

SOCIALLY RESPONSIBLE INVESTMENT: IS IT PROFITABLE?*

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1 What is Socially Responsible?

Before we can answer the question we posed in the title, we need to define just what is “socially” responsible. Evidently, the meaning varies with time and place, since social responsibility is defined by a group’s cultural and ethical values. For example in the middle ages lending with interest was not considered ethical, let alone “socially responsible”. To this day, lending with interest is reprehensible according to Moslem tradition, and in Saudi Arabia at least it is not officially condoned. This does not mean that banking does not exist in that country, only that certain subterfuges are practiced which allow normal banking practices without the payment of “interest”.

In the nineteenth century the manufacture of tobacco products in the US spawned several vast fortunes, and was certainly a very respectable enterprise. But this is not so today. One can go on and produce example after example in which the social mores change, and with them what is socially “good” and what is socially “bad” changes as well.

2 Law of One Price

The judgments made regarding social acceptability referred to above, are, and were, made in reference to the individuals that actually carried out

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these trades. As societies evolved and economies became more complex, it became possible for one to own an enterprise in whole or in part without actually taking part in the production of the goods, or services, provided by the enterprise in question. This is the stage of finance capitalism that Marx noted in the latter half of the nineteenth century. Finance capital, as distinct from physical capital, is fungible. Today I may be involved in the production of refrigerators, and tomorrow in the production of insurance services. The institutions that preserve and extend this fungibility are capital markets. Thus, at this period of time (finance) capital is a means by which an almost infinite variety of activities are available for an individual investor to employ his capital. Since this resource has many possible uses it comes under the purview of what economists have called for a long time now, the **Law of one Price**. This principle has been enunciated in the early nineteenth century by David Ricardo, and it is a fairly trite assertion in today's world, viz. two identical goods or services must command the same price. Thus, since capital may be employed in a myriad of activities, **other things being equal**, it must earn the **same** rate of return in all sectors. But how does one know how much capital must be invested in each of the activities available so that the rate of return is equalized? The answer is that no one person needs to know; but, in the ordinary working of markets, at the end of the day a certain rate of return is determined for each activity. If, **other things being equal**, some returns are higher than others, individual investors will shift their capital from the lower return activities to the higher return activities; the process then will go on until no one has any reason to shift their capital. In this fashion rates of return tend to be equalized, again other things being equal.

3 Efficient Capital Allocation

An important feature of capital markets is that the rates of return on practically any investment are not guaranteed with certainty. In other words there is **risk**. If riskiness varies according to the type of investment, the simple application of the law of one price has to be amended to take this feature into account. Riskiness is usually measured by the **variance** or variability of returns. In the face of risk, how would, or rather should, a rational investor behave? In this respect we invoke another important concept from economics, that of **Pareto efficiency**. An investment policy is Pareto efficient if it is not possible by a simple reallocation of assets to increase mean returns without increasing variability. This concept plays an important role in the capital asset pricing model (CAPM), in that the "market portfolio"

of that model is shown to be efficient. Indeed, it is the invocation of Pareto optimality, or efficiency, that leads the theorists to conclude that the market portfolio **must** be “efficient”. In recent times, Pareto optimality has been reintroduced in the finance literature under the title of **arbitrage pricing theory, (APT)**. In other words it is argued that if by reallocating investments, one may increase mean return without increasing variance, one would “arbitrage” one’s initial portfolio allocation so as to increase mean return. This process will stop when it is no longer possible to do so. Thus, the “no arbitrage assumption” that drives the APT model, in a reflection of Pareto efficiency.

The difference between these two models is not as great as it is commonly thought. In CAPM, one introduces, and determines the “price” of risk, but **only in connection with diversifiable risk**; specifically, one focuses on the relationship of an **individual asset** to the “market”, giving rise to the so called **beta coefficients**, which measure the sensitivity of a given capital asset’s return to fluctuations in market returns. It is a simple inference from this to conclude that if one “buys” the market, CAPM has no role to play. The advent of **index funds** was an obvious result of these considerations. The problem with such models, however, is that they leave their fundamental concepts primitive, in the logical sense of the term. What is the “market”? Is it the NYSE, the ASE, the NASDAQ, all three, or is it the network of organized global stock exchanges, or more generally global capital markets? Perhaps we should also explicitly include “real assets”, such as paintings, real estate etc. to the extent that such assets do not have an equivalent financial and tradeable counterpart.

However the “market” is defined, it, itself, experiences fluctuations, and market returns exhibit considerable variability. In that respect APT is somewhat neater conceptually, in that it does not depend on such primitive concepts. It is not, however, much better than the CAPM in that important and essential elements of capital market behavior are left undefined.

Basically, APT simply states that the returns on a (any) capital asset is a noisy (linear) function of the risk free rate of return, such as the interest rate on US 90-day Treasury Bills. We would probably all agree that if there is anything certain in this world, at present, it is that over a period of 90 days the US government may be counted upon to meet its obligations. The noisy part of the return is a random variable obeying a variance components specification. This means that one visualizes actually specific sources for the observed variability and the task of financial analysis is to isolate and measure the contribution of such sources to the observed risk (fluctuations).

These variance components were referred to as “factors”, and APT was initially based on the factor analysis model. The latter was earlier employed in psychology to measure intelligence, but was subsequently discredited.

Although its (APT) initial empirical application was substantially flawed by a serious misunderstanding of what factor analysis entails, nonetheless it did formalize the notion that there may be several independent sources of risk, in addition to the generalized risk (represented by a generic error term not peculiar necessarily to each asset). This generalized risk may be interpreted as the diversifiable risk, eliminated by the market portfolio in CAPM.

4 Social Responsibility and Risk

As the preceding analysis makes clear, investors are thought by theorists to wish to be compensated for the risks they undertake; this compensation is the (expected) rate of return. Thus, in considering the issue of social responsibility in the investment decision we have two options: first, we may think of investing in the securities of “socially responsible” enterprises as an act of charity, which would invite an entirely different set of considerations. This however is of little empirical relevance in that most people will subscribe to the proposition that “business is business” and charity is something else entirely. Second, we may subsume “socially responsible” investment under the rubric of the analysis above and ask: in what way does social responsibility enter into the financial calculus of the CAPM and APT models?

Evidently, there is additional risk in the securities of a “socially irresponsible” enterprise, vis-a-vis those of “socially responsible” ones. One may only look at **asbestos** or, more recently, tobacco to be convinced of that. These are cases that ultimately resulted in billions of payments to various claimants (asbestos), or may potentially involve hundreds of billions of compensation to the states and/or individuals afflicted with cancer of the mouth or lungs or other pulmonary ailments (tobacco). It is difficult to ignore this as a source of additional risk. Some other sources of risk are much more subtle. For example, the social excoriation of certain activities in the sex trade make the financing of such activities more murky and problematic. Or the boycott or the threat of boycott, as in the case of the fur trade, or certain types of fishing, may temporarily or permanently reduce the demand for such products, and thus affect expected returns. Since “socially irresponsible” enterprises are more likely to be the object of such boycotts, there is an additional but subtle risk associated with such enterprises, which is not present in the case

of “socially responsible” ones.

Finally, even though we dismissed investment in socially responsible enterprises as a form of charity (i.e. with the expectation of zero or very small rates of return), it is not entirely clear that we should dismiss the possibility of investment in such enterprises as a form of partial charity. More precisely, over and above all the standard considerations entering the investment decision, one may accept a somewhat lower rate of return, and be comforted by the knowledge that in so doing one makes the country a better place, or contributes to the proper equilibrium of the ecosystem. In other words, some part of the (mean) return may be “psychic income” in the phraseology of old fashioned economics. We all know of people who only consume organically grown food because they wish to retard the process of toxification of aquifers and the like.

All of these considerations would lead us to expect that, other things being equal, securities of socially responsible enterprises may well have a lower mean rate of return than those of “socially irresponsible” enterprises. The magnitude of the difference ought to shed some light on whether this reflects the business judgment of the investor, regarding the risk differential (in which case the difference in rates of return should not be very great), or whether this reflect an attitude of charity, in which case the return differential should be very substantial. Or, it may be the case that socially irresponsible enterprises comprise such a small part of the market that statistically meaningful results are not possible. All of this may be clarified by the findings of our empirical investigation, which are given in the next section.

5 Empirical Results

5.1 Data

Although we discussed the issue of social responsibility earlier, and observed that it varies according to time and place we have not disposed of the issue of how to take it into account in our analysis.

We shall do so by utilizing the KLD index rating of securities as an indicator of the degree of social responsibility or irresponsibility of the underlying firm(s).

The considerations about socially responsible investment advanced in the previous section suggest that there may well be differentials in the rates of return of various securities depending on the social responsibility rating of the underlying enterprise. To investigate this issue, I have taken the KLD

index of social responsibility and superposed it on a data set¹ that contains information, *inter alia*, on the rates of return for a number of firms over the years 1991 through 1996. The data set also contains the IBES sector classification of each firm. The list of variables used in my analysis is given in Table A1* of the Appendix.

5.2 Framework of Analysis and the Basic Model

5.2.1 Framework of Analysis

Often the discussion of whether it “pays to invest in socially responsible” enterprises is framed rather loosely. One constructs a portfolio of securities of self styled socially responsible firms and compares its rate of return to another portfolio’s, which is not so constructed. This, of course, does not produce reliable results because the design of the analysis has not controlled for other factors. The design also suffers from partiality. By taking a rather small number of securities and bundling them in a portfolio we do not gain a full insight into the empirical information available to us, because we are neglecting the information conveyed by other securities not included in our portfolios.

Our analysis is rather novel in the sense that, with the exception of the work of John Guerard, on a smaller scale, such analysis has not been undertaken in the past. What is proposed here is this: take the universe of securities for which a KLD index of social responsibility is available. Collect whatever other information is relevant and customarily part of financial analysis. Examine the relationship of the rate of return on the security to the KLD index of social responsibility.

If we find that the coefficient of the index of social responsibility is significantly different from zero, we shall conclude that social responsibility matters either positively or negatively. In the former case it would mean that there are actually additional rewards to investing in socially responsible securities; in the latter case it would mean there is diminution in the rate of return when one invests in socially responsible securities. Finally, if the social responsibility index has a coefficient which is **insignificantly different from zero**, we shall conclude that it does not matter from the point of view of mean (expected) returns whether we do or do not invest in socially responsible securities. This would mean that mutual fund managers may elect to

¹I wish to thank John Guerard who provided me with a machine readable data set containing all information used in this study.

invest in socially responsible securities, secure in their knowledge that their actions will not penalize the rate of return on their funds.

5.2.2 The Basic Model

The basic model investigated is

$$y_i = \alpha_0 + \sum_{j=1}^{18} \beta_j X_j + \sum_{k=1}^{10} \gamma_k D_k + u_i, \quad (1)$$

and it is estimated by least squares. The variable names corresponding to the symbols X_j and D_k are given in Table A1* of the Appendix.

The specification in Eq. (1) is basically an analysis of variance model, and the interpretation of the model and its parameters is as follows: the left hand variable, y_i , represents the annual rate of return on the securities of firm i ; the constant term, i.e. the parameter α above represents the general mean, and is thus the mean annual rate of return for firms which have no strengths and no concerns, and are in IBES sector Public Utilities, which is the omitted classification. The fictitious variable corresponding to this coefficient is denoted by CON in the tables of the appendix. The coefficient of X^j is the **additional** rate of return due to the strength or concern in question. The coefficient of D^k is the **additional** rate of return due to membership in the IBES sector in question. So the general setup is: a rate of return for a given firm is decomposed into the general mean (baseline rate of return) plus additions (or subtractions) attributable to strengths or concerns, as well as membership in IBES sectors.

The number of observations on which the analysis is based are: 1991, 490; 1992, 494; 1993, 480; 1994, 488; 1995, 508; 1996, 516.

Thus, in all cross sections we have a sufficient number of observations to obtain reliable estimates.

5.3 Discussion of Empirical Results

The detailed results of the analysis are given in the appendix. Here I comment on their meaning and significance:

1. The R^2 in 1991, 1994, 1995, 1996 is in the .01 to .1 range, while in 1992 is .15 and in 1993 it is .2. This means that the correlation between actual rates of return and rates of return predicted with the estimated equation is .39 for 1992, .45 in 1993 and in the range .3 to .32 for the

remaining years. This degree of explanatory power is not uncommon in cross sectional studies. There is no strong evidence that the semi-log form specification² is to be preferred to the linear specification

2. If we adopt a 10% level of significance as our standard for concluding that some variable has a perceptible influence on the rate of return, then in 1991 only Product concern has a significantly positive impact on the rate of return; on the other hand the classificatory variables F, H, and TE have coefficients that are significantly different from zero, and they correspond to IBES sectors Financial, Health and Technology, meaning that these sectors earned significantly different rates of return than the baseline sector, viz. Public Utilities.

In 1992, being in S & P 500, variable SP, and Environment strength, variable ENVS, (i.e. being socially responsible on the environment) have significant coefficients – both negative. In addition the constant term is significantly different from zero and positive; the classificatory variables H and ConND (corresponding to IBES sectors Health and Consumer Nondurables) also have significant coefficients, both negative. This means that being (actively) socially responsible on the environment has a negative impact on rates of return, relative to the case of being neutral, i.e. exhibiting neither strengths or concerns—perhaps due to the underlying nature of the economic activity in question.

In 1993 membership in S & P 500, variable SP, membership in DSI, variable DSI, Environment strength, variable ENVS, Product strength, variable PS, have coefficients that are significantly different from zero, and positive, as is also the case with H, ConND, ConS, TE, BI, CG and the constant. The latter set of variables correspond to IBES classifications Health, Consumer Nondurables, Consumer Services, Technology, Basic Industries and Capital Goods, respectively.

In 1994 Product strength, variable PS, and Concern about minorities and women, variable WMC, have significantly negative coefficients. The constant is again significant as is the coefficient of TE, IBES sector Technology.

In 1995 only the coefficients of Community strength, variable PS, and Product concern, variable PC, have significant coefficients.

²The semi-log specification has the logarithm of the rate of return regressed on the right hand variables. Because rates of return may be negative, we have actually used the logarithm of $(1 + \text{rate of return})$.

In 1996, none of the concern and strength variables have significant coefficients; of the classificatory variables only E, IBES sector Energy, and BI, IBES sector Basic Industries, **fail to have significant coefficients**.

3. A useful generalization that may be deduced from the results I presented is that, by and large, the social responsibility ranking is not relevant in determining the rate of return on a given security. What is more important, by far, is the type of business the firm is in (IBES classification).

The implication of the preceding is that, since the social responsibility classification is **not consistency** a significant determinant of a firm's security rate of return, one can engage in socially responsible investment without, in the aggregate, consistently sacrificing returns.

Having stated that, I do not mean this to be interpreted in a blanket fashion. This analysis applies to the universe of firms in my sample, which corresponds to the KLD rated universe. The results are not to be interpreted as indicating that every self styled socially responsible enterprise is a suitable acquisition for any mutual fund.

In addition to these results, given in Tables A1, A3, A5, A7, A9, and A11 of the appendix, I have also produced similar regression results based on a semi-log specification, i.e. one in which the logarithm of the (annual) rate of return is represented as an analysis of variance model. Because the rate of return may be **negative or zero**, I have actually used the logarithm of $1 +$ rate of return. This is not expected to produce any substantial distortions in comparison with the linear specification of the analysis of variance models. Results from the semi-log specification are given also in the appendix, in tables A2, A4, A6, A8, A10, and A12. These results, although different in detail, do not present a materially different configuration than is produced by the linear specification; the major result still holds, viz. that by and large and Concerns and Strengths of the KLD index of social responsibility are not consistently significant in determining annual rates of return; on the other hand, IBES classifications are consistently more significant.

5.4 An Alternative Approach

In an effort to test the sensitivity of the results obtained through the analysis of variance specification, I followed a simpler and more direct approach. This may be done easily for one or two classifications; but it would be unrealistic,

and even confusing, to employ the procedure below for every concern or strength.

The approach involves asking the following simple question: Suppose that nothing else is relevant except the KLD rating on the environment, and otherwise we think of the (annual) rates of return on a firm's securities as independent identically distributed random variables, with a mean (expected return) which depends only on their assigned KLD concern for environment index. Is the sub-population that exhibits no environmental concern ($CENV = 0$), distinguishable from the sub-population exhibiting some concern ($CENV = 1$), and/or from the sub-population that exhibits severe concerns ($CENV = 2$)?

The answer to this question is given in Table 1 below, and is almost evident by inspection. For 1991, it would appear that there is a difference but that the differentials are **perverse**. The rates of return ought to be higher for the "riskier" securities in the sub-population $CENV = 2$, but instead they are the lowest. On the other hand the magnitude of the variance or standard deviation estimate leaves little doubt that as a matter of statistical theory there is no significant difference amongst the mean returns in the three sub-populations. For 1992, 1993 and 1994 the three point estimates do not appear to differ appreciably. In 1995 and 1996 there are some discrepancies, but these are nearly as severe in the comparison of the no concern sub-population ($CENV = 0$) with the mild concern ($CENV = 1$) sub-population, as they are in the comparison between the two concerned sub-populations, i.e. in the comparison between $CENV = 1$ and $CENV = 2$.

Thus, the results from this rather simple exercise give more or less the same substantive answer as the more sophisticated analysis given earlier, viz. that in the aggregate there are not perceptible and consistent differences in the (expected or mean) rates of return between firms which are deemed to be socially responsible vis-a-vis the entire universe investigated.

6 Conclusion

In this paper we sought to answer a question much discussed in the literature of mutual fund management, viz. does "socially responsible" investment policy inevitably leads to lower (expected) rates of return.

We approached this problem not by constructing a particular portfolio incorporating social responsibility and then comparing its (*ex post*) returns with those of another portfolio, not so constructed. This design inevitably leads to disputes as to whether the process of constructing such portfolios

faithfully represents two situations in which the **only** difference is social responsibility. Instead, we followed a more straight forward approach. The model we formulated is basically an “analysis of variance model” in which the rate of return of a given security is “explained” by Concern and Strength rating on various issues of social responsibility as given by KLD and, in addition, by the type of business of the underlying firm, as denoted by its IBES (sector) classification.

Table 1
Annual Rates of Return (in decimals) by Environmental
Concern 1991-1996

CENV	Mean	Variance	St. Deviation	No. Obs.
1991				
CENV = 0	.1569	.1375	.3708	409
CENV = 1	.0796	.1113	.3336	76
CENV = 2	.0665	.0529	.2300	62
1992				
CENV = 0	.1374	.1309	.3618	404
CENV = 1	.1407	.1006	.3171	83
CENV = 2	.1376	.0615	.2480	72
1993				
CENV = 0	-0.038	.0611	.2472	397
CENV = 1	-0.038	.0379	.1948	94
CENV = 2	.0011	.0748	.2735	71
1994				
CENV = 0	.2720	.2688	.5185	382
CENV = 1	.2758	.0592	.2432	99
CENV = 2	.2464	.0520	.2280	80
1995				
CENV = 0	.1762	.1055	.3248	414
CENV = 1	.1107	.0541	.2326	95
CENV = 2	.1190	.0417	.2042	91
1996				
CENV = 0	.1236	.0328	.1812	464
CENV = 1	.0626	.0178	.1334	73
CENV = 2	.1061	.0168	.1297	76

In this framework, if the Concerns and/or Strengths display consistently significant coefficients we may argue that “socially responsible” investment

policy has significant and perceptible effects and we may then set out to determine the direction and sense of such effect. If on the other this is not consistently so, we are entitled to conclude that in the aggregate a “socially responsible” investment policy need not result in perceptible loss of returns. This is strongly suggested both by the linear regression results, as well as those of the semi-log regression and the comparison of mean returns for sub-populations classified according to the Concern environment.

Finally, as a general *caveat*, I ought to note the limitations of this study.

The conclusions are naturally limited by the fact that KLD rates only a small number of securities that are available on NYSE, ASE and NASDAQ.

Moreover, in explaining rates of return we ought to consider other financial characteristics of the relevant firm, such as its size, scope, liquidity, leverage, its ownership of patents etc.

Until we have done all this research we cannot unambiguously and without reservation urge the general acceptance of our conclusions. Nonetheless, within the limits noted the best conclusion we may arrive at given the information available is that exercising social responsibility in choosing portfolios mutual fund managers will be penalized in having to accept lower rates of return.

APPENDIX

Table A1 *

Variable Names and Symbols, 1991-1996

SP	(X1)	=	1 if firm is in SP 500, zero otherwise.
DSI	(X2)	=	1 if firm is in DSI, zero otherwise.
CC	(X3)	=	1 or 2 if firm exhibits concern, Community, zero otherwise.
CS	(X4)	=	1 or 2 if firm exhibits strength, Community, zero otherwise.
EC	(X5)	=	1 or 2 if firm exhibits concern, Employment, zero otherwise.
ES	(X6)	=	1 or 2 if firm exhibits strength, Employment, zero otherwise.
ENVC	(X7)	=	1 or 2 if firm exhibits concern, Environment, zero otherwise.
ENVS	(X8)	=	1 or 2 if firm exhibits strength, Environment, zero otherwise.
PC	(X9)	=	1 or 2 if firm exhibits concern, Product, zero otherwise.
PS	(X10)	=	1 or 2 if firm exhibits strength, Product, zero otherwise.
WMC	(X11)	=	1 or 2 if firm exhibits concern, Women and Minorities, zero otherwise.
WMS	(X12)	=	1 or 2 if firm exhibits strength, Women and Minorities, zero otherwise.
OC	(X13)	=	1 or 2 if firm exhibits concern, Other, zero otherwise.
OS	(X14)	=	1 or 2 if firm exhibits strength, Other, zero otherwise.
NUSC	(X15)	=	1 or 2 if firm exhibits concern, Non-US, zero otherwise.
NUSS	(X16)	=	1 or 2 if firm exhibits strength, Non-US, zero otherwise.
MC	(X17)	=	1 or 2 if firm exhibits concern, Military, zero otherwise.
MS	(X18)	=	1 or 2 if firm exhibits concern, Nuclear, zero otherwise.

DUMMY (INDICATOR) VARIABLES

F	(D1)	=	1 if firm is in IBES sector Financial, and zero otherwise.
H	(D2)	=	1 if firm is in IBES sector Health, and zero otherwise.
ConND	(D3)	=	1 if firm is in IBES sector Consumer Nondurables, and zero otherwise.
ConS	(D4)	=	1 if firm is in IBES sector Consumer Services, and zero otherwise.
ConD	(D5)	=	1 if firm is in IBES sector Consumer Durables, and zero otherwise.
E	(D6)	=	1 if firm is in IBES sector Energy, and zero otherwise.
TR	(D7)	=	1 if firm is in IBES sector Transportation, and zero otherwise.
TE	(D8)	=	1 if firm is in IBES sector Technology, and zero otherwise.
BI	(D9)	=	1 if firm is in IBES sector Basic Industries, and zero otherwise.
CG	(D10)	=	1 if firm is in IBES sector Capital Goods, and zero otherwise.

Table A1

Cross Sectional Regression 1991, Sample Size: 490

Std. Error of Regression: 0.276099, R-square: 0.101631

Correlation of Actual and Fitted Values: 0.318796

Variable	Estimate	St. Error	t-value	Prob > t
SP	-0.005783	0.035043	-0.165019	0.869
DSI	0.023391	0.038074	0.614365	0.539
CC	0.084349	0.080311	1.050275	0.294
CS	-0.020920	0.024313	-0.860460	0.390
EC	0.038427	0.034041	1.128824	0.260
ES	-0.002161	0.027304	-0.079155	0.937
ENVC	-0.000706	0.026902	-0.026238	0.979
ENVS	-0.004477	0.030800	-0.145344	0.885
PC	0.050673	0.027700	1.829344	0.068
PS	0.034780	0.034063	1.021031	0.308
WMC	-0.010244	0.072096	-0.142087	0.887
WMS	-0.038006	0.025991	-1.462282	0.144
OC	-0.016424	0.032399	-0.506918	0.612
OS	0.002761	0.066121	0.041756	0.967
MC	0.015908	0.026752	0.594649	0.552
MS	-0.016606	0.039946	-0.415702	0.678
CON	0.069141	0.072926	0.948092	0.344
F	0.142620	0.071193	2.003286	0.046
H	-0.148115	0.078720	-1.881546	0.061
ConND	-0.030585	0.069391	-0.440760	0.660
ConS	0.085606	0.066584	1.285669	0.199
ConD	0.112383	0.079316	1.416906	0.157
E	-0.017363	0.076694	-0.226394	0.821
TR	0.030469	0.095931	0.317610	0.751
TE	0.121838	0.072838	1.672718	0.095
BI	-0.020297	0.071784	-0.282755	0.777
CG	0.027071	0.067504	0.401026	0.689

Table A2

Cross Sectional (Semi-Log) Regression 1991, Sample Size: 490

Std. Error of Regression: 0.236924; R-square: 0.095816

Correlation of Actual and Fitted Values: 0.309542

Variable	Estimate	St. Error	t-value	Prob > t
SP	0.004033	0.030071	0.134104	0.893
DSI	0.023792	0.032671	0.728217	0.467
CC	0.047007	0.068916	0.682096	0.496
CS	-0.016535	0.020863	-0.792550	0.428
EC	0.014144	0.029211	0.484189	0.628
ES	-0.010482	0.023430	-0.447388	0.655
ENVC	0.002126	0.023085	0.092080	0.927
ENVS	-0.003612	0.026430	-0.136666	0.891
PC	0.040455	0.023770	1.701967	0.089
PS	0.028023	0.029230	0.958682	0.338
WMC	-0.004235	0.061867	-0.068458	0.945
WMS	-0.031591	0.022303	-1.416444	0.157
OC	-0.016373	0.027802	-0.588911	0.556
OS	0.004901	0.056739	0.086380	0.931
MC	0.009167	0.022956	0.399305	0.690
MS	-0.015851	0.034278	-0.462426	0.644
CON	0.060216	0.062579	0.962240	0.336
F	0.104888	0.061092	1.716888	0.087
H	-0.181609	0.067551	-2.688485	0.007
ConND	-0.046651	0.059545	-0.783456	0.434
ConS	0.054153	0.057137	0.947772	0.344
ConD	0.058575	0.068062	0.860612	0.390
E	-0.019455	0.065812	-0.295616	0.768
TR	0.010786	0.082320	0.131021	0.896
TE	0.053978	0.062504	0.863602	0.388
BI	-0.042071	0.061599	-0.682980	0.495
CG	0.010892	0.057926	0.188037	0.851

Table A3

Cross Sectional Regression 1992, Sample Size: 494

Std. Error of Regression: 0.304786; R-square: 0.151353

Correlation of Actual and Fitted Values: 0.389041

Variable	Estimate	St. Error	t-value	Prob > t
SP	-0.078091	0.037772	-2.067424	0.039
DSI	-0.008914	0.040983	-0.217501	0.828
CC	0.011469	0.106293	0.107903	0.914
CS	0.018319	0.025223	0.726281	0.468
EC	0.012767	0.029011	0.440064	0.660
ES	0.034732	0.025999	1.335903	0.182
ENVC	-0.001066	0.028143	-0.037882	0.970
ENVS	-0.070431	0.034129	-2.063691	0.040
PC	0.030916	0.027175	1.137650	0.256
PS	0.037850	0.034880	1.085168	0.278
WMC	-0.091677	0.097063	-0.944511	0.345
WMS	-0.002448	0.026425	-0.092637	0.926
OC	-0.010569	0.030379	-0.347890	0.728
OS	-0.075814	0.052380	-1.447375	0.148
MC	0.040060	0.029534	1.356393	0.176
MS	-0.047002	0.045448	-1.034192	0.302
CON	0.214287	0.079091	2.709352	0.007
F	-0.078938	0.078371	-1.007241	0.314
H	-0.319261	0.087650	-3.642459	0.000
ConND	-0.185296	0.076516	-2.421658	0.016
ConS	-0.028011	0.073752	-0.379803	0.704
ConD	0.002195	0.087787	0.025001	0.980
E	-0.004937	0.085961	-0.057431	0.954
TR	0.075399	0.104487	0.721617	0.471
TE	0.056453	0.080226	0.703681	0.482
BI	-0.043019	0.080779	-0.532546	0.595
CG	0.067439	0.075640	0.891571	0.373

Table A4

Cross Sectional (Semi-Log) Regression 1992, Sample Size: 494

Std. Error of Regression: 0.246193; R-square: 0.171293

Correlation of Actual and Fitted Values: 0.413876

Variable	Estimate	St. Error	t-value	Prob > t
SP	-0.060769	0.030511	-1.991739	0.047
DSI	-0.008196	0.033105	-0.247571	0.805
CC	0.021996	0.085858	0.256193	0.798
CS	0.023858	0.020374	1.170992	0.242
EC	0.010908	0.023434	0.465475	0.642
ES	0.030247	0.021001	1.440260	0.150
ENVC	0.002459	0.022733	0.108167	0.914
ENVS	-0.054799	0.027568	-1.987783	0.047
PC	0.031266	0.021951	1.424375	0.155
PS	0.014714	0.028174	0.522237	0.602
WMC	-0.082821	0.078403	-1.056342	0.291
WMS	-0.014225	0.021345	-0.666445	0.505
OC	-0.008291	0.024539	-0.337863	0.736
OS	-0.069139	0.042310	-1.634090	0.103
MC	0.041163	0.023857	1.725427	0.085
MS	-0.041242	0.036711	-1.123430	0.262
CON	0.179667	0.063887	2.812287	0.005
F	-0.077880	0.063305	-1.230249	0.219
H	-0.332003	0.070800	-4.689322	0.000
ConND	-0.183402	0.061806	-2.967361	0.003
ConS	-0.048629	0.059573	-0.816285	0.415
ConD	-0.016959	0.070910	-0.239159	0.811
E	-0.012397	0.069435	-0.178536	0.858
TR	0.048748	0.084400	0.577580	0.564
TE	-0.011644	0.064803	-0.179680	0.857
BI	-0.071074	0.065250	-1.089251	0.277
CG	0.031839	0.061099	0.521106	0.603

Table A5

Cross Sectional Regression 1993, Sample Size: 480

Std. Error of Regression: 0.219758; R-square: 0.201031

Correlation of Actual and Fitted Values: 0.448365

Variable	Estimate	St. Error	t-value	Prob > t
SP	0.049909	0.028137	1.773760	0.077
DSI	0.053999	0.029773	1.813707	0.070
CC	0.099290	0.085993	1.154640	0.249
CS	-0.011472	0.017245	-0.665239	0.506
EC	-0.001345	0.021179	-0.063494	0.949
ES	-0.001982	0.018090	-0.109573	0.913
ENVC	0.000012	0.020307	0.000604	1.000
ENVS	0.039569	0.023564	1.679257	0.094
PC	0.024184	0.020067	1.205137	0.229
PS	0.067867	0.024965	2.718450	0.007
WMC	0.038977	0.024404	1.597133	0.111
WMS	-0.023686	0.018044	-1.312648	0.190
OC	0.000754	0.020260	0.037237	0.970
OS	-0.013499	0.037686	-0.358200	0.720
MC	0.023165	0.021620	1.071466	0.285
MS	-0.000128	0.031810	-0.004019	0.997
CON	-0.243265	0.057888	-4.202351	0.000
F	0.078645	0.055830	1.408663	0.160
H	0.264472	0.062297	4.245375	0.000
ConND	0.158184	0.055363	2.857238	0.004
ConS	0.096735	0.053117	1.821163	0.069
ConD	0.038037	0.062708	0.606572	0.544
E	0.079748	0.061834	1.289719	0.198
TR	-0.082420	0.073543	-1.120707	0.263
TE	0.300740	0.059021	5.095446	0.000
BI	0.157678	0.056912	2.770549	0.006
F0	0.103954	0.054089	1.921909	0.055

Table A6

Cross Sectional (Semi-Log) Regression 1993, Sample Size: 480

Std. Error of Regression: 0.221912; R-square: 0.177258

Correlation of Actual and Fitted Values: 0.421020

Variable	Estimate	St. Error	t-value	Prob > t
SP	0.056408	0.028413	1.985291	0.048
DSI	0.056674	0.030064	1.885069	0.060
CC	0.112378	0.086835	1.294146	0.196
CS	-0.005847	0.017414	-0.335743	0.737
EC	-0.003502	0.021387	-0.163732	0.870
ES	-0.003595	0.018267	-0.196791	0.844
ENVC	0.001120	0.020506	0.054631	0.956
ENVS	0.043823	0.023795	1.841703	0.066
PC	0.030161	0.020264	1.488403	0.137
PS	0.062023	0.025210	2.460251	0.014
WMC	0.029379	0.024643	1.192182	0.234
WMS	-0.023618	0.018221	-1.296224	0.196
OC	0.001969	0.020458	0.096245	0.923
OS	-0.000822	0.038055	-0.021591	0.983
MC	0.026935	0.021832	1.233731	0.218
MS	0.004037	0.032121	0.125695	0.900
CON	-0.283076	0.058455	-4.842611	0.000
F	0.089115	0.056377	1.580700	0.115
H	0.267445	0.062907	4.251430	0.000
ConND	0.156944	0.055905	2.807321	0.005
ConS	0.106146	0.053638	1.978941	0.048
ConD	0.047323	0.063323	0.747327	0.455
E	0.097520	0.062440	1.561814	0.119
TR	-0.115089	0.074263	-1.549736	0.122
TE	0.258911	0.059600	4.344172	0.000
BI	0.165692	0.057470	2.883115	0.004
CG	0.116845	0.054619	2.139287	0.033

Table A7

Cross Sectional Regression 1994, Sample Size: 488

Std. Error of Regression: 0.453120; R-square: 0.097046

Correlation of Actual and Fitted Values: 0.311521

Variable	Estimate	St. Error	t-value	Prob > t
SP	-0.023623	0.057447	-0.411206	0.681
DSI	-0.055324	0.062601	-0.883760	0.377
CC	0.036388	0.158769	0.229186	0.819
CS	0.016946	0.034994	0.484259	0.628
EC	-0.037224	0.040292	-0.923854	0.356
ES	-0.013394	0.034345	-0.390000	0.697
ENVC	0.018173	0.040124	0.452916	0.651
ENVS	-0.023288	0.046179	-0.504293	0.614
PC	0.027648	0.042466	0.651054	0.515
PS	-0.085407	0.050351	-1.696237	0.091
WMC	-0.081483	0.047827	-1.703698	0.089
WMS	0.015764	0.035237	0.447388	0.655
OC	-0.001533	0.041658	-0.036805	0.971
OS	0.015987	0.071827	0.222574	0.824
MC	-0.016713	0.044220	-0.377949	0.706
MS	-0.012141	0.064407	-0.188509	0.851
CON	0.307563	0.116719	2.635076	0.009
F	0.183334	0.113279	1.618435	0.106
H	0.132066	0.124616	1.059785	0.290
ConND	-0.058956	0.112360	-0.524709	0.600
ConS	-0.056831	0.106967	-0.531292	0.595
ConD	0.000812	0.127333	0.006376	0.995
E	0.009845	0.124371	0.079161	0.937
TR	0.215083	0.153565	1.400601	0.162
TE	0.384220	0.120073	3.199890	0.001
BI	-0.037970	0.112725	-0.336838	0.736
CG	0.022108	0.108854	0.203093	0.839

Table A8

Cross Sectional (Semi-Log) Regression 1994, Sample Size: 488

Std. Error of Regression: 0.284026; R-square: 0.126658

Correlation of Actual and Fitted Values: 0.355890

Variable	Estimate	St. Error	t-value	Prob > t
SP	0.053616	0.036009	1.488946	0.137
DSI	-0.054868	0.039240	-1.398263	0.163
CC	0.039410	0.099520	0.396002	0.692
CS	0.023168	0.021935	1.056185	0.291
EC	-0.032787	0.025256	-1.298174	0.195
ES	0.015481	0.021528	0.719119	0.472
ENVC	0.010876	0.025151	0.432423	0.666
ENVS	-0.007338	0.028946	-0.253519	0.800
PC	0.018918	0.026619	0.710703	0.478
PS	-0.026126	0.031561	-0.827792	0.408
WMC	-0.046763	0.029979	-1.559841	0.119
WMS	-0.012078	0.022087	-0.546847	0.585
OC	-0.002477	0.026112	-0.094842	0.924
OS	0.028461	0.045023	0.632145	0.528
MC	0.020117	0.027718	0.725770	0.468
MS	-0.018905	0.040372	-0.468271	0.640
CON	0.198060	0.073162	2.707146	0.007
F	0.142520	0.071006	2.007170	0.045
H	0.075699	0.078112	0.969106	0.333
ConND	-0.081361	0.070430	-1.155216	0.249
ConS	-0.085745	0.067049	-1.278840	0.202
ConD	-0.039485	0.079815	-0.494710	0.621
E	-0.020972	0.077958	-0.269009	0.788
TR	0.130207	0.096258	1.352690	0.177
TE	0.116049	0.075264	1.541883	0.124
BI	-0.075556	0.070659	-1.069304	0.285
CG	-0.050614	0.068232	-0.741782	0.459

Table A9

Cross Sectional Regression 1995 Sample Size: 508

Std. Error of Regression: 0.285937; R-square: 0.092084

Correlation of Actual and Fitted Values: 0.303453

Variable	Estimate	St. Error	t-value	Prob > t
SP	0.018126	0.035357	0.512663	0.608
DSI	-0.001256	0.035631	-0.035256	0.972
CC	-0.025164	0.075356	-0.333933	0.739
CS	0.037997	0.020109	1.889575	0.059
EC	0.004958	0.025371	0.195415	0.845
ES	0.028495	0.021878	1.302462	0.193
ENVC	-0.036318	0.024008	-1.512752	0.131
ENVS	-0.014817	0.026586	-0.557306	0.578
PC	0.058472	0.028234	2.071013	0.039
PS	0.032350	0.031044	1.042052	0.298
OC	0.008227	0.024770	0.332141	0.740
OS	-0.001022	0.046856	-0.021818	0.983
MC	0.007163	0.028454	0.251732	0.801
MS	-0.056788	0.040516	-1.401614	0.162
CON	0.079529	0.070244	1.132170	0.258
F	0.104665	0.069267	1.511030	0.131
H	-0.076234	0.076983	-0.990265	0.323
ConND	0.056127	0.068290	0.821899	0.412
ConS	0.010249	0.065383	0.156752	0.876
ConD	-0.057683	0.077812	-0.741311	0.459
E	0.160488	0.074133	2.164872	0.031
TR	-0.038973	0.095261	-0.409118	0.683
TE	0.022553	0.072326	0.311821	0.755
BI	-0.026824	0.067434	-0.397791	0.691
CG	0.104172	0.067124	1.551931	0.121

Table A10

Cross Sectional (Semi-Log) Regression 1995 Sample Size: 508

Std. Error of Regression: 0.302939; R-square: 0.080505

Correlation of Actual and Fitted Values: 0.283733

Variable	Estimate	St. Error	t-value	Prob > t
SP	0.067420	0.037459	1.799829	0.073
DSI	0.004716	0.037750	0.124940	0.901
CC	-0.028505	0.079836	-0.357039	0.721
CS	0.034000	0.021304	1.595905	0.111
EC	-0.006288	0.026879	-0.233928	0.815
ES	0.030609	0.023178	1.320591	0.187
ENVC	-0.026068	0.025435	-1.024885	0.306
ENVS	-0.012566	0.028167	-0.446142	0.656
PC	0.056945	0.029912	1.903734	0.058
PS	0.049537	0.032890	1.506144	0.133
OC	0.010330	0.026243	0.393623	0.694
OS	0.007071	0.049642	0.142442	0.887
MC	0.022061	0.030146	0.731818	0.465
MS	-0.052273	0.042926	-1.217750	0.224
CON	0.018575	0.074421	0.249591	0.803
F	0.080875	0.073386	1.102046	0.271
H	-0.099225	0.081560	-1.216590	0.224
ConND	0.037689	0.072350	0.520923	0.603
ConS	-0.024002	0.069270	-0.346495	0.729
ConD	-0.062300	0.082438	-0.755711	0.450
E	0.113728	0.078541	1.448012	0.148
TR	-0.052200	0.100925	-0.517217	0.605
TE	-0.069050	0.076626	-0.901130	0.368
BI	-0.047920	0.071443	-0.670750	0.503
CG	0.014392	0.071115	0.202369	0.840

Table A11

Cross Sectional Regression 1996 Sample Size: 516

Std. Error of Regression: 0.167531; R-square: 0.100884

Correlation of Actual and Fitted Values: 0.317623

Variable	Estimate	St. Error	t-value	Prob > t
SP	0.003908	0.021054	0.185629	0.853
DSI	0.003097	0.020608	0.150261	0.881
CC	0.044990	0.045761	0.983150	0.326
CS	0.012391	0.012626	0.981405	0.327
EC	0.012234	0.015352	0.796903	0.426
ES	-0.007074	0.013116	-0.539325	0.590
ENVC	-0.009487	0.014598	-0.649863	0.516
ENVS	0.000541	0.015373	0.035159	0.972
PC	0.005883	0.015663	0.375576	0.707
PS	0.024622	0.018669	1.318867	0.188
OC	0.014901	0.015503	0.961190	0.337
OS	0.009929	0.024753	0.401116	0.689
NUSC	0.018594	0.029662	0.626850	0.531
NUSS	0.005924	0.036501	0.162304	0.871
MC	-0.010762	0.017297	-0.622193	0.534
MS	-0.033324	0.024775	-1.345024	0.179
CON	0.013101	0.041979	0.312080	0.755
F	0.120327	0.040792	2.949795	0.003
H	0.091610	0.045515	2.012758	0.045
ConND	0.099514	0.040852	2.435971	0.015
ConS	0.065552	0.038890	1.685558	0.093
ConD	0.099865	0.047785	2.089867	0.037
E	0.054398	0.046130	1.179238	0.239
TR	0.231705	0.058031	3.992741	0.000
TE	0.136091	0.042430	3.207436	0.001
BI	0.061079	0.040911	1.492957	0.136
CG	0.095810	0.039908	2.400763	0.017

Table A12

Cross Sectional (Semi-Log) Regression 1996 Sample Size: 516

Std. Error of Regression: 0.152577; R-square: 0.095176

Correlation of Actual and Fitted Values: 0.308506

Variable	Estimate	St. Error	t-value	Prob > t
SP	0.015417	0.019175	0.803997	0.422
DSI	0.004309	0.018769	0.229591	0.819
CC	0.040899	0.041676	0.981342	0.327
CS	0.012800	0.011499	1.113089	0.266
EC	0.010647	0.013981	0.761525	0.447
ES	-0.003208	0.011945	-0.268548	0.788
ENVC	-0.007036	0.013295	-0.529220	0.597
ENVS	0.002244	0.014001	0.160258	0.873
PC	0.005848	0.014265	0.409976	0.682
PS	0.021460	0.017002	1.262152	0.207
OC	0.010405	0.014119	0.736978	0.461
OS	0.011822	0.022543	0.524431	0.600
NUSC	0.018498	0.027015	0.684748	0.494
NUSS	0.005149	0.033243	0.154877	0.877
MC	-0.007929	0.015753	-0.503343	0.615
MS	-0.036028	0.022564	-1.596702	0.111
CON	0.000497	0.038232	0.012988	0.990
F	0.104582	0.037150	2.815094	0.005
H	0.076955	0.041452	1.856480	0.064
ConND	0.083413	0.037205	2.241971	0.025
ConS	0.047939	0.035419	1.353495	0.177
ConD	0.087369	0.043520	2.007565	0.045
E	0.040646	0.042012	0.967466	0.334
TR	0.197373	0.052852	3.734472	0.000
TE	0.101767	0.038643	2.633548	0.009
BI	0.052574	0.037260	1.411017	0.159
CG	0.078322	0.036346	2.154911	0.032