

## Conclusion

The opening part of this thesis has performed a detailed review of the most relevant, previous academic contributions in the field of mutual fund flow-performance relationship research and especially focused on working out potential shortcomings regarding research and model methodologies. It concluded that, comparable research projects have generally focused on highlighting the flow-performance relationship for just one fund domicile, thereby automatically limiting the perception of how mutual funds compete against each other.

Chapter 2 provided comprehensive insights into the historical development as well as the current state of competition within European mutual fund industry and worked out that, due to the increased cross-border activity within the European mutual fund industry (e.g. as a result of UCITS-regulations), above mentioned research methodologies might not be applicable to such an open market. This further supported the unconventional flow-performance research methodology of this thesis – which, in contrast to comparable research, is not focusing on highlighting the flow-performance relationship for funds of just one specific domicile, but instead is researching flow-performance dynamics for an extensive cross-border market (entire European market) on the example of an empirical set of European equity funds (UCITS). Sample derivation has completely been disregarding a fund's domicile and solely focused on a fund's potential availability (i.e. sales registration) within the focus region.

The subsequent chapters 3 to 4 then provided some essential background information on the most important input factors and driving factors of flow-performance dynamics. Chapter 3 delivered a critical review of commonly employed (mutual fund) performance and risk measurement methods and (based on the results of a literature meta-analysis) came to the conclusion that there are hardly any proofs for persistency of mutual fund (out-) performance. Since findings of comparable research have generally been identifying significant irrationalities (e.g. detection of significant positive and convex relations) within flow-performance relationships, chapter 4 has focused on assessing such illogical investor decisions from a behavioral finance point of view and worked out that the flow-performance relationship is significantly being affected by “recency bias” (explaining why investors chase

(non-persistent) past performance), “disposition effect” (explaining convexity) as well as “status quo bias” (explaining why investors buy the same fund year by year).

Chapters 5 marked the start of the actual (autonomously conducted) quantitative empirical part of this thesis and delivered an in-depth description of sample derivation as well as architecture and logic behind all employed statistical models. The detailed results of all performed statistical tests were structurally presented in chapter 6, whereas chapter 7 condensed the empirical findings by delivering explicit answers for all raised researched questions.

Based on a broad set of statistical tests (rolling Spearman’s rank-correlation tests, (piecewise-) bivariate and multivariate OLS-regression models) this thesis has been able to deliver empirical evidence that the main findings of previous flow-performance research (focusing on solely one fund domicile) also remain valid when the underlying methodologies are being applied to a broad cross-border sample of European equity funds (UCITS-structure). In more detail the quantitative models of this research project have been assessing a highly significant positive relation between past performance (in form of percentage growth and Sharpe-ratio) and lagged fund flows – indicating that investors of the observed sample are demonstrating a certain kind of performance chasing behavior. Moreover, results of segmented bivariate and multivariate OLS-regressions ascertained these relations to be of a non-linear nature – implying that investors react to out- or under-performance with different sensitivity magnitudes.

An extensive set of monthly rolling rank correlation tests disclosed insights into the historical development of each researched flow-performance relation and detected possible hints for potential trends and structural patterns within these variables. A closer study of the time-wise stability of flow-performance relationships could become subject of future research projects.

The implementation of total assets under management of a mutual fund’s fund management company within multivariate models tried to assess the impact of a company’s market presence on its ability to attract flows. However, inconsistent with findings of comparable research methodology (Ber et al. (2007)) this thesis has not been able to proof a significant positive influence of this particular factor.

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# Appendix A: correlation-test details: flow~percentage growth

Date:	08.2004	09.2004	10.2004	11.2004	12.2004	01.2005	02.2005	03.2005	04.2005	05.2005	06.2005	07.2005	08.2005	09.2005	10.2005	11.2005
Spearman's $\rho$	0.2421	0.2402	0.3257	0.3375	0.2913	0.2536	0.2434	0.2770	0.3681	0.3335	0.3200	0.3985	0.3685	0.2717	0.2910	0.2769
t-value	6.4046	6.6017	9.0670	9.5329	8.3878	7.2415	6.9811	8.2699	11.2328	10.0678	9.9233	12.5693	11.4696	8.3175	8.8719	8.4807
Significance <sup>1</sup>	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Significance <sup>2</sup>	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Date:	12.2005	01.2006	02.2006	03.2006	04.2006	05.2006	06.2006	07.2006	08.2006	09.2006	10.2006	11.2006	12.2006	01.2007	02.2007	03.2007
Spearman's $\rho$	0.3176	0.3099	0.2979	0.2680	0.2941	0.2828	0.2640	0.3035	0.2759	0.3006	0.2492	0.2572	0.2149	0.1966	0.2117	0.2124
t-value	10.0157	9.7513	9.4866	8.4662	9.3686	9.0528	8.4101	9.7926	8.8385	9.7008	7.9423	8.2242	6.2236	6.7623	6.8428	
Significance <sup>1</sup>	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Significance <sup>2</sup>	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Date:	04.2007	05.2007	06.2007	07.2007	08.2007	09.2007	10.2007	11.2007	12.2007	01.2008	02.2008	03.2008	04.2008	05.2008	06.2008	07.2008
Spearman's $\rho$	0.2040	0.2207	0.2360	0.2667	0.2758	0.2800	0.2444	0.2432	0.1924	0.1550	0.1430	0.0997	0.0623	0.1213	0.1448	0.1625
t-value	6.5212	7.1061	7.6793	8.7503	9.1516	9.2932	8.0627	8.0542	6.3632	5.1145	4.7337	3.3077	2.0660	4.0599	4.8542	5.4857
Significance <sup>1</sup>	***	***	***	***	***	***	***	***	***	***	***	***	*	***	***	***
Significance <sup>2</sup>	***	***	***	***	***	***	***	***	***	***	***	***	*	***	***	***
Date:	08.2008	09.2008	10.2008	11.2008	12.2008	01.2009	02.2009	03.2009	04.2009	05.2009	06.2009	07.2009	08.2009	09.2009	10.2009	11.2009
Spearman's $\rho$	0.1965	0.2510	0.2270	0.2146	0.2165	0.1855	0.1609	0.1742	0.1354	0.1534	0.1365	0.1359	0.1506	0.1188	0.0804	0.0707
t-value	6.6576	8.6115	7.8029	7.3658	7.4764	6.4028	5.5570	6.0424	4.6470	5.2910	4.7181	4.7014	5.2596	4.1456	2.8051	2.4562
Significance <sup>1</sup>	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Significance <sup>2</sup>	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Date:	12.2009	01.2010	02.2010	03.2010	04.2010	05.2010	06.2010	07.2010	08.2010	09.2010	10.2010	11.2010	12.2010	01.2011	02.2011	03.2011
Spearman's $\rho$	0.0530	0.0691	0.0789	0.0830	0.1462	0.1721	0.1902	0.1935	0.1882	0.1965	0.1506	0.1679	0.1344	0.1460	0.1240	0.1192
t-value	1.8304	2.4054	2.7454	2.8855	5.0905	6.0056	6.6319	6.4016	6.5523	6.8905	5.2258	5.8171	4.6089	5.0335	4.2699	4.1187
Significance <sup>1</sup>	*	*	*	*	***	***	***	***	***	***	***	***	***	***	***	***
Significance <sup>2</sup>	*	*	*	*	***	***	***	***	***	***	***	***	***	***	***	***
Date:	04.2011	05.2011	06.2011	07.2011	08.2011	09.2011	10.2011	11.2011	12.2011	01.2012	02.2012	03.2012	04.2012	05.2012	06.2012	07.2012
Spearman's $\rho$	0.1751	0.1798	0.2049	0.2017	0.1942	0.1903	0.1685	0.1144	0.1258	0.1200	0.0774	0.1334	0.1402	0.0947	0.0560	0.1397
t-value	6.0843	6.2118	7.1625	7.0291	6.7407	6.6141	5.8085	3.9115	4.3026	4.1003	2.6178	4.5291	4.7759	3.1976	1.8733	4.7167
Significance <sup>1</sup>	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Significance <sup>2</sup>	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Date:	08.2012	09.2012	10.2012	11.2012	12.2012	01.2013	02.2013	03.2013	04.2013	05.2013	06.2013	07.2013	08.2013			
Spearman's $\rho$	0.1688	0.1351	0.1641	0.1640	0.1508	0.1390	0.1546	0.1559	0.1372	0.1367	0.1159	0.1339	0.1513			
t-value	5.7252	4.5574	5.5529	5.6805	5.0814	4.6772	5.2013	5.2392	4.5939	4.5707	3.8572	4.4717	5.0527			
Significance <sup>1</sup>	***	***	***	***	***	***	***	***	***	***	***	***	***			
Significance <sup>2</sup>	***	***	***	***	***	***	***	***	***	***	***	***	***			

Legend: <sup>1</sup>) Significance under a one-sided t-test; <sup>2</sup>) Significance under a two-sided t-test; Significance codes: \*\*\*=0.1% level, \*\*=1% level, \*=5% level, \*o=10% level.



## Appendix B: correlation-test details: flow~volatility

Date: 08.2004		09.2004		10.2004		11.2004		12.2004		01.2005		02.2005		03.2005		04.2005		05.2005		06.2005		07.2005		08.2005		09.2005		10.2005		11.2005					
Spearman's $\rho$	0.0351	-0.0434	-0.0097	-0.0093	-0.0229	0.0110	-0.0343	-0.0649	-0.0751	-0.0698	-0.0812	-0.0873	-0.1061	-0.0775	-0.0689	0.0098																			
t-value	0.9026	1.1584	0.2566	0.2474	0.6299	0.3028	0.9561	1.8670	2.1364	1.9901	2.3924	2.5351	3.0884	2.2889	0.1712	0.2894																			
Significance <sup>1</sup>															*																				
Significance <sup>2</sup>																																			
<b>Date: 12.2005</b>																																			
Spearman's $\rho$	0.0575	0.0779	0.0739	0.1233	0.1266	0.1247	0.1429	0.1579	0.1603	0.1622	0.1634	0.1644	0.1490	0.1407	0.1335	0.1366																			
t-value	1.7228	2.3389	2.2534	3.7659	3.8856	3.8610	4.4373	4.9167	4.9990	5.0600	5.1136	5.1505	4.6723	4.4107	4.2086	4.3419																			
Significance <sup>1</sup>	*	**	*	***	***	***	***	***	***	***	***	***	***	***	***	***																			
Significance <sup>2</sup>			*	***	***	***	***	***	***	***	***	***	***	***	***	***																			
<b>Date: 04.2007</b>																																			
Spearman's $\rho$	0.0931	0.0500	0.0424	0.0511	0.0589	0.0648	0.0462	0.0427	0.0558	0.0712	0.0694	0.0921	0.1347	0.0859	-0.0135	-0.0328																			
t-value	2.9244	1.5733	1.3410	1.6254	1.8817	2.0686	1.4784	1.3744	1.8129	2.3257	2.2803	3.0538	4.4947	2.8635	0.4467	1.0945																			
Significance <sup>1</sup>	**	*	o	*	*	*	o	o	*	*	*	*	*	*	*	*																			
Significance <sup>2</sup>	**																																		
<b>Date: 08.2008</b>																																			
Spearman's $\rho$	-0.0390	-0.0345	0.0237	-0.0430	-0.0187	-0.0031	0.0228	0.0094	-0.0054	0.0306	-0.0003	-0.0245	-0.0056	-0.0104	-0.0226	0.0005																			
t-value	1.2977	1.1463	0.7942	1.4439	0.6316	0.1054	0.7781	0.3205	0.1843	1.0422	0.0099	0.8385	0.1946	0.3608	0.7860	0.0190																			
Significance <sup>1</sup>	o			o																															
Significance <sup>2</sup>																																			
<b>Date: 12.2009</b>																																			
Spearman's $\rho$	0.0240	0.0232	0.0067	0.0236	0.0641	0.0683	0.0636	0.0538	0.0474	0.0279	0.0299	0.0404	0.0237	-0.0006	0.0251	0.0130																			
t-value	0.8269	0.8059	0.2309	0.8182	2.2132	2.3541	2.1831	1.8483	1.6233	0.9584	1.0261	1.3798	0.8071	0.0215	0.8585	0.4458																			
Significance <sup>1</sup>				*	*	*	*	*	*	*	*	*	*	*	*	*																			
Significance <sup>2</sup>																																			
<b>Date: 04.2011</b>																																			
Spearman's $\rho$	-0.0424	-0.0717	-0.0750	-0.0594	-0.0902	-0.0641	-0.0677	-0.0548	-0.0391	-0.0533	-0.0731	-0.0936	-0.1052	-0.0901	-0.0912	-0.0803																			
t-value	1.4524	2.4421	2.5726	2.0296	3.0849	2.1908	2.3037	1.8633	1.3279	1.8096	2.4700	3.1653	3.5677	3.0402	3.0583	2.6926																			
Significance <sup>1</sup>	o	**	**	*	***	*	*	*	*	*	*	*	***	***	***	***																			
Significance <sup>2</sup>		*	*	*	**	*	*	*	*	*	*	*	***	***	***	***																			
<b>Date: 08.2012</b>																																			
Spearman's $\rho$	-0.0821	-0.0701	-0.0345	-0.0283	0.0141	0.0177	0.0334	0.0454	0.0228	-0.0047	-0.0193	-0.0249	-0.0337																						
t-value	2.7558	2.3492	1.1537	0.9484	0.4691	0.5896	1.1111	1.5089	0.7551	0.1563	0.6368	0.8237	1.1141																						
Significance <sup>1</sup>	**	**	*	*				o																											
Significance <sup>2</sup>	**	**	*	*																															

Legend: <sup>1</sup>) Significance under a one-sided t-test; <sup>2</sup>) Significance under a two-sided t-test; Significance codes: \*\*\*\* 0.1% level, \*\*\* 5% level, \*\* 10% level, \* 10% level.

## Appendix C: correlation-test details: flow~Sharpe ratio

Date:		08.2004	09.2004	10.2004	11.2004	12.2004	01.2005	02.2005	03.2005	04.2005	05.2005	06.2005	07.2005	08.2005	09.2005	10.2005	11.2005
Spearman's $\rho$		0.2375	0.2567	0.3269	0.3389	0.3168	0.2636	0.2442	0.3826	0.3970	0.3899	0.3792	0.4116	0.3719	0.2852	0.2660	0.2484
t-value		6.2754	7.0885	9.1066	9.5796	9.2007	7.5490	7.0049	11.8736	12.2736	12.0499	12.0380	13.0696	11.5917	8.1024	8.0433	7.5475
Significance <sup>1</sup>		***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Significance <sup>2</sup>		***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Date:		12.2005	01.2006	02.2006	03.2006	04.2006	05.2006	06.2006	07.2006	08.2006	09.2006	10.2006	11.2006	12.2006	01.2007	02.2007	03.2007
Spearman's $\rho$		0.2880	0.2824	0.2637	0.2118	0.2576	0.2048	0.2048	0.1572	0.1207	0.1279	0.0892	0.0748	0.0487	0.0398	0.0753	0.0891
t-value		9.0274	8.8052	8.3083	6.5689	8.1176	6.4243	5.1183	4.8924	3.7440	3.9680	2.7648	2.3180	1.5111	1.2375	2.3568	2.1791
Significance <sup>1</sup>		***	***	***	***	***	***	***	***	***	***	***	o	o	***	***	***
Significance <sup>2</sup>		***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Date:		04.2007	05.2007	06.2007	07.2007	08.2007	09.2007	10.2007	11.2007	12.2007	01.2008	02.2008	03.2008	04.2008	05.2008	06.2008	07.2008
Spearman's $\rho$		0.1118	0.2315	0.2390	0.2426	0.2188	0.2237	0.2220	0.2358	0.1696	0.1237	0.1271	0.0812	0.0261	0.0746	0.1709	0.1748
t-value		3.5203	7.4717	7.7823	7.9405	7.1545	7.3125	7.2828	7.7931	5.5831	4.0640	4.1987	2.6911	0.8645	2.4858	5.7514	5.9119
Significance <sup>1</sup>		***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Significance <sup>2</sup>		***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Date:		08.2008	09.2008	10.2008	11.2008	12.2008	01.2009	02.2009	03.2009	04.2009	05.2009	06.2009	07.2009	08.2009	09.2009	10.2009	11.2009
Spearman's $\rho$		0.2066	0.2554	0.2266	0.2160	0.2188	0.1863	0.1655	0.1530	0.1119	0.1402	0.1226	0.1143	0.1466	0.1270	0.0710	0.0733
t-value		7.0116	8.8818	7.7893	7.4151	7.5545	6.4304	5.7219	5.2875	3.8314	4.8260	4.2297	3.9425	5.1159	4.4359	2.4757	2.5473
Significance <sup>1</sup>		***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Significance <sup>2</sup>		***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Date:		12.2009	01.2010	02.2010	03.2010	04.2010	05.2010	06.2010	07.2010	08.2010	09.2010	10.2010	11.2010	12.2010	01.2011	02.2011	03.2011
Spearman's $\rho$		0.0635	0.0809	0.0764	0.1048	0.1912	0.2272	0.2297	0.2257	0.2250	0.2016	0.1385	0.1496	0.1271	0.1672	0.0979	0.1235
t-value		2.1937	2.8191	2.6582	3.6511	6.7096	8.0220	8.0792	7.9467	7.8938	7.0750	4.8333	5.1654	4.3558	5.7861	3.3617	4.2673
Significance <sup>1</sup>		***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Significance <sup>2</sup>		***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Date:		04.2011	05.2011	06.2011	07.2011	08.2011	09.2011	10.2011	11.2011	12.2011	01.2012	02.2012	03.2012	04.2012	05.2012	06.2012	07.2012
Spearman's $\rho$		0.1806	0.1847	0.2161	0.2059	0.1973	0.1907	0.1750	0.1179	0.1288	0.1321	0.1205	0.1524	0.1682	0.1428	0.1136	0.1541
t-value		6.2823	6.3858	7.5740	7.1826	6.8512	6.6285	6.0380	4.0318	4.4070	4.5225	4.0903	5.1919	5.7563	4.8489	3.8171	5.2118
Significance <sup>1</sup>		***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Significance <sup>2</sup>		***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Date:		08.2012	09.2012	10.2012	11.2012	12.2012	01.2013	02.2013	03.2013	04.2013	05.2013	06.2013	07.2013	08.2013			
Spearman's $\rho$		0.1726	0.1536	0.1810	0.1827	0.2074	0.1773	0.1849	0.1809	0.1608	0.1605	0.1303	0.1380	0.1515			
t-value		5.8580	5.1981	6.1434	6.2172	7.0597	6.0054	6.2554	6.1068	5.4049	5.3855	4.3450	4.6138	5.0618			
Significance <sup>1</sup>		***	***	***	***	***	***	***	***	***	***	***	***	***			
Significance <sup>2</sup>		***	***	***	***	***	***	***	***	***	***	***	***	***			

Legend: \*) Significance under a one-sided t-test. \*\*) Significance under a two-sided t-test. Significance codes: \*\*\*\*\*) 0.1% level, \*\*\*) 1% level, \*\*) 5% level, \*) 10% level.

## Appendix D: geographical database coverage: Lipper for Investment Management

# LIPPER

## LIPPER IM

DATABASE BREAKDOWN



ALL DATABASE SUBSCRIPTIONS INCLUDE ACCESS TO INDICES, CURRENCIES, MERGED AND LIQUIDATED FUNDS.

ALL REGION SUBSCRIPTIONS INCLUDE ACCESS TO INTERNATIONAL OFFSHORE AND HEDGE FUND DATA SETS.

### REGION EUROPE

Austrian Mutual Funds (Reg. For Sale)	Polish Mutual Funds (Reg. For Sale)
French Mutual Funds (Reg. For Sale)	Portuguese Mutual Funds (Reg. For Sale)
German Mutual Funds (Reg. For Sale)	Belgian Mutual Funds (Reg. For Sale)
Italian Mutual Funds (Reg. For Sale)	Dutch Mutual Funds (Reg. For Sale)
Italian Pension Funds	Swedish Mutual Funds (Reg. For Sale)
Spanish Mutual Funds (Reg. For Sale)	Finnish Mutual Funds (Reg. For Sale)
Spanish Pension Funds	Norwegian Mutual Funds (Reg. For Sale)
Swiss Mutual Funds (Reg. For Sale)	Danish Mutual Funds (Reg. For Sale)
Swiss Pension Funds	Czech Mutual Funds (Reg. For Sale)
UK Mutual Funds (Reg. For Sale)	Slovak Mutual Funds (Reg. For Sale)
UK Pension and Insurance Funds	Lithuanian Mutual Funds (Reg. For Sale)
Latvian Mutual Funds (Reg. For Sale)	Estonian Mutual Funds (Reg. For Sale)
Hungarian Mutual Funds (Reg. For Sale)	