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Human capital values and returns: Bounds implied by earnings and asset returns data ☆

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Abstract

We provide theory for calculating bounds on both the value of an individual's human capital and the return on an individual's human capital, given knowledge of the process governing earnings and financial asset returns. We calculate bounds using U.S. data on male earnings and financial asset returns. The large idiosyncratic component of earnings risk implies that bounds on values and returns are quite loose. However, when aggregate shocks are the only source of earnings risk, both bounds are tight.

JEL classification: J24; G12

Keywords: Value of human capital; Return on human capital; Asset pricing

1. Introduction

A long-standing problem is to provide an empirical description of the value of an individual's human capital and the associated return on an individual's human capital. The value of human capital is in theory simply discounted future earnings. Thus, it is key to determine how an individual's earnings and an individual's stochastic discount factor comove. The main difficulty is that discount factor properties can only be inferred indirectly through data on financial asset returns or individual choices.

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One strategy for making progress on this problem is to take a structural approach and make parametric assumptions about preferences, as well as assumptions on the exact structure of an individual's decision problem. These parameters can then be estimated, and the value and return to human capital can be characterized using the stochastic discount factor produced by a solution to an empirically-motivated specification of this decision problem.

In this paper we take a different approach. We explore what can be said about individual human capital values and returns without making parametric assumptions on preferences and without solving such a decision problem. However, we assume that one knows two important things:

(1) a statistical model for financial asset returns and an individual's earnings; and
(2) some key properties of an individual's stochastic discount factor.

We assume this discount factor is non-negative, satisfies an Euler equation for each financial asset and is no more variable than some specified upper bound. These assumptions will not allow one to precisely value an individual's future earnings unless future earnings can be replicated by trade in financial assets. Nevertheless, upper and lower bounds on the value of human capital can be determined by pricing the earnings component that can be replicated by trade in financial assets and then bounding the value of the residual component of earnings.

We view the two approaches as being complementary. If the bounds approach puts tight bounds on values and returns, then this tells one that all the extra assumptions and additional data used in the structural approach can only serve to slightly narrow the value and return to human capital beyond what can be determined from earnings and asset returns data. In contrast, if the bounds approach implies very loose bounds, then this tells one that the additional data and assumptions employed in the structural approach are critical for reaching conclusions about the return to human capital.

We highlight one area in which an empirical understanding of the value and return to human capital is relevant. To maintain a constant fraction of overall wealth in stock holdings, an individual's direct financial holdings of stock and bonds need to be selected with the value of human capital in mind. If human capital is like stock, then the fraction of financial wealth held in stock would need to increase over the lifetime. If human capital is like risk-free debt, then the opposite reasoning applies. To make progress on this argument and give practical advice, one needs to investigate this *if condition* empirically. To do so, it is important to adopt the human capital value and return notions used in this paper: values and returns based on an individual's stochastic discount factor.

There are three main contributions of the paper. First, we show that value bounds imply return bounds. Second, we illustrate how all the concepts work within a simple example. Third, we calculate value and return bounds using U.S. data.

Value and return bounds for U.S. data are determined in two steps. We start by providing an empirical description of the joint dynamics of male earnings and stock returns. Given such a statistical model, we then calculate value and return bounds using the restriction that the coefficient of variation of an individual's stochastic discount factor is no larger than a given multiple of the conditional Sharpe ratio. If the Euler equation restriction is to hold, then this coefficient of variation must, at a minimum, be at least as large as the Sharpe ratio. We find that value and return bounds are very loose even after imposing that the coefficient of variation is at most 1.1 times the conditional Sharpe ratio. Specifically, for this upper limit the expected lifetime return to human capital must lie between -10 and 17 percent per year. This is almost exclusively due to the