



# **Socially Responsible Versus Conventional Investment Fund Performance: the Long Run and the Global Financial Crisis**

*Stefano Herzel*  
**University of Rome “Tor Vergata”**  
November 6<sup>th</sup>, 2013

**Co-authored with:**

**Leonardo Becchetti**, *Department of Law, Economics, and Institutions - University of Roma Tor Vergata*

**Ambrogio Dalò**, *Department of Economics and Finance - University of Roma Tor Vergata*

**Rocco Ciciretti**, *Department of Economics and Finance - University of Roma Tor Vergata*



## The Cost of Sustainable Investment

- Cost of acquisition of specific information related to CSR
- Cost of missed diversification opportunities.
- Cost of forced liquidation.



## Relevant Literature

- *Bauer, Koedijk and Otten (2005)*: SRFs significantly outperformed CFs in the UK in the period 1990-2001. The opposite occurred in the US. Learning effect in SRFs which significantly improve their performance over time;
- *Renneboog, Ter Horst and Zhang (2007)*: European and Asian SRFs (while not US and UK) significantly underperform CFs, even though a learning effect reduces the distance over time;
- *Nofsinger and Varma (2012)*: SRFs outperform CFs in the global financial crisis.



## **Our objective**

- Compare performances of SR funds to conventional ones
- Analyze investment styles and portfolio manager's contributions

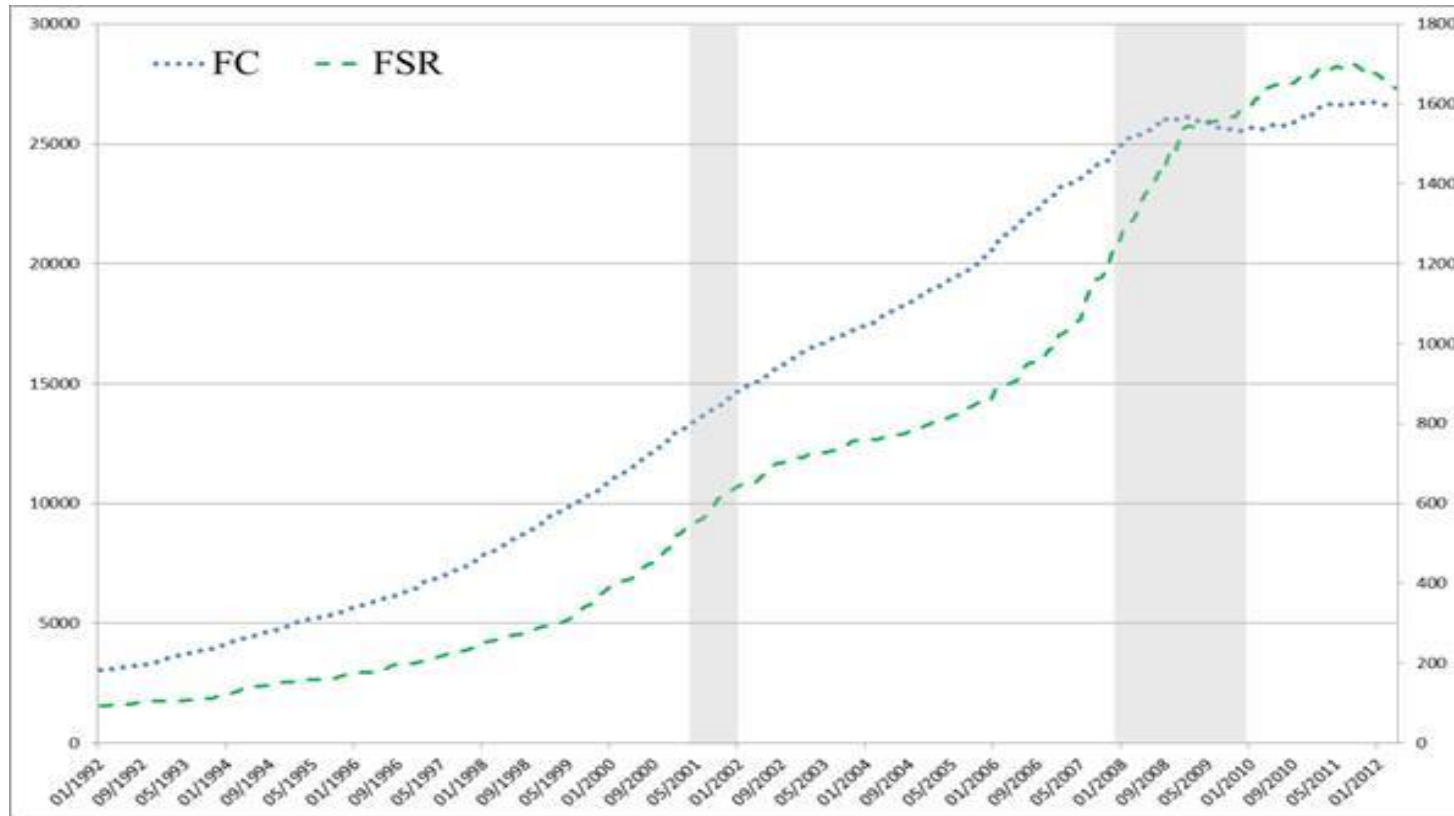


## Data

<b>Time horizon</b>	01-1992/04-2012
<b>Frequency</b>	Monthly; (244 point in time)
<b>Morningstar</b>	Funds' returns Investment style (SR=2,127; Conventional=38,496) Investment area (Geographic/Size)
<b>Risk factors</b>	Market, SMB, HML, MoM, Timing



## SRF and CF 1992-2012





## Descriptive Statistics

Investment Area		Mean	St. Dev
Global	CF	0.652	4.425
	SRF	0.465	4.663
	<i>SRF-CF</i>	-0.187	2.008
North America	CF	0.728	4.449
	SRF	0.632	4.529
	<i>SRF-CF</i>	-0.096	0.669
Europe	CF	0.690	4.406
	SRF	0.709	5.254
	<i>SRF-CF</i>	0.019	2.726
Asia/Pacific	CF	0.849	4.951
	SRF	1.072	6.031
	<i>SRF-CF</i>	0.224	2.741
Investment Sector			
Large	CF	0.578	3.966
	SRF	0.620	4.601
	<i>SRF-CF</i>	0.042	1.713
Middle-Small	CF	0.857	4.880
	SRF	0.742	4.761
	<i>SRF-CF</i>	-0.115	1.457



## Intuition from Descriptive Statistics

- i) Absence of a clear cut dominance of one style over the other;
- ii) SRFs perform better during the financial crisis;
- iii) Global funds perform no better than sectorial funds.





## The General Model

We estimate the following models at the aggregate level:

$$R_t - R_{ft} = \alpha + \beta_1 * (R_{mt} - R_{ft}) + \beta_2 * SMB_t + \beta_3 * HML_t + \beta_4 * MoM_t + \beta_5 * Timing_t + \varepsilon_t$$

where  $R_t$  is the monthly average returns (**equally weighted**) for the given (SRF or CF) investment style superfund;  $R_{ft}$  is the risk free asset;  $R_{mt}$  is the stock market index used as benchmark for each area/size specification;  $SMB_t$ ,  $HML_t$ ,  $MoM_t$  are the standard Fama-Frech-Carhart risk factors; and  $Timing_t$  (Bollen e Busse, 2001) captures the timing of the investment

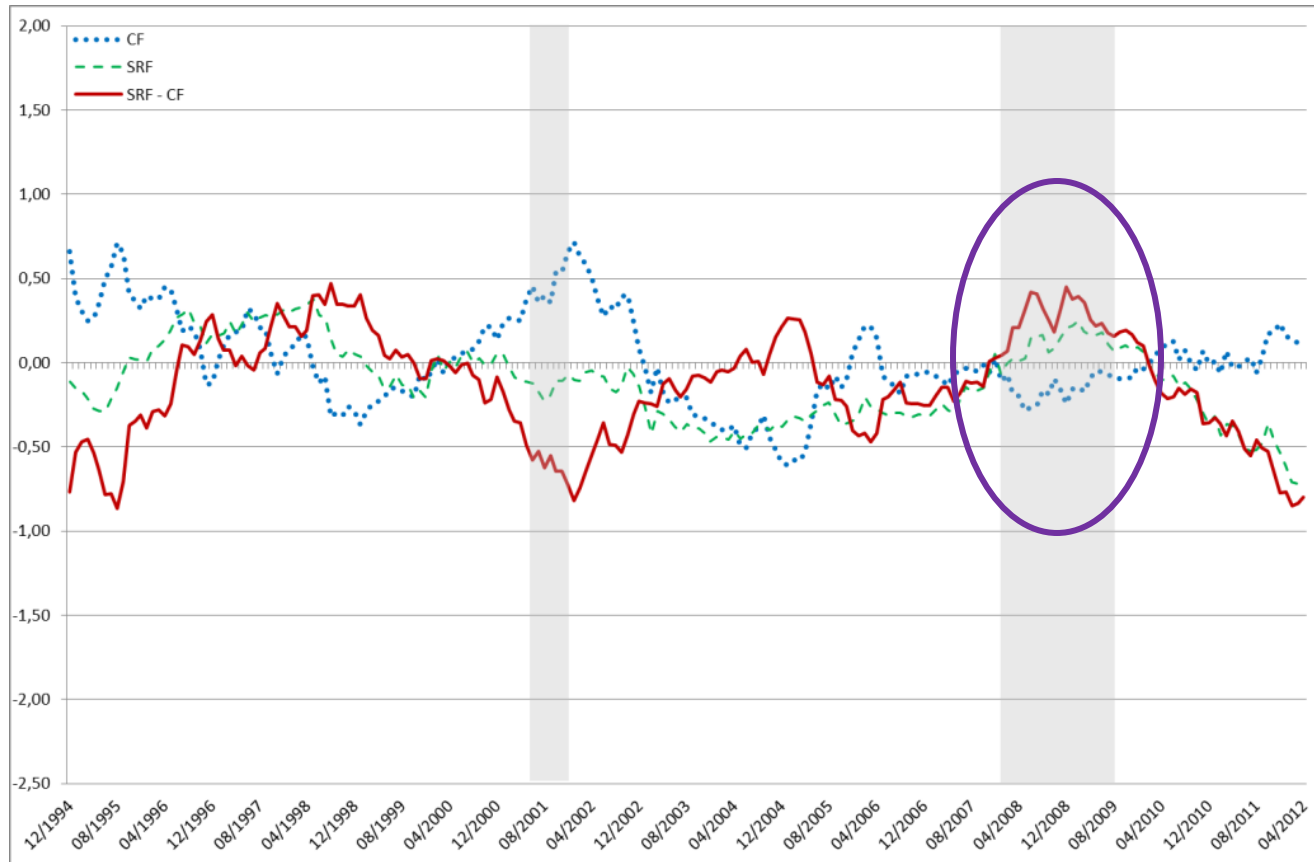


## Results (Market Model)

Investment Area		$\alpha$	$\beta$
Global	CF	0.056 (0.123)	<b>0.906***</b> (0.028)
	SRF	<b>-0.200**</b> (0.088)	<b>1.011***</b> (0.020)
	<i>SRF-CF</i>	<b>-0.256**</b> (0.127)	<b>0.105***</b> (0.028)
North America	CF	-0.070 (0.055)	<b>0.988***</b> (0.012)
	SRF	<b>-0.185***</b> (0.045)	<b>1.013***</b> (0.010)
	<i>SRF-CF</i>	<b>-0.116***</b> (0.043)	<b>0.024***</b> (0.010)
Europe	CF	0.132 (0.156)	<b>0.729***</b> (0.030)
	SRF	-0.068 (0.068)	<b>1.015***</b> (0.013)
	<i>SRF-CF</i>	-0.200 (0.150)	<b>0.286***</b> (0.029)
Asia/Pacific	CF	0.115 (0.134)	<b>0.715***</b> (0.021)
	SRF	0.198 (0.179)	<b>0.852***</b> (0.028)
	<i>SRF-CF</i>	0.083 (0.169)	<b>0.137***</b> (0.026)
Investment Sector			
Large	CF	0.078 (0.091)	<b>0.856***</b> (0.021)
	SRF	0.056 (0.125)	<b>0.965***</b> (0.029)
	<i>SRF-CF</i>	-0.021 (0.107)	<b>0.109***</b> (0.024)
Middle Small	CF	0.096 (0.061)	<b>0.897***</b> (0.011)
	SRF	0.037 (0.111)	<b>0.832***</b> (0.021)
	<i>SRF-CF</i>	-0.060 (0.092)	<b>-0.065***</b> (0.017)



## Results (recursive alpha MM)



Global (3 Year Estimation Window)

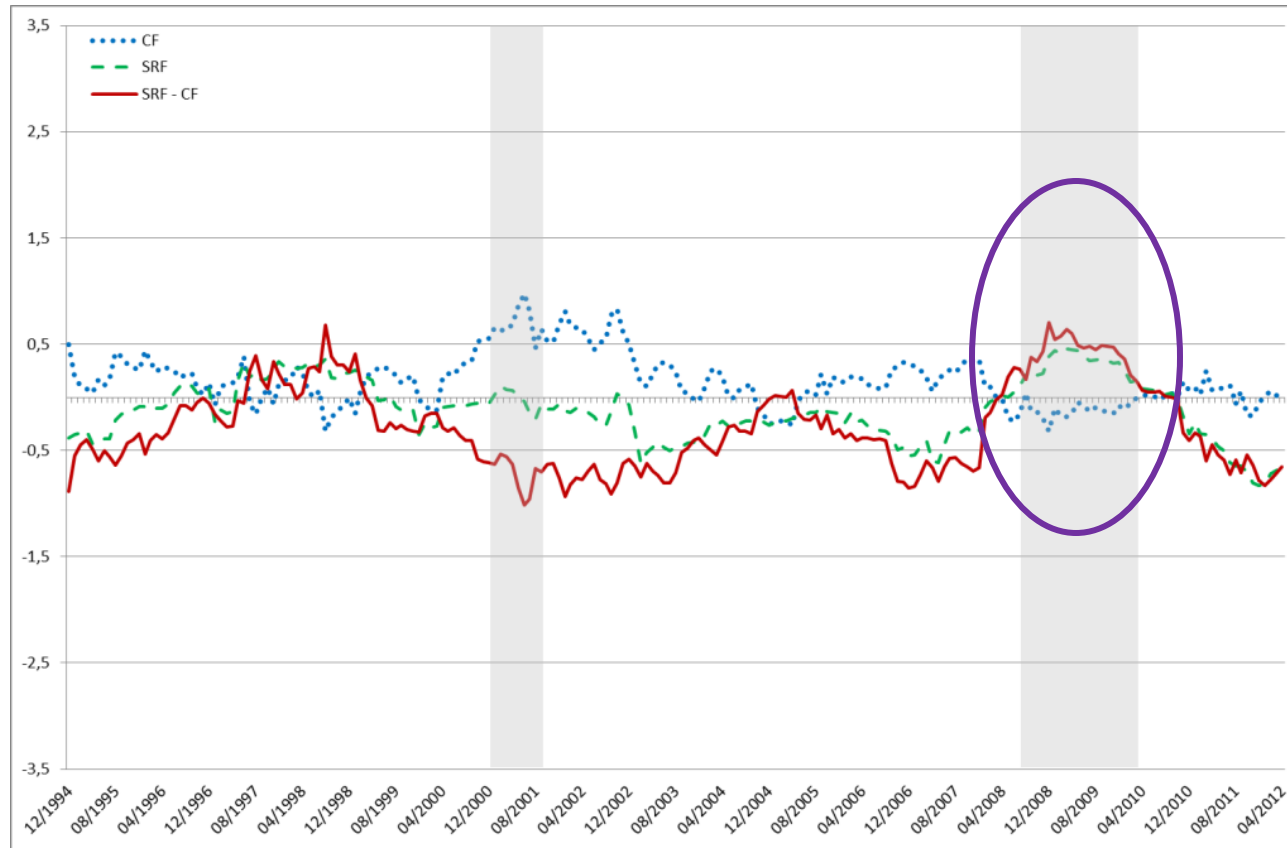


## Results (Multi Factor Model)

<b>Investment Area</b>		<b><math>\alpha</math></b>	<b><math>\beta</math></b>
<b>Global</b>	CF	<b>0.312**</b> (0.140)	<b>0.871***</b> (0.028)
	SRF	-0.071 (0.099)	<b>0.995***</b> (0.019)
	<b>SRF-CF</b>	<b>-0.383**</b> (0.154)	<b>0.124***</b> (0.030)
<b>North America</b>	CF	<b>-0.084**</b> (0.041)	<b>0.957***</b> (0.008)
	SRF	<b>-0.166***</b> (0.047)	<b>0.988***</b> (0.009)
	<b>SRF-CF</b>	<b>-0.083*</b> (0.044)	<b>0.031***</b> (0.009)
<b>Europe</b>	CF	0.462 (0.187)	<b>0.710***</b> (0.032)
	SRF	0.004 (0.073)	<b>1.027***</b> (0.013)
	<b>SRF-CF</b>	<b>-0.458*</b> (0.177)	<b>0.318***</b> (0.031)
<b>Asia/Pacific</b>	CF	0.218 (0.157)	<b>0.712***</b> (0.022)
	SRF	<b>0.334*</b> (0.187)	<b>0.862***</b> (0.026)
	<b>SRF-CF</b>	0.116 (0.185)	<b>0.151***</b> (0.025)
<b>Investment Sector</b>			
<b>Large</b>	CF	0.140 (0.109)	<b>0.863***</b> (0.022)
	SFR	0.078 (0.146)	<b>0.986***</b> (0.030)
	<b>SRF-CF</b>	-0.062 (0.133)	<b>0.123***</b> (0.027)
<b>Middle/Small</b>	CF	<b>0.285***</b> (0.069)	<b>0.879***</b> (0.011)
	SRF	<b>0.357***</b> (0.126)	<b>0.820***</b> (0.021)
	<b>SRF-CF</b>	0.072 (0.101)	<b>-0.059***</b> (0.016)



## Results (recursive alpha MFM)



Global (3 Year Estimation Window)



## Intuition from Estimations at Aggregate Level

The three main facts from descriptive findings are confirmed by the econometric estimations at aggregate level and in the two rolling windows (3 and 5 Year):

- i) absence of a clear cut dominance of one investment style over the other;
- ii) Better performance of the SR superfunds around the crisis;
- iii) superfunds operating in specific investment area do not suffer from geographical constraint with respect to the Global superfund.



## Are Results Robust?

We provide two different fund-by-fund approaches to check the robustness of our previous (aggregate) results:

- 1) We first estimate the market model and the multi factor model at fund's level, then we define a *matching* procedure to identify pairs of SRFs/CFs with minimum distance in terms of different risk factors. In this way we create two balanced samples for each matching proposed. Second, we compare the distribution coming from the difference between a pair of SRF/CF alphas.
- 2) We estimate the market model and the multi factor model on unbalanced and balanced samples using a panel fixed effect procedure.



## 1) Fund by Fund Estimation

We estimate the following models at fund  $i$  level:

$$R_t - R_{ft} = \alpha + \beta_1 * (R_{mt} - R_{ft}) + \beta_2 * SMB_t + \beta_3 * HML_t + \beta_4 * MoM_t + \beta_5 * Timing_t + \varepsilon_t$$

where  $R_t$  is the monthly returns for fund  $i$ , calculated as the *natural log* of the ratio between net asset value in  $t$  and net asset value in  $t-1$ ;  $R_{ft}$  is the risk free asset;  $R_{mt}$  is the stock market index used as benchmark for each area/size specification;  $SMB_t$ ,  $HML_t$ ,  $MoM_t$  are the standard Fama-Frech-Carhart risk factors; and  $Timing_t$  captures the timing of the investment.





## 1) Matching

$$d(i, j) = \left( \sum_{k=1}^K |\beta_{ik} - \beta_{jk}| \right)$$

We select the pairs of *i-th* SRF and *j-th* CF which minimizes the distance  $d(i, j)$

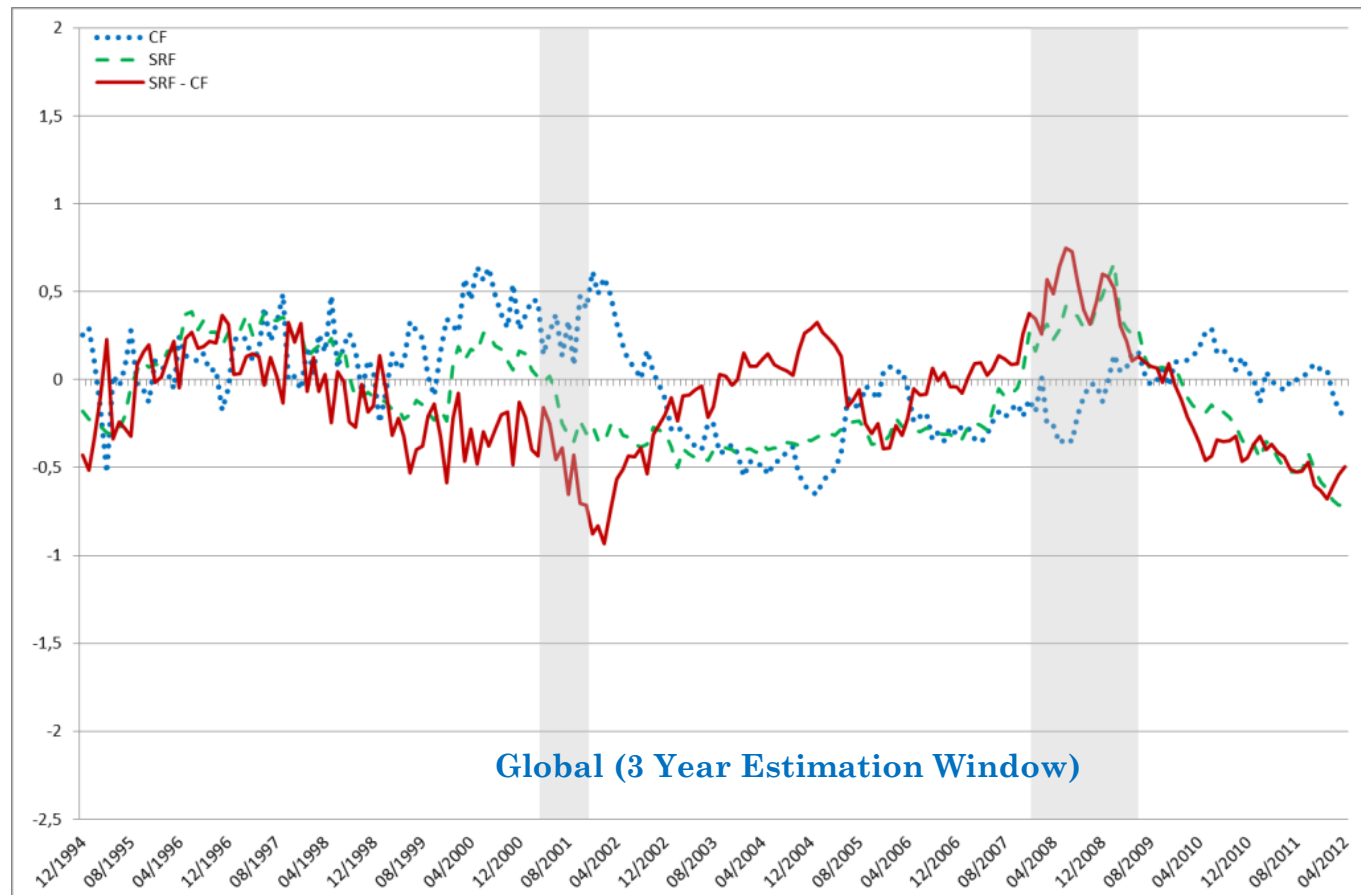


## 1) Results: Market Model

Investment Area/Sector		Over All	3 Years	
		01/1992 04/2012	05/2000 04/2003	05/2006 04/2009
Global	$\alpha_{SRF} - \alpha_{CF}$	<b>-0.277***</b>	-0.089	<b>0.218***</b>
	p-value	0.000	0.220	0.000
	N	1154	271	815
North America	$\alpha_{SRF} - \alpha_{CF}$	<b>-0.066**</b>	<b>0.181***</b>	<b>0.086***</b>
	p-Value	0.033	0.009	0.027
	N	376	203	299
Europe	$\alpha_{SRF} - \alpha_{CF}$	0.007	<b>0.745***</b>	<b>0.244***</b>
	p-value	0.856	0.000	0.000
	N	457	217	374
Asia/Pacific	$\alpha_{SRF} - \alpha_{CF}$	<b>0.236***</b>	<b>1.135***</b>	-0.074
	p-value	0.003	0.000	0.690
	N	89	27	66
Investment Sector				
Large	$\alpha_{SRF} - \alpha_{CF}$	<b>0.094***</b>	<b>0.349***</b>	<b>0.275***</b>
	p-value	0.000	0.000	0.000
	N	1023	485	808
Middle-Small	$\alpha_{SRF} - \alpha_{CF}$	<b>-0.112*</b>	0.062	<b>-0.103*</b>
	p-value	0.060	0.710	0.054
	N	195	94	166



## 1) Results (Recursive alpha MM)



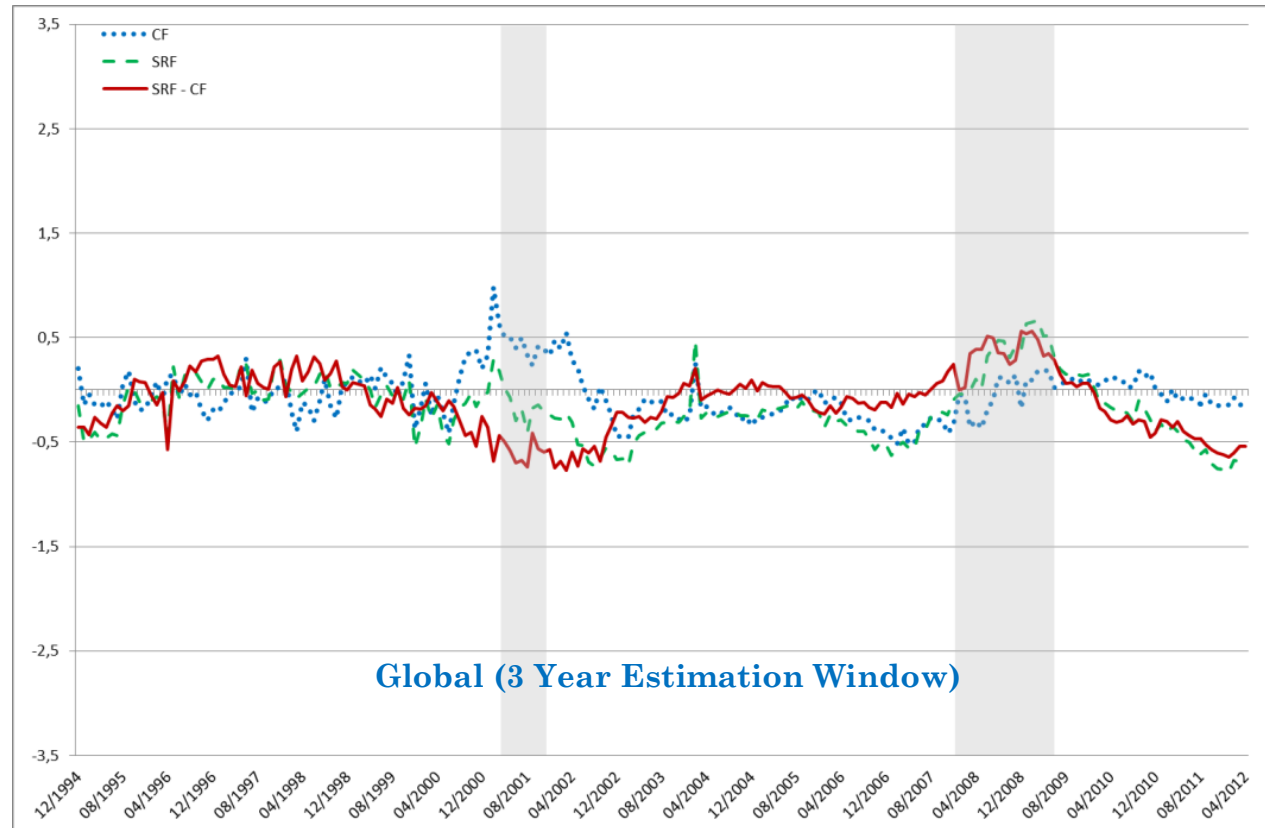


## 1) Results: Multi Factor Model

Investment Area/Sector		Over All	3 Years	
		01/1992 04/2012	05/2000 04/2003	05/2006 04/2009
Global	$\alpha_{FSR} - \alpha_{FC}$	-0.397***	-0.253***	0.325***
	p-value	0.000	0.001	0.000
	N	1154	271	815
North America	$\alpha_{FSR} - \alpha_{FC}$	-0.092**	0.078	0.153
	p-Value	0.012	0.281	0.109
	N	376	203	299
Europe	$\alpha_{FSR} - \alpha_{FC}$	-0.094***	0.399***	0.201***
	p-value	0.000	0.000	0.000
	N	457	217	374
Asia/Pacific	$\alpha_{FSR} - \alpha_{FC}$	0.206**	0.666**	-0.103
	p-value	0.025	0.041	0.544
	N	89	27	66
<b>Investment Sector</b>				
Large	$\alpha_{FSR} - \alpha_{FC}$	-0.035*	0.369***	0.286***
	p-value	0.098	0.000	0.000
	N	1023	485	808
Middle/Small	$\alpha_{FSR} - \alpha_{FC}$	-0.123**	0.091	0.179*
	p-value	0.014	0.487	0.069
	N	195	94	166



## 1) Results (Recursive alpha MFM)





## 2) Panel Estimation

We estimate the following models at fund level:

$$R_{it} - R_{ft} = \alpha_i + \beta_1 * (R_{mt} - R_{ft}) + \beta_2 * SMB_t + \beta_3 * HML_t + \beta_4 * MoM_t + \beta_5 * Timing_t + \varepsilon_{it}$$

where  $R_{it}$  is the monthly returns for fund  $i$  (SRF or CF), calculated as  $\ln$  of the ratio between net asset value in  $t$  and net asset value in  $t-1$  of all individual funds;  $R_{ft}$  is the risk free asset;  $R_{mt}$  is the stock market index used as benchmark for each area/size specification;  $SMB_t$ ,  $HML_t$ ,  $MoM_t$  are the standard Fama-Frech-Carhart risk factors; and  $Timing_t$  captures the timing of the investment.



## 2) Results: Panel Estimation

	MM (1)	FFC (2)	FFC+Timing (3)
$\alpha$	0,125*** (0,007)	0,144*** (0,007)	0,195*** (0,007)
$\beta_1$	0,835*** (0,000)	0,814*** (0,000)	0,809*** (0,000)
$\beta_2$		0,181*** (0,001)	0,177*** (0,001)
$\beta_3$		-0,076*** (0,001)	-0,077*** (0,001)
$\beta_4$		-0,033*** (0,000)	-0,036*** (0,000)
$\beta_5$			-0,215*** (0,004)
SRF	-0,130*** (0,012)	-0,143*** (0,012)	-0,142*** (0,012)
Crisis	-0,456*** (0,004)	-0,410*** (0,004)	-0,392*** (0,004)
SRF*Crisis	0,173*** (0,020)	0,174*** (0,019)	0,177*** (0,019)
Global	-0,011 (0,008)	-0,012 (0,007)	0,001 (0,007)
N. America	0,041*** (0,008)	0,026*** (0,008)	0,035*** (0,008)
Europe	0,096*** (0,008)	0,080*** (0,008)	0,087*** (0,008)
Large	-0,071*** (0,005)	-0,076*** (0,005)	-0,076*** (0,005)
M/S	-0,108*** (0,007)	-0,094*** (0,007)	-0,093*** (0,007)
R <sup>2</sup>	0,575	0,584	0,584
N	51834	51834	51834



## Conclusion

The three main results, confirmed at **aggregate** and **fund-by-fund** level with *static* and *recursive* estimation in both market and multi factor model, also by panel regression.

1. No clear cut dominance of one investment style on the other
2. SRFs perform better in a post-crisis period (*Nofsinger and Varma, 2012*);
3. SRFs/CFs with limited diversification constraint (Investment or Size investment Area) do not underperform the Global SRFs/CFs.





*Thank you*

**Comments are welcome**