, Costa and Eid Jr. (2006) developed a precursor study in this field, showing evidences about the effect. With data of multimarket funds, Fonseca and Malaquias (2012) and Malaquias et al. (2016) also indicated that some investors can choose the investment funds that will present a good (or the great) performance in the future.

II. Previous Findings

As we commented in the introduction of this paper, there are divergent evidences about the relationship between fund's size and performance. In Figure 1, we present a summary of findings about the relationship between these variables.

The arguments pointed out by literature about a negative relationship between size and performance rely on the flexibility that small funds can obtain in buying and selling assets in financial markets. Small funds "can more easily purchase and sell securities without altering securities prices" (Grinblatt & Titman, 1989, p. 407). On the other hand, small funds "may experience higher transaction costs than larger funds because they cannot take advantage of certain economies of scale" (Grinblatt & Titman, 1989, p. 407).

There is also evidence about an optimal size for investment funds. In this case, the argument is that funds need to reach a minimum size that supports the operational costs of the fund (Indro et al., 1999). Tang et al. (2012) observed, in Chinese mutual funds, that for small funds, economies of scale play an important role; "however, for large funds, the role of liquidity is substantial" (Tang et al., 2012, p.246). Liquidity issues were pointed out by other authors as an explanation for the absence of positive relationship between size and performance (Pillay et al., 2015).

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Author	Result	Market	Period
Grinblatt e Titman (1989)	Negative	U.S.A.	1974-1984
Indro et al. (1999)	Inverted U-Shape	U.S.A.	1993-1995
Castro &Minardi (2009)	Positive	Brazil	1996-2006
Pillay et al. (2010)	Negative; Positive	South Africa	1991-2008
Milani&Ceretta (2012)	Positive	Brazil	2001-2009
Tang et al. (2012)	Inverted U-Shape	China	2004-2010
Malaquias&Eid Jr. (2013)	Positive	Brazil	2007-2011
Blake et al. (2014)	Negative	U.K.	1998-2008
Chen et al. (2014)	Negative	U.S.A.	1962-1999
Malaquias&Eid Jr. (2014)	Positive	Brazil	2005-2011
Milan &Eid Jr. (2014)	Positive	Brazil	2007-2011
Babalos et al. (2015)	Negative	U.S.A.	2002-2010
Chen & Lai (2015)	Non-Significant	Taiwan	2001-2012
Ding et al. (2015)	Inverted U-Shape; U-Shape	Asia	2003-2009
Malaquias & Mamede (2015)	Positive	Brazil	2005-2013

Source: compiled from previous studies.

Figure 1: Summary of results from some previous studies

III. Data and Method

In order to develop the empirical analysis, we selected 355 Brazilian multimarket funds, in the category of *estratégiaespecífica* (specific strategy), during the period from January, 2009 to March, 2014. We obtained 9,013 observations for monthly returns. After excluding missing values in dependent variable or in variables of control, we obtained a final sample of 231 funds (7,997 observations). The profitability was estimated with the following reasoning: $[(share_t - share_{t-1})/(share_{t-1}) - 1] * 100$. We used the winsorize procedure (5%) in the dependent variable to avoid any problem with extreme outliers.

In this study, we used the variable size, which represents the natural logarithm of the monthly equity of each fund. We also created three dummy variables:

Size q1: it receives 1 for all observations with monthly equities in the first quartile, by fund, and it receives 0 in the other cases.

Size q2: it receives 1 for all observations with monthly equities in the second quartile, by fund, and it receives 0 in the other cases.

Size q3: it receives 1 for all observations with monthly equities in the third quartile, by fund, and it receives 0 in the other cases.

Size q4: it receives 1 for all observations with monthly equities in the fourth quartile, by fund, and it receives 0 in the other cases.

The creation of quartiles permits the observation of the size behavior along the fund life time. As control variables, we used:

Management fee: we expect to observe a negative relationship between management fee and performance of investment funds (Malaquias & Mamede, 2015; Dalmácio et al., 2007). Measurement: dummy variable; it receives 1 if the fund has management fee; and 0 for the other cases.

Performance fee: the payment of performance fees may incentive the manager in obtaining a better performance for the fund investors (Agarwal & Naik, 2000; Malaquias & Eid Jr., 2014). Therefore, we expect a positive relationship between performance fee and profitability. Measurement: dummy variable; it receives 1 if the fund has performance fee; and 0 for the other cases.

Age: based on previous literature (Milani & Ceretta, 2012), we included this variable to represent the experience of the fund, and because youngest funds can present higher transaction costs and lower performance (in comparison with funds that are already established in the market).Measurement: fund age in March 31, 2014 (in years).

In order to control for time effects, we included the variable "year" in the model. It represents each one of the years (2009; 2010; 2011; 2012; 2013; 2014) in the database.

We employed panel data (pooled) to test the relationship between the variables. To identify problems of multicollinearity, we used VIF (variance inflation factor) test.

IV. RESULTS

Table 1 shows descriptive statistics of data in the sample. We can observe that, on average, 84% of

funds in the sample charge management fees and 35% charge performance fees when the fund outperforms its benchmark. The estimate for age of these funds is 5.5 years, in the range between 1 and 20.9 years.

Table 1: Descriptive statistics of variables

Variables	N	Minimum	Maximum	Mean	Std. Deviation
profitab.	7,977	-6.396	6.989	0.638	2.144
size_ln	7,977	5.521	22.569	17.186	1.715
mg_fee	7,977	0.000	1.000	0.841	0.366
pf_fee	7,977	0.000	1.000	0.355	0.479
Age	7,977	1.000	20.917	5.513	3.178

We first run the regression analysis only with the dummy variables of size, which was segregated in quartiles. Table 2 contains the results. We can observe that the effect of size is positive in the performance of the funds, but it is not necessarily increasing among

different quartiles. In this way, when investment funds are in periods with high equity they not necessarily reach their better performance indexes. It is evidence about an inverted U-Shaped relationship.

Table 2: Relationship between size (dummies by quartiles) and performance

Variables	B	Std. Error	T	Sig.	VIF
constant	0.421	0.050	8.459	0.000	-
size_q2	0.199	0.069	2.875	0.004	1.555
size_q3	0.338	0.069	4.906	0.000	1.562
size_q4	0.310	0.068	4.551	0.000	1.576

In Table 3 we report the results including all control variables in the quantitative research model. The results show that only age and year were significant to explain the profitability of the funds in the sample. The negative signal of age indicates that younger funds tend to present higher levels of performance in comparison with the older ones. The profitability of the funds presented a decrease (on average) along the years.

Maybe this result is related with the economic scenario of the Brazilian financial market. In the sample, large funds tend to guarantee greater performance than small funds, suggesting a positive relationship between these variables (size_ln and profitability). Nevertheless, the analysis of quartiles indicates that when the fund is with its large equity status, its performance not necessarily is the higher.

Table 3: Relationship between size (dummies by quartiles) and performance, with the variables of control

Variables	B	Std. Error	T	Sig.	VIF
constant	276.612	36.420	7.595	0.000	-
Age	-0.025	0.008	-2.928	0.003	1.248
mg_fee	-0.012	0.069	-0.175	0.861	1.122
pf_fee	0.068	0.053	1.287	0.198	1.126
Year	-0.138	0.018	-7.628	0.000	1.133
size_ln	0.109	0.015	7.171	0.000	1.208
size_q2	0.161	0.070	2.320	0.020	1.587
size_q3	0.287	0.070	4.100	0.000	1.637
size_q4	0.260	0.070	3.692	0.000	1.711

In all tables, VIF statistics indicate that multicollinearity was not a problem in the quantitative models. In general, our results are in line with some previous studies (Indro et al., 1999; Tang et al., 2012), because we also observed that marginal returns become negative when the fund exceeds its optimal size. The reasoning about large size may negatively affects performance may apply to these funds, probably when they receive large volumes of investment.

V. Final Remarks

In this paper we explored the effect of size on investment funds performance. Previous studies show different results, such as an inverted U-Shaped, a U-Shaped, a positive and a negative relationship between the variables (size and performance).It is important to note that we used quartiles for the quantitative analysis. To create the quartiles, we classified the size of the funds and compared it with the historical size of the same fund. Therefore, we have four quartiles for each fund in the sample.

Using a sample of Brazilian multimarket funds, during the period from January, 2009 to March, 2014, we observed evidences about a U-Shaped relationship. Therefore, size is an important variable to address performance in investment funds that operate in Brazil.

Results show that not necessarily being a large fund during the life of the fund is a characteristic that improve performance. Maybe it is difficult to negotiate a large amount of resources when the fund receives new investments and choose the assets that probably will present good profitability. This reasoning leads to the idea of an optimal size of investment funds, and further studies can explore this issue in other emerging economies.

Our results are interesting for the Smart Money literature, since papers in this field explore the relationship of new inflows and the performance of investment funds. If there is an optimal size for investment funds, does size moderate the smart money effect in Brazil?

Finally, it is important to comment a limitation of this paper: the sample. We selected only one subcategory of multimarket funds: specific strategy. Further studies can analyze the presence (or absence) of a U-Shaped relationship between size and performance on the other subcategories of multimarket funds. The second limitation is the period of analysis.

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