The Price of Taste for Socially Responsible Investment

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Abstract

The increasing demand overtime for socially responsible investments (SRIs) might be associated to: i) the risk characteristics of responsible assets, and ii) the investors' *taste* for such assets. While the former is relatively known, the latter entails that investors screen stocks out of their portfolios based purely on their *taste* for such assets, uncorrelated to risk and return considerations. In this paper, we disentangle the different contributions of risk and *taste* in generating risk-adjusted returns for responsible assets. We are particularly cautious with respect to the risk-adjustment of returns, and by ruling out the both systematic and residual risk components, we try to quantify whether and to what extent investors pay a price, in terms of lower returns, due to their *taste* for responsible assets. Using a sample of 1000 firms between 2005 and 2014, we find evidence for the *taste* effect and estimate the associated underperformance at 4.8% annually.

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1 Introduction

The US Social Investment Foundation (2016) reports that the total value of assets under management in the US subject to Socially Responsible Investments (SRIs) screening amount to $6.57 trillion in 2014 – an increase of 76% with respect to 2012. SRI funds now account for more than one out of six dollars under professional management in the US. The same trend is registered in Europe where the assets under management subject to SRIs reached almost € 158 billion at the end of June 2016 – an increase of 16% (VIGEO, 2016).[1] What drives this increasing demand for SRIs? The demand might be driven by two different effects: i) the risk characteristics of responsible assets, and ii) the investors *taste* for such assets. Of course, both risk and *taste* effects for responsible assets can coexist. A recent case study on the Desjardins SRI fund indeed documents that even though their clients take ethical considerations into account, stock's returns still play a prominent role in their investment decisions (Diouf et al., 2016). A possible explanation for the risk effect, is that responsible assets exhibit financial risk characteristics that appeal to investors. For example, SRI strategies might reduce exposure to stakeholder risk (Freeman, 1984), such as potential consumer boycotts or environmental scandals, that have an impact on stock returns. In this view, social responsibility as such, is only an indirect concern to investors. For the *taste* effect instead, an intuitive explanation is that more and more investors decide to compose their portfolios according to the degree of assets social responsibility level. This type of investors preference are unrelated to assets risk-return characteristics, and they have been labeled by Fama and French (2007) as *taste* for assets.[2] It thus remains an empirical question which demand effect dominates.

Generally, systematic screening of certain assets based on investors preferences, leads to a return premium on the screened assets in equilibrium (see e.g. Merton, 1987, Dam and Scholtens, 2015, or

[1] Corporate Social Responsibility (CSR) is generally seen as a departure from the goal of profit maximization to the broader strategy of interests' satisfaction for a wider set of stakeholders. The European Commission (2001) define socially responsible firms as those that "integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis". Alternatively the World Bank Institute (2003) defines CSR as "the commitment of business to contribute to sustainable economic development, working with employees, their families, the local community and society at large to improve quality of life, in ways that are both good for business and good for development". The most common form of SRI entails screening out firms that underperform based on various CSR indicators.

[2] The literature attaches different labels sometimes to the taste effect. For example, Derwall et al., 2011 use the term *values-driven* investment approach to identify any social investment with non-pecuniary motivations, while Renneboog et al. (2008) label it as the *price of ethics*, which is the price paid by investors for investing in responsible firms.

Heinkel et al., 2001).[3] The intuition is that a systematic lower demand leads to a systematic lower price and thus a higher dividend-price ratio.[4] Specifically, in the strand of literature on the existing relation between social responsibility and financial performance, compelling evidence is provided by Hong and Kacperczyk (2009), who document that the so-called sin stocks earn a positive abnormal return of about 2.5% annually. However, the vast majority of the literature find mixed evidences about the existing relation between risk-adjusted returns and corporate social responsibility. Bauer et al. (2007, 2006, 2005b), and Renneboog et al. (2008) find that SRI generates negative risk-adjusted returns, whereas Kempf and Osthoff (2007) Glushkov and Statman (2009) find that SRI generates positive risk-adjusted returns. Yet, the return advantages is offset by the adoption of negative screening criteria that exclude sin stocks from the opportunity set.[5] Moreover, Bauer et al. (2005a) find that risk-adjusted returns increase as responsibility increases, wheres Becchetti et al. (2016) and de Haan et al. (2012) find an opposite relation.

In this paper, we disentangle the different contributions of risk and *taste* in generating risk-adjusted returns for responsible assets. In particular, the main contribution of our paper is that we isolate the price of *taste* for responsible assets by ruling out both systematic and residual risk components (see Galema et al. (2008) for a similar approach). Our results indicate that investors exhibit indeed a *taste* for responsible assets. We find a significant and negative relation between social responsibility scores and risk-adjusted returns, that is robust to alternative model specifications. We interpret the portion of under performance related to social responsibility scores as price of *taste* payed by social responsible investors in terms of lower returns which amount to 4.8% annually.

The paper is organized as follows. In the next section, we explain our methodology in more detail. In section 3, we describe our dataset and provide descriptive statistics. Section 4 shows the results and Section 5 concludes.

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[3] These papers highlight that it is a misconception that such return differences can be arbitraged away be "neutral" investors.

[4] Alternatively, more responsible firms may face higher operating costs, leading to lower profits, but investors' taste for SRI make them willing to hold such firms in their portfolio despite the lower return.

[5] With positive screening criteria investors compose a portfolio by choosing among stocks with the higher social responsible performance. The best-in-class is similar to positive screening, with the exception that a portfolio is also balanced across industry sectors. Negative screening entails that investors, for example, eliminate sin stocks from the opportunity set or delete those with the lowest social responsible performance.

2 Methodology

In order to verify weather and to what extent there exist a *taste* effect for responsible assets, we rule out from risk-adjusted returns both systematic and residual risk components. In doing so, we adopt the Fama-Macbeth two step cross-sectional regression procedure (Black et al., 1972, Fama and MacBeth, 1973), and as first step we run for each asset i a time-series regression to estimate a multifactor model including K risk factors:

$$R^e_{i,t} = \alpha_i + \sum_{k=1}^{k} \beta_{i,k} f_{k,t} + u_{i,t}; \qquad t = 1, ..., T. \tag{1}$$

where $R^e_{i,t}$ is the excess return of asset i at time t; α_i is the intercept, or risk-adjusted return of asset i; $f_{k,t}$ is risk factor k with $k = 1, ..., K$; and $u_{i,t}$ is the error term.[6] Recalling that responsible assets might exhibit financial risk characteristics that appeal to investors, such as their lower exposition to stakeholder risk, we introduce in model (1) a k^{th} risk factor to capture the stakeholder risk exposition, labeled as CSR risk factor (Becchetti et al., 2016 and de Haan et al., 2012). By doing so it is possible to control for more systematic risk components with respect to those proposed by the literature so far, and to clearly identify weather or not an unobserved risk-adjusted return is the result of an incorrect specified asset pricing model or is a truly *taste* effect. Clearly there is merit in including a CSR risk factor in empirical analyses, but it does not take away the concern that any reported out-performance is a mere reflection of an omitted risk component

We acknowledge that the omitted risk factor problem is an ongoing theoretical issue, that can be mitigated by estimating from model (1) a measure of residual risk namely idiosyncratic volatility (IV). The rationale behind this approach is that if it is possible to correctly specify a K risk factor model, the residual risk $\left(IV_i = \sqrt{\sigma^2_{i,u}}\right)$ will truly be idiosyncratic and exhibit no explanatory power in the cross-sectional regression. It is possible to show however, that by omitting the k^{th} risk factor, the resulting model is incorrectly specified with $K-1$ risk factors, the residual risk $\left(IV_i = \sqrt{\lambda^2_k \beta^2_{k,i} + \sigma^2_{i,u}}\right)$ is now correlated with the k^{th} omitted risk factor and therefore it will have explanatory power in the cross-sectional regression. There is ample literature pointing out the relationship between return and idiosyncratic volatility: see among others, Ang et al. (2006, 2009),

[6] For a clear tractability, in this section we will refer our explanations to a generic asset i. From the next sections instead, we will refer our results to portfolios or firms.

Bali and Cakici (2008), Blitz and Vliet (2007), and Fu (2009). Including the residual risk (IV) in the cross-sectional analysis might have two downside effects: i) it may blur the analysis by adding noise, and ii) it might be positively correlated with factor betas and then the analysis may suffer from multicollinearity making hard to interpret the estimated risk premiums. Nevertheless, our focus is primarily on assessing the price of *taste*, that itself requires to control for as many sources of risk as possible. We thus conclude that including the IV in the analysis is an appropriate way to cope the more severe omitted risk factor problem.

We now introduce the second step of our analysis to relate the cross-sectional average returns of each asset i to the residual risk component and the *taste* effect for responsible assets as follows:

$$\bar{R}_i^e = \lambda_0 + \lambda_S \bar{S}_i + \lambda_{IV} IV_i + \sum_{k=1}^{K} \lambda_k \beta_{i,k} + \epsilon_i; \qquad i = 1, ..., N. \tag{2}$$

where $\bar{R}_i^e$ is the average excess return for asset i over the entire sample period, λ_0 is the intercept, $\bar{S}_i$ is the average responsibility score, IV_i and $\beta_{i,k}$ are the idiosyncratic volatility and the risk factors' betas estimated in model (1), respectively; ϵ_i is pricing error. Knowing that the average excess returns in model (1) is equal to model (2), by relating each other and solving for the risk-adjusted returns (α_i) we are able to decompose the latter as follows:

$$\alpha_i = \tilde{\lambda} + \lambda_S \bar{S}_i + \lambda_{IV} IV_i \tag{3}$$

where $\tilde{\lambda} = \lambda_0 + \epsilon_i$ is the model constant that includes the asset specific pricing error.[7] By using the Fama-Macbeth two step cross-sectional regression procedure, and including $\bar{S}_i$ and IV_i we take the analysis one step further with respect to the existing literature so far. In particular, we are able to decompose the risk-adjusted returns (α_i) separating the residual risk (IV_i) from the variation in the social responsibility scores ($\bar{S}_i$) leaving a part an unexplained component ($\tilde{\lambda}$). Our focus is on the parameter λ_S, which identifies whether and to what extent, the *taste* for responsible assets is priced in the cross-section of returns. Our hypothesis is that λ_S is negative, reflecting a price for

[7] If there are no taste effects, and the asset pricing model is correctly specified, so that $\lambda_0 = \lambda_{IV} = 0$, we have $\alpha_i = \epsilon_i$. This illustrates that in this case the time-series risk-adjusted return, α_i, is sufficient to assess out-performance and there is no need to run cross-sectional regressions.

responsible assets payed by investors in the form of lower risk-adjusted return.

We have three main motivations for including the social responsibility score in the cross-sectional regressions, instead of simply focusing on the risk-adjusted returns. First, this approach allows us to perform the analysis at the firm level as well.[8] Second, assets that have a lower responsibility score are likely to be subject to more severe screening, so that there should be a relation between the responsibility scores and the risk-adjusted return. Third, the approach allows us to filter out any pricing error (reflected by ϵ_i) that may exist for other reasons than taste; for example measurement error.

3 Data and Descriptive Statistics

To build our unique dataset we retrieve data from different sources. We retrieve at firm level stock price and the market value of equity (ME) from Datastream on monthly bases. Responsibility score (S) at firm level is retrieved from VIGEO on yearly basis.[9] The Responsibility score (S) is used to build both the testing assets used for our main analysis and the CSR risk factor to capture the stakeholder risk. In what follows, the testing assets are the CSR quintiles portfolios generated from the sorting variable S. Monthly excess returns for those portfolios are calculated yearly from July of year t to the following June in $t+1$. To build our CSR Risk factor we use the same procedure, but in this case, we independently sort by ME and S, considering the median as cut-offs. The resulting CSR risk factor ($Worst\ Minus\ Best - WMB$) is then computed as the difference between the two portfolios composed by stocks with the lower responsibility scores (*Worst*), and the two portfolios composed by stocks with the higher responsibility scores (*Best*). Finally from the Fama-French we retrieve the additional risk factors: the excess return of the market (R^e_{mkt}), the size risk factor (SMB), the value risk factor (HML), and the momentum risk factor (MoM). For additional details about

[8] This in contrast with a cross-section of firm-level pricing errors resulting from time-series regressions, which is not informative – hence the conventional construction of test portfolios in pure time-series analysis.

[9] VIGEO is a leading ethical rating agency that analyzes firms included in the STOXX Global 1800 Index. It assesses CSR performances by mean scores that are assigned to the firms under analysis every 18 months. The presence of litigations may lead to an earlier revision of the score. Its dataset covers the 95.3% of STOXX Global 1800 Index in terms of market capitalization (65% of companies). Other companies are included if they are constituents of specific national indexes (i.e. S&P/MIB for Italy). The STOXX Global 1800 Index provides a broad investable representation of the Europe, North America and Asia/Pacific markets. This Index contains 600 European, 600 American and 600 Asia/Pacific region stocks represented by the STOXX Europe 600 Index, the STOXX North America 600 Index and the STOXX Asia/Pacific 600 Index. The Responsibility scores (S) is a result of six different dimensions: Business Behavior (S^{BB}), Corporate Governance (S^{CG}), Community Involvement (S^{CIN}), Environment (S^{ENV}), Human Resources (S^{HR}), Human Rights (S^{HRT}).

the risk factors above, see: Fama and French (1993, 1996), Carhart (1997); Jegadeesh and Titman (1993) and Becchetti et al. (2016). We end up with an unbalanced panel of 1000 firms (295 U.S., 512 Europe and 193 Asia-Pacific) unique firms for a total number of 5319 observations, between July 2005 to June 2014 (108 months).

Table 1: Descriptive Statistics for Responsibility Scores at Firm level

The table reports the main descriptive statistics for the Responsibility score (S) and the six dimensions as reported in footnote 9: Business Behavior (S^{BB}), Corporate Governance (S^{CG}), Community Involvement Global (S^{CIN}), Environment (S^{ENV}), Human Resources (S^{HR}), Human Rights (S^{HRT}). $^{*}p-value < 0.1$, $^{**}p-value < 0.05$ and $^{***}p-value < 0.01$

	Panel A						**Panel B**						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	$Mean$	Min	Max	Med	$St.Dev$	N	S	S^{BB}	S^{CG}	S^{CIN}	S^{ENV}	S^{HR}	S^{HRT}
S	41.49	31.00	69.00	40.00	8.08	5319	1.00						
S^{BB}	44.52	7.00	82.00	44.00	10.93	5319	0.60***	1.00					
S^{CG}	50.87	1.00	91.00	52.00	14.95	5319	0.22***	-0.02	1.00				
S^{CIN}	41.16	0.00	94.00	40.00	16.77	5319	0.53***	0.32***	0.01	1.00			
S^{ENV}	37.40	0.00	86.00	37.00	14.23	5319	0.71***	0.28***	-0.19***	0.39***	1.00		
S^{HR}	34.22	2.00	81.00	33.00	14.72	5319	0.72***	0.34***	-0.19***	0.30***	0.52***	1.00	
S^{HRT}	44.23	10.00	86.00	43.00	12.34	5319	0.68***	0.46***	-0.10***	0.34***	0.44***	0.60***	1.00

Table 1 reports descriptive statistics for all responsibility scores at firm level. Scores range, in principle, between 0 and 100, where higher values are associated with higher level of responsibility.[10] The average value of the Responsibility (S) score is 41.49 and it is higher than the median, which is equal to 40.00, suggesting that the more than the fifty percent of the firms have a score lower than the average (Panel A, column 1 and 4). Breaking down the Responsibility score (S) to

[10] Following the VIGEO methodological approach, we discard all firms that have a Responsibility score (S) lower than 30. In doing so we exclude firms that do not have enough information to measure the level of social responsibility. This procedure does not generate a selection bias in our final dataset because we discard only firms for which is not possible to assess any degree of responsibility and not firms with low responsibility levels. The VIGEO approach is applied only to Responsibility score (S) but leaving each different dimensions free to vary between 0 and 100.

different dimensions, the lowest average responsibility score is 34.22 for Human Resources dimension (Panel A, column 1), while the highest average responsibility score is 50.87 for the Corporate Governance dimension (Panel A, column 1) which is even higher than the average S. With the exception of the Corporate Governance dimension, the main takeaways in Table 1 is that the Responsibility score (S) is highly and positively correlated with all the six dimensions (column 7). The highest average value jointly with the lowest correlation registered, suggest that the Corporate Governance dimension does not represent a peculiar social responsible characteristic.

To move towards our portfolio analysis, we report in Table 2 the overall period average of monthly excess return ($\bar{R}_p^e$) and its standard deviation (σ_p) for the CSR quintiles portfolios p; the average of yearly Responsibility score ($\bar{S}_p$); and the average of firms used for the portfolio composition (N_{fp}). In line with the existing literature (Becchetti et al., 2016,de Haan et al., 2012, Humphrey et al., 2012), we observe that the overall period average of monthly excess return slightly declines as we move from the *Worst* to the *Best* portfolio (column 1), with the exception of the standard deviation (column 2).[11] A strategy that buys the Worst portfolio and sells the Best portfolio yields an additional extra return of 7.2 percentage points on annual basis. The question remains whether the lower returns of responsible firms are mainly driven by risk or *taste*, which we address in the next section.

The descriptive statistics, of our CSR risk factors and other commonly used risk factors in literature are reported in Table 3. The higher average premiums of momentum and CSR risk factor suggest that they could account for much cross-sectional variation in the average stocks excess returns (Panel A, column 1). Instead the correlations between the CSR risk factor and those most commonly used in the literature are fairly low yet, negative and significant for the size risk factor, not significant for the remaining risk factors (Panel B). These results suggest that multicollinearity should not affect the estimates of a multifactor model including CSR risk factor.

[11] The absence of a clear monotonic pattern in average excess returns is not uncommon in literature. For example, also in Carhart (1997) average excess returns slightly decrease for the portfolios formed on one-year lagged returns.

Table 2: Descriptive Statistics for the Value Weighted CSR Quintiles Portfolios

The table reports the overall period average monthly excess return and its standard deviation for the CSR quintiles portfolios, the average responsibility score and the average percentage of firms used for the portfolio composition. All the variables are computed across all the sample period of 108 months. *Worst* is the portfolio composed by firms with lower responsibility scores and *Best* is the portfolio composed by firms with higher responsibility scores. The *Diff* is the difference portfolio built as difference in monthly return series among the *Worst* and the *Best* portfolios (*Diff* = *Worst* - *Best*)

	(1)	(2)	(3)	(4)
	$\bar{R}_p^e$ (%)	σ_p (%)	$\bar{S}_p$	N_{fp} (%)
$Worst$	0.53	6.83	31.27	8.31
2	0.35	7.35	32.49	7.89
3	0.43	6.91	33.63	6.09
4	0.88	5.91	34.72	6.84
5	0.80	6.17	35.92	7.00
6	0.61	6.18	37.09	6.56
7	0.81	5.40	38.22	6.20
8	0.86	5.85	39.33	5.64
9	0.35	6.67	40.39	4.73
10	0.54	6.19	41.55	5.80
11	0.36	6.43	42.82	5.40
12	0.57	5.30	44.07	4.89
13	0.72	5.50	45.29	5.07
14	0.55	5.61	46.56	4.84
15	0.29	7.79	48.09	4.89
16	0.43	6.18	49.65	5.38
17	0.43	6.21	51.50	5.24
18	0.30	6.77	53.91	6.53
19	0.31	6.91	56.73	5.22
$Best$	-0.07	7.68	61.54	4.98
$Diff$	0.60	4.02	-	-

4 Results

We apply our procedure to the standard asset pricing models proposed in the literature, namely the Capital Asset Pricing Model ($CAPM$), the Fama-French three-factor model ($FF3$ - Fama and French, 1993, 1996), the Fama-French-Carhart four-factor model (FFC - Jegadeesh and Titman, 1993, Carhart, 1997) and the Responsible Fama-French model (RFF - Becchetti et al., 2016). Each subsequent model nests the previous model by adding one or more risk factors. Our analysis refers

Table 3: Descriptive Statistics for the CSR Risk Factors and Other Risk Factors

The table reports the main descriptive statistics for: the excess return of the market (R^e_{mkt}), the size risk factor (SMB), the value risk factor (HML) the momentum risk factor (MoM), and the CSR risk factor (WMB). $^{*}p-value < 0.1$, $^{**}p-value < 0.05$ and $^{***}p-value < 0.01$

	Panel A						Panel B				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	$Mean$	Min	Max	Med	$St.Dev$	N	R^e_{mkt}	SMB	HML	MoM	WMB
R^e_{mkt}	0.64	-19.54	11.44	1.31	4.91	108	1.00				
SMB	0.05	-3.53	4.01	-0.09	1.44	108	0.13	1.00			
HML	0.10	-4.71	4.81	0.08	1.60	108	0.26***	-0.05	1.00		
MoM	0.35	-24.37	9.18	0.61	3.82	108	-0.33***	-0.02	-0.33***	1.00	
WMB	0.14	-3.91	5.36	-0.01	1.41	108	-0.01	-0.20**	-0.04	0.07	1.00

to CSR quintiles portfolios, and we report as robustness check the same analysis at individual firm level.

According to the methodology proposed, we present the results of the first step based on the time-series regressions of equation (1) for all the model specifications. In Table 4, we report the estimated risk-adjusted returns (α_p), and the residual risk (IV_p), for the CSR quintiles portfolios in which most of the systematic risk components are ruled out according to the different model specifications. In line with the descriptive result concerning the average monthly excess return for CSR quintiles portfolios in Table 2, the risk-adjusted returns slightly decrease as we move from the *Worst* to the *Best* portfolio according to the $CAPM$ and the $FF3$ (Panel A to B, column 1 and 4). Risk-adjusted returns for the CSR quintile portfolios, are statistically different form zero in six out of twenty cases, and appear to be clustered towards to the portfolios composed by firms with higher responsibility score in four over six cases. For these four cases, the risk reduction and/or the taste effect might play a crucial role. For all the remaining specifications, we observe a reduction in the number of statistically significant risk-adjusted returns (Panel C to D, column 7 and 10). We report also that in line the descriptive regarding the standard deviation for CSR quintiles portfolios in Table 2, IV_p do not present any clear pattern as we move from the *Worst* to the *Best* according to all the

Table 4: Risk-adjusted Returns and IVs for the CSR Quintile Portfolios

$$R^e_{pt} = \alpha_p + \beta_{pmk}R^e_{mkt} + u_{pt} \qquad (CAPM)$$
$$R^e_{pt} = \alpha_p + \beta_{pmk}R^e_{mkt} + \beta_{ps}SMB_t + \beta_{ps}HML_t \; u_{pt} \qquad (FF3)$$
$$R^e_{pt} = \alpha_p + \beta_{pmk}R^e_{mkt} + \beta_{ps}SMB_t + \beta_{ph}HML_t + \beta_{pm}MoM_t + u_{pt} \qquad (FFC)$$
$$R^e_{pt} = \alpha_p + \beta_{pmk}R^e_{mkt} + \beta_{ps}SMB_t + \beta_{ph}HML_t + \beta_{pm}MoM_t + \beta_{pw}WMB_t + u_{pt} \qquad (RFF)$$

where R^e_{pt} is the monthly excess return of the CSR quintiles portfolios; α_p is the risk-adjusted returns of the model used to price the portfolio; R^e_{mkt} is the monthly excess return of the stock market index used as benchmark; SMB_t is the size risk factor in month t capturing exposition to size risk; HML_t is the value risk factor in month t capturing exposition to value risk; MoM_t is the momentum risk factor in month t; WMB_t is the CSR risk factor in month t capturing exposition to stakeholder risk and u_{pt} is the error term for the testing portfolio p in month t. $^{*}p-value < 0.1$, $^{**}p-value < 0.05$ and $^{***}p-value < 0.01$

	Panel A			**Panel B**			**Panel C**			**Panel D**		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	CAPM			*FF3*			*FFC*			*RFF*		
	α_p	$\tau[\alpha_p]$	IV_p	α_p	$\tau[\alpha_p]$	IV_p	α_p	$\tau[\alpha_p]$	IV_p	α_p	$\tau[\alpha_p]$	IV_p
Worst	-0.28	[-1.09]	0.03	-0.28	[-1.12]	0.02	-0.15	[-0.63]	0.02	-0.23	[-0.98]	0.02
2	-0.50	[-1.50]	0.03	-0.49	[-1.50]	0.03	-0.35	[-1.10]	0.03	-0.52*	[-1.84]	0.03
3	-0.41*	[-1.77]	0.02	-0.42*	[-1.79]	0.02	-0.29	[-1.29]	0.02	-0.34	[-1.55]	0.02
4	0.18	[0.77]	0.02	0.17	[0.72]	0.02	0.12	[0.51]	0.02	0.05	[0.23]	0.02
5	0.07	[0.29]	0.03	0.05	[0.20]	0.02	0.12	[0.49]	0.02	0.01	[0.05]	0.02
6	-0.11	[-0.45]	0.03	-0.12	[-0.49]	0.03	-0.06	[-0.24]	0.03	-0.18	[-0.74]	0.02
7	0.20	[0.77]	0.03	0.21	[0.82]	0.03	0.24	[0.91]	0.03	0.09	[0.38]	0.02
8	0.16	[0.71]	0.02	0.15	[0.68]	0.02	0.19	[0.87]	0.02	0.05	[0.28]	0.02
9	-0.45*	[-1.90]	0.02	-0.47**	[-2.03]	0.02	-0.36	[-1.60]	0.02	-0.43**	[-2.01]	0.02
10	-0.21	[-0.96]	0.02	-0.21	[-0.98]	0.02	-0.19	[-0.85]	0.02	-0.20	[-0.90]	0.02
11	-0.40	[-1.63]	0.03	-0.39	[-1.57]	0.02	-0.29	[-1.19]	0.02	-0.36	[-1.52]	0.02
12	-0.03	[-0.14]	0.02	-0.04	[0.18]	0.02	-0.03	[-0.13]	0.02	0.02	[0.10]	0.02
13	0.07	[0.33]	0.02	0.07	[0.33]	0.02	0.13	[0.58]	0.02	0.13	[0.55]	0.02
14	-0.10	[-0.41]	0.02	-0.08	[-0.34]	0.02	-0.17	[-0.70]	0.02	-0.06	[-0.27]	0.02
15	-0.59	[-1.63]	0.04	-0.59	[-1.62]	0.04	-0.42	[-1.18]	0.04	-0.41	[-1.14]	0.04
16	-0.30	[-1.25]	0.02	-0.31	[-1.29]	0.02	-0.36	[-1.48]	0.02	-0.32	[-1.30]	0.02
17	-0.33*	[-1.69]	0.02	-0.34*	[-1.75]	0.02	-0.29	[-1.49]	0.02	-0.26	[-1.32]	0.02
18	-0.53***	[-2.56]	0.02	-0.51***	[-2.58]	0.02	-0.45**	[-2.30]	0.02	-0.33**	[-1.95]	0.02
19	-0.51*	[-1.93]	0.03	-0.52**	[-2.13]	0.02	-0.37	[-1.63]	0.02	-0.28	[-1.28]	0.02
Best	-0.96***	[-2.91]	0.03	-0.98***	[-2.98]	0.03	-0.65***	[-2.54]	0.03	-0.56**	[-2.27]	0.02
Diff	0.68**	[1.76]	0.04	0.70**	[1.95]	0.04	0.50	[1.46]	0.03	0.34	[1.06]	0.03

model specifications (Panel A to D, column 3, 6, 9 and 12) but this result does not take away the concerns about the omitted risk factor problem.

We now briefly describe the other risk expositions for the CSR quintiles portfolios.[12] Consistently with Albuquerque et al. (2015), composing portfolios with more responsible firms do not increases the overall portfolio market beta, or equivalently do not increase the exposition to systematic risk. The same happens for value and momentum betas. Differently, the size and CSR risk factors betas decrease as we move from the *Worst* to the *Best*. The former indicate that portfolios with higher score are mostly composed by larger firms that can invest resources on the adoption of a social responsible behavior without increasing the size risk. The latter can be interpreted as evidence of a decreasing stakeholder risk exposition for firms achieving higher responsibility conducts.[13]

The results on risk-adjusted returns show that even by ruling out most of the systematic risk components it is not possible to completely disentangle the differences in returns among portfolios with lower/higher responsibility scores. So far, it seems that indeed both risk and taste play a role in explaining differences in returns between more and less responsible companies.

We now move to the second step of our analysis to verify and quantify te existence of a price of *taste* due responsible investors screening. To do so, we are going to disentangle the contribution of residual risk (IV) and Responsibility scores (S) in generating the risk-adjusted returns (for a similar approach see: Galema et al., 2008).

Table 5 reports the results of the cross-sectional regressions of equation (2) for the CSR quintile portfolios. The intercepts are positive and significant in all the model specifications. Large intercept with low market risk premiums point to the well-known issue of an empirical security market line that is "too flat" (Cochrane, 2009). Size and market premium are always negative and significant, while value, momentum and CSR premiums are always positive and significant. The negative market premium could be a result of the limited variability of cross-sectional market betas among the CSR quintile portfolios. Finally, in line with Ang et al. (2006), residual risk premiums have a negative sign and are significant for all the model specifications.

[12] For reason of space we do not report the estimations of risk factors' betas. However, these results are available from the authors upon request.

[13] For similar results on the risk exposition to systematic risk components for responsible firms see among others: Kempf and Osthoff (2007), Humphrey et al. (2012), Bauer et al. (2005a), de Haan et al. (2012) and Becchetti et al. (2016).

Table 5: Cross-sectional Regressions for the CSR Quintile Portfolios

$\bar{R}_p^e = \lambda_0 + \lambda_S \bar{S}_p + \lambda_{mk}\beta_{pmk} + \lambda_s \beta_{ps} + \lambda_h \beta_{ph} + \lambda_m \beta_{pm} + \lambda_w \beta_{pw} + \lambda_{IV} IV_p + \epsilon_p \; FM$

where $\bar{S}_p$ is the average of yearly overall Responsibility score (S), β_{pmk}, β_{ps}, β_{ph}, β_{pm} and IV_p are respectively risk factors' betas and IVs estimated from the previous time-series regressions and ϵ_p is the pricing error. $^{*}p-value < 0.1$, $^{**}p-value < 0.05$ and $^{***}p-value < 0.01$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	$\bar{S}_p$	$\bar{S}_p/CAPM$		$\bar{S}_p/FF3$		$\bar{S}_p/FF4$		$\bar{S}_p/RFF$	
λ_0	1.25***	2.42***	0.02***	2.61***	2.63***	2.31***	2.36***	1.99***	2.06***
$\tau[\lambda_0]$	[19.91]	[37.00]	[35.93]	[37.41]	[36.71]	[28.71]	[25.35]	[21.90]	[21.02]
λ_S	-0.02***	-0.01***	0.00***	-0.02***	-0.02***	-0.02***	-0.02***	-0.01***	-0.01***
$\tau[\lambda_S]$	[18.02]	[-13.49]	[-13.52]	[-14.05]	[-13.02]	[-13.44]	[-13.57]	[-7.64]	[-7.41]
λ_{mk}		-1.14***	-0.01***	-1.04***	-0.97***	-0.78***	-0.78***	-0.71***	-0.70***
$\tau[\lambda_{mk}]$		[-16.35]	[-15.84]	[-14.37]	[-14.39]	[-10.41]	[-10.41]	[-9.68]	[-9.69]
λ_s				-0.22***	-0.19***	-0.20***	-0.20***	-0.17***	-0.16***
$\tau[\hat{\lambda}_s]$				[-5.76]	[-4.85]	[-5.06]	[-5.03]	[-4.25]	[-3.89]
λ_h				0.10***	0.09***	0.14***	0.14***	0.14***	0.13***
$\tau[\lambda_h]$				[3.46]	[3.20]	[5.03]	[4.81]	[4.65]	[4.38]
λ_m						0.34***	0.33***	0.45***	0.43***
$\tau[\lambda_m]$						[5.96]	[5.71]	[7.56]	[7.18]
λ_w								0.05*	0.05**
$\tau[\lambda_w]$								[1.81]	[2.01]
λ_{IV}			-0.07***		-5.63***		-1.95		-4.27***
$\tau[\lambda_{IV}]$			[-5.00]		[-3.91]		[-1.26]		[-2.75]
R^2	0.15	0.23	0.28	0.34	0.39	0.40	0.45	0.46	0.51

We should not attach too much value to some of the estimates of the risk premia, as the estimates likely suffer from multicollinearity due to inclusion of the residual risk.[14] For our purposes this is not a problem though, since we are not necessarily interested in the risk premium of the factors, but only in the marginal effect of the Responsibility score (S) for which the estimate will not be affected.[15] Investors seem to pay a cost in terms of lower returns due to their responsible preferences. The premium related to the responsibility score, the price of *taste*, is negative, strongly significant and stable across all the model specifications. It varies around -0.01 and reaches a maximum value of -0.02. This stability suggests that the social responsibility scores indeed do not suffer from the multicollinearity problem, and that we obtain unbiased estimates. Economically, these findings

[14] See appendix B for the cross-correlation among factors betas and residual risk.

[15] Similar to other studies including those on CSR (El Ghoul et al., 2011 and Chen et al., 2011), the endogeneity issue among excess returns and responsibility scores could be a possible concern. Our results are robust to such issue since by construction we are using average responsibility score.

imply that on annual basis the average investor pays a cost in terms of lower returns that in absolute value ranges between 0.12 and 0.24 percent annually per unit of the responsibility score. With an average responsibility score of 40, it leads to a conservative estimate of the price of taste of 4.8% annually on average.

Recalling that theoretically by relating equation (1) and (2) it is possible to decompose the risk-adjusted returns as in (3), to intuitively show the results of Table 4-5, we now report in Figure 1 the contribution of residual risk (Panel A to D) and responsibility score (Panel E to H) in generating risk-adjusted returns. Panel A to D in Figure 1 report the existing relation among the risk-adjusted returns (α_p) and residual risk (IV_p) estimated for the CSR quintiles portfolios with all the model specifications. If the model are correctly specified, what we should theoretically observe is a flat regression line between risk-adjusted returns and the measure of residual risk. This would indicate the absence of any relation between the two. Clearly this is not the case, in fact the regression line present a negative slope no matter which model specification we use, and confirms that the omitted risk factor problem is a serious concern. Panel G to H report the existing relation among the risk-adjusted returns (α_p) and average responsibility scores ($\bar{S}_p$). Also in this case it is possible to note a clear negative relation between the two. Therefore, it seems indeed even after controlling for most of the systematic risk components, both residual risk and *taste* play a role in explaining differences in returns between CSR quintiles portfolios composed by firms with higher/lower responsibility scores.

With the aim of completeness, we repeat our procedure at firm-level showing that all results do not change. The space constraints do not allow for reporting the individual time-series regressions.

Table 6 only present the second-step cross-sectional regressions. The results at firm level are similar to those at the portfolio level with respect to the momentum, CSR and IV premiums. The market premium is positive now, indicating that the negative estimate of the market premium for the CSR quintile portfolios is indeed due to the lower variability in the cross-sectional market betas. However, all estimates of the market risk premium is still lower compared to the historical average of 0.64%. More importantly, the premium related to the social responsibility score is still negative, strongly significant and robust throughout the various specifications. Again it ranges between -0.01% and -0.02%. In sum, the firm-level analysis supports the findings for the quintile

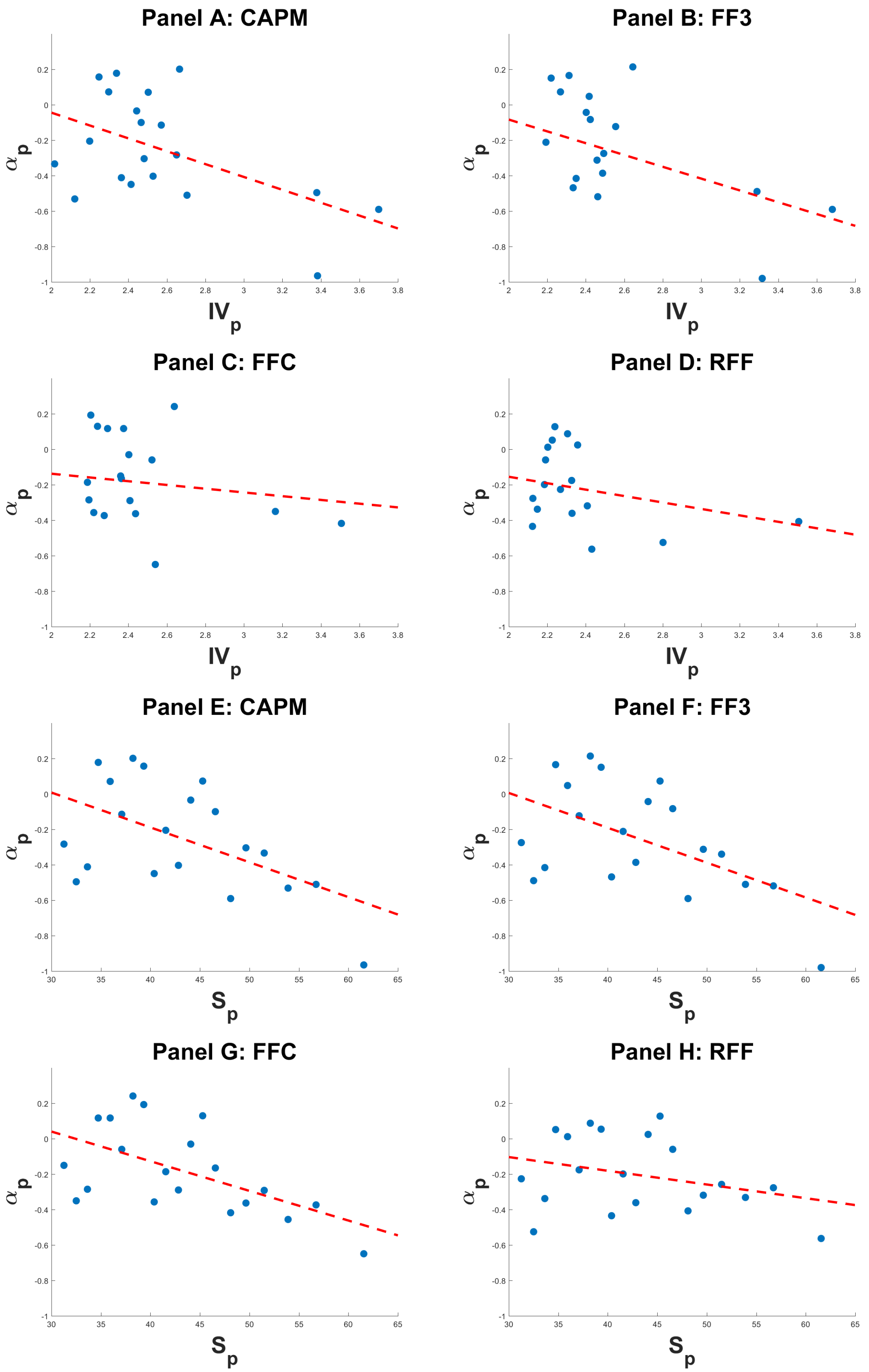

Figure 1: from Panel A to D we report the relation between risk-adjusted returns (α_p) and the residual risk (IV_p) for the CSR quintiles portfolios. From Panel E to H we report the relation between risk-adjusted returns (α_p) and average yearly responsibility scores (S_p). Risk-adjusted returns and residual risk are estimated according to all the model specification used.

Table 6: Cross-sectional Regressions at Firm Level

$\bar{R}_i^e = \lambda_0 + \lambda_S \bar{S}_i + \lambda_{mk}\beta_{imk} + \lambda_s\beta_{is} + \lambda_h\beta_{ih} + \lambda_m\beta_{im} + \lambda_w\beta_{iw} + \lambda_{IV}IV_i + \epsilon_i \ FM$

where $\bar{S}_i$ is average of yearly overall responsibility measure for firm i, β_{imk}, β_{is}, β_{ih}, β_{im} and IV_i are respectively risk factors' betas and IVs estimated from the previous time series regressions and ϵ_i is the pricing error. $^{*}p-value < 0.1$, $^{**}p-value < 0.05$ and $^{***}p-value < 0.01$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	$\bar{S}_i$	$\bar{S}_i/CAPM$		$\bar{S}_i/FF3$		$\bar{S}_i/FF4$		$\bar{S}_i/RFF$	
λ_0	1.37***	1.16***	1.30***	0.94***	1.00***	0.94***	1.03***	0.85***	0.97***
$\tau[\lambda_0]$	[29.61]	[33.29]	[28.61]	[28.66]	[23.08]	[28.09]	[22.04]	[31.63]	[24.73]
λ_S	-0.01***	-0.02***	-0.02***	-0.01***	-0.02***	-0.01***	-0.02***	-0.01***	-0.01***
$\tau[\lambda_S]$	[-16.55]	[-22.59]	[-23.86]	[-19.89]	[-19.84]	[-20.96]	[-20.61]	[-19.21]	[-20.49]
$\hat{\lambda}_{mk}$		0.26***	0.35***	0.39***	0.42***	0.39***	0.41***	0.14**	0.14**
$\tau[\lambda_{mk}]$		[5.07]	[6.77]	[7.69]	[8.28]	[7.60]	[8.22]	[2.31]	[2.26]
λ_s				0.01	0.02	0.00	0.02	-0.10***	-0.12***
$\tau[\lambda_s]$				[0.50]	[1.15]	[0.17]	[0.93]	[-4.43]	[-6.19]
λ_h				-0.26***	-0.26	-0.26***	-0.25***	-0.02	-0.02
$\tau[\lambda_h]$				[-13.19]	[1.15]	[-14.41]	[-14.14]	[-1.06]	[-1.16]
λ_m						0.09**	0.07*	0.58***	0.66***
$\tau[\lambda_m]$						[2.10]	[1.66]	[9.94]	[13.50]
λ_w								0.13***	0.12***
$\tau[\lambda_w]$								[8.37]	[7.95]
λ_{IV}			-2.33***		-0.98***		-1.29***		-1.63***
$\tau[\lambda_{IV}]$			[-6.11]		[-2.61]		[-3.17]		[-3.09]
R^2	0.01	0.08	0.10	0.14	0.15	0.16	0.17	0.13	0.15

portfolios.

5 Conclusion

The total value of assets under management subject to SRIs is constantly increasing although what drives the demand for SRIs is still an open question. The preference of investors for socially responsible assets can be driven by either: i) the risk characteristics of responsible assets, or ii) *taste*. By ruling out the both systematic and residual risk components, we try to quantify whether and to what extent investors pay a price, in terms of lower returns, due to investors' *taste* for responsible assets.

Using a sample of 1000 global firms (295 U.S., 512 Europe and 193 Asia-Pacific) for the period July 2005 to June 2014, we compose CSR quintiles portfolios and relate the cross-section of their risk-adjusted returns to a the overall responsibility scores. In doing so, one faces an omitted risk factor problem, which we address by including a measure of residual risk in Fama-Macbeth cross-sectional regressions. In addition, we judge that only the relation between risk-adjusted returns and social responsibility scores reflects a price for *taste*. We find that even after controlling for the stakeholder risk exposition, the portfolios composed by firms with higher responsibility scores still present negative and significant risk-adjusted returns. The risk reduction and *taste* effects indeed coexist. The price of *taste* for SRIs in terms of a lower return amount to a 4.8 percent on annual basis.

Our finding seems to contradict the literature documenting how SRIs, at fund and firm level, worked as a shield during the last financial crisis (Lins et al., 2015, Nofsinger and Varma, 2014). However our sample cover a larger time span with respect to previous literature and we are not exclusively focusing our attention in evaluating the performance of SRIs during boom or bust periods.

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Appendix A Construction of the Social Responsibility Scores

VIGEO responsibility scores are divided in six dimensions: Business Behavior (S^{BB}), Corporate Governance (S^{CG}), Community Involvement (S^{CIN}), Environment (S^{ENV}), Human Resources (S^{HR}), Human Rights (S^{HRT}). VIGEO also aggregates the scores into an overall responsibility score (S). Each dimension is divided in c categories, for a total of 38 categories. The dimension specific responsibility measure for firm i within industry j in the dimension d is denoted as $-S_{ij}^{d}-$ and it is computed as follows:

$$S_{ij}^{d} = \sum_{c=1}^{C} \frac{s_{ij}^{dc} w_{j}^{dc}}{W_{j}^{d}}, \tag{1}$$

where s_{ij}^{dc} is the score assigned to firm i within industry j in the dimension d and category c which takes an integer value between 0 and 100, w_{j}^{dc} is the weight assigned to industry j in the dimension d and category c which takes an integer value between 1 and 3, W_{jd} is the sum of all the categories' weights activated in the dimension ($W_{j}^{d} = \sum_{c=1}^{C} w_{j}^{dc}$).[16–17] The dimension specific responsibility measures $-S_{ij}^{d}-$ are then used to compute the Responsibility score $-S_{ij}-$ for firm i within industry j defined as follows:

$$S_{ij} = \sum_{d=1}^{D} \frac{S_{ij}^{d} W_{j}^{d}}{W_{j}}, \tag{2}$$

where W_j is the sum of all the category weights activated in the six dimensions ($W_j = \sum_{d=1}^{D} \sum_{c=1}^{C} w_{jc}^{d}$).

[16] $s_{ij}^{dc} = 0$ indicates the "absence" of socially responsible behavior for firm i within industry j in the dimension d and category c, while $s_{ij}^{dc} = 100$ indicates "fully" socially responsible behavior.

[17] The value assigned to w_{j}^{dc} is industry specific and is related to the level effort that a firm i in industry j needs to spend for the implementation of responsible standards in the dimension d and category c. For example in the dimension d "Environment" and category c "Pollution Retention and Control", w_{j}^{dc} is equal to 1 for firms operating within the Financial industry while is 3 for firms within Health Care industry.

Appendix B Betas Correlation Matrix

Table B1: Correlations Between: Average Responsibility Score, Risk Factors Betas and IV measures

CAPM	$\bar{S}_p$	β_{pmk}	IV_p				
$\bar{S}_p$	1.00						
β_{pmk}	0.32	1.00					
IV_p	0.11	0.51**	1.00				
FF3	$\bar{S}_p$	β_{pmk}	β_{ps}	β_{ph}	IV_p		
$\bar{S}_p$	1.00						
β_{pmk}	0.22	1.00					
β_{ps}	-0.82***	0.00	1.00				
β_{ph}	0.47**	-0.09	-0.28	1.00			
IV_p	0.08	0.46**	0.11	-0.06	1.00		
FFC	$\bar{S}_p$	β_{pmk}	β_{ps}	β_{ph}	β_{pm}	IV_p	
$\bar{S}_p$	1.00						
β_{pmk}	0.18	1.00					
β_{ps}	-0.81***	0.01	1.00				
β_{ph}	0.35	-0.40*	-0.27	1.00			
β_{pm}	-0.27	-0.57***	0.02	0.22	1.00		
IV_p	-0.13	0.24	0.17	-0.33	-0.33	1.00	
RFF	$\bar{S}_p$	β_{pmk}	β_{ps}	β_{ph}	β_{pm}	β_{pw}	IV_p
$\bar{S}_p$	1.00						
β_{pmk}	0.06	1.00					
β_{ps}	-0.53**	0.16	1.00				
β_{ph}	0.03	-0.47**	-0.08	1.00			
β_{pm}	-0.20	-0.57***	0.00	0.22	1.00		
β_{pw}	-0.83***	-0.02	0.24	0.10	-0.08	1.00	
IV_p	-0.06	0.27	0.13	-0.17	-0.34	0.14	1.00