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# A Conditional Single Index model with Local Covariates for detecting and evaluating active portfolio management



Massimiliano Caporin<sup>a,\*</sup>, Francesco Lisi<sup>b</sup>

<sup>a</sup> Department of Economics and Management “Marco Fanno”, University of Padua, Italy

<sup>b</sup> Department of Statistical Sciences, University of Padua, Italy

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### ABSTRACT

The intercept of standard Single Index and Conditional Single Index models, the so-called alpha, is often used to evaluate the long-run performance of managed portfolios. However, this measure is not always appropriate for detecting the presence and impact of active management strategies. Based on the conditional factor models literature, we introduce a Conditional Single Index model where the time-varying alpha and beta parameters depend only on the past history of the underlying portfolio returns and of the benchmark returns. The dynamics of the parameters have two components: the first describes the long-term behaviour of the alpha and beta, whereas the second is associated with the short-term performance of the underlying portfolio. The interpretation of parameters allows the identification of portfolio managers who implement active management strategies. An application on a set of 1300 U.S. mutual funds shows how widespread active management is on the U.S. market.

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## 1. Introduction

One of the main purposes of portfolio managers is to “beat the benchmark”, making their financial products attractive for private and institutional investors. Extra-performances over the reference

\* Corresponding author at: Department of Economics and Management “Marco Fanno”, University of Padua, via del Santo, 22, 35123 Padua, Italy.

E-mail address: [massimiliano.caporin@unipd.it](mailto:massimiliano.caporin@unipd.it) (M. Caporin).

index could be produced, for instance, by implementing active management strategies such as security selection programs and tactical asset allocation choices. If portfolio holdings are not known, the financial literature often uses style analysis and conditional factor models to study ex-post the performances of managed products, see [Christopherson, Ferson, and Turner \(1998, 1999\)](#), among others. These methods give some insight into the effectiveness of portfolio management, but generally say very little about the type of active strategies implemented (i.e., security selection, tactical allocation, timing, static or dynamic strategies) and on their specific contribution to the overall return. More detailed analysis could be performed with a complete knowledge of portfolio composition and trades, following for instance [Daniel, Grinblatt, Titman, and Wermers \(1997\)](#) or [Wermers \(2006\)](#).

Usually, in conditional factor models the dynamics of the parameters is characterized by two components: a constant one and a term related to some economic and financial covariates. In this case, the identification of the appropriate covariates is fundamental to avoid omitted variable, collinearity or managers heterogeneity problems and to correctly detect active management presence and effectiveness. An additional critical issue of traditional conditional factor approaches is that non-fundamental strategies are not identified through quantitative covariates.

In this work we focus on portfolio performance evaluation and propose a model that tries to improve on the existing approaches. The first contribution of our proposal is the way of building conditioning variables. It is assumed that the only information available is time series of the portfolio and benchmark returns. Our covariates are extracted from the historical data through local estimates of the standard “unconditional” single index model. As a result, the model overcomes most of the previously mentioned problems related to the selection and relevance of covariates. A second contribution of this work is given by a proper and direct interpretation of model parameters. In our Conditional Single Index model, the time-varying alpha and beta still have two components, but with a well defined active management meaning: the intercept describes the long-term behaviour of alpha and beta, whereas the second component is associated with the short-term performances of the underlying portfolio. The intercept of the time-varying alpha can be also, interpreted as an overall measure of returns persistence. Furthermore, the parameter estimation, provides an interesting classification of managed portfolios.

With respect to existing approaches, the model we propose has some advantages: it overcomes the problem of appropriately selecting covariates; it enables investors to check the correspondence between portfolio objectives and performances (beating the benchmark and using active management strategies); it can be considered as an advanced tool in the selection of investment products for both private investors and “fund of funds” investment managers.

To show the potential of our modelling approach, we present an empirical applications based on a database containing U.S.-based mutual funds quoted in the period January 2000–September 2011 and investing in highly capitalized companies. We compare the performances of mutual funds which are still active at the end of the sample to those of funds which have been closed before September 2011. Moreover, we consider possible differences across mutual funds on the basis of their investment style. Our results support the common wisdom that active portfolio management strategies are applied by portfolio managers but their outcomes are not stable in the long run. Beating the benchmark might be feasible in the short run but the number of mutual funds with long run positive extra-performances with respect to large-cap benchmarks is very limited. In addition, Dead funds result to be identified as the group with a largest fraction of long run negative extra-performances.

The remainder of the paper is organized as follows: [Section 2](#) briefly reviews conditional factor models, highlights their connections with the analysis of portfolio performances and discusses some critical related issues; [Section 3](#) introduces the Conditional Single Index model with Local Covariates (COSILC) and describes its components. Issues related to model estimation are discussed in [Section 3.1](#) while [Section 3.2](#) is devoted to parameter interpretation and shows its connection with portfolios management style. [Section 4](#) provides an application on a database of 1300 U.S. Large mutual funds. [Section 5](#) concludes.

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