

MACROECONOMIC FACTORS EFFECTS ON THE VENTURE CAPITAL INDUSTRY RETURNS

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ABSTRACT

The paper investigates the effects of different macroeconomic variables on the returns of the venture capital industry. The paper uses a quarterly time series dataset for the period between 1982 and 2006. An ARCH (1) model is used in the analysis. The analysis uses three methods of measuring the venture capital funds' returns: average time weighted internal rate of return (avwtirr), capital weighted time weighted internal rate of return (cwtirr) and pooled time weighted internal rate of return (pldwtirr). The VC funds returns are divided into categories based on different investment focus, different size and different fund sequence.

INTRODUCTION

The venture capital industry is a critical part of cash inflows and outflows within an economy. In the U.S., every year there are transactions amount to billions of US dollars. Much of the academic research was done to explore the mechanism of venture capitalists with their portfolio companies. The view of this paper is different as it tries to investigate the relationship between the venture capital industry and macroeconomic variables. The research is limited to the U.S. venture capital industry and its related economy.

METHODOLOGY

The methodology used to analyze the time series dataset is ARCH (1) [Autoregressive Conditional Heteroskedasticity (1)] model after taking the first difference of the variables:

$$E_t Y_{t+1} = a_0 + a_1 Y_t \quad (1)$$

Where,

E_t is the expected value of Y_{t+1} at time t.

Y_{t+1} is the dependent value at time t+1.

a_0 is the constant term.

Y_t is the dependent variable at time t.

In which:

Dependent variables = venture capital fund variables (average weighted time weighted internal rate of return, capital weighted time weighted internal rate of return and pooled time weighted internal rate of return) categorized to differentiate between VC funds' investment focus, size and fund sequence.

Independent variables = macroeconomic variables (M1, certificate of deposit rate, share prices, NASDAQ composite, unemployment rate, trade balance, household expenditure, change in inventory, gross savings and GDP deflator.).

The time series quarterly dataset starts from the first quarter of 1982 and ends on the fourth quarter of 2006. The starting date of 1982 is selected for two reasons. First, the venture capital industry is seriously started to get inflows after 1979 which experienced the effect of the Employee Retirement Income Security Act's (ERISA) "prudent man" rule (Gompers, 2001). And second, examining the venture capital data source (VentureXpert) shows that prior to 1982 there was no significant number of observations. Hence, the starting date of 1982 seems justified.

The compiled dataset is collected from two sources. The first source is the Securities Data Corporation (SDC) – VentureXpert Database (VE). From which, the dependent variables that are specific to the venture capital industry were downloaded. The second source is International Monetary Fund (IMF) International Financial Statistics (IFS) database. From which, the independent variables of macroeconomic variables were downloaded.

SUMMARY OF RESULTS

The first part of the results relates the whole pool of venture capital funds (using the three methods of return calculations: average time weighted internal rate of return, capital weighted time weighted internal rate of return and pooled time weighted internal rate of return) to the macroeconomic factors. The results show that the change of avwtirr has no significant sensitivity to the different macroeconomic variables except for a marginal negative significance (at the 10% level) to the change of CD rate. Hence, as the change in CD rate decreases from one quarter to another, the change in avwtirr increases. The results also show that the change of M1 money supply is positive and significant to the change of cwtwirr, the change of NASDAQ is positive and significant to both the change of cwtwirr and pldtwirr, and share prices variable is only significant and negative if the pldtwirr is used. Moreover, the change in unemployment rate shows a positive and significant relation with cwtwirr, the change of both the trade balance and change in inventory is significant and negative to cwtwirr while only the change in inventory is negative and significant to pldtwirr.

The second part of the empirical analysis divides the general pool of venture capital funds into more specific categories. These categories differentiates between funds' returns based on investment focus, size and fund sequence. The results of this section show that change of NASDAQ is always positive and significant in all results regardless of the investment focus of the venture capital fund. However, the change of inventory is negative and significant only for the venture capital funds with later investment focus regardless of the return measurement used. Venture capital funds' sizes are affected differently by the macroeconomic factors. For example, VC funds with size of more than 250 million USD (largest group) are extremely affected by the macroeconomic factors as all of the macroeconomic factors are statistically significant. On the other hand, VC funds with size of less than or equal to 10 million USD (smallest group) are marginally affected by the change of unemployment rate and change of inventory.

And finally, the empirical results differentiate between venture capital returns based on fund sequence (whether it is the first fund to be initiated or act as a follow-on fund to a previous fund). Regardless of fund sequence, change of NASDAQ is always positive and significant in both groups while share price variable is negative and significant. However, fund sequence differs in its sensitivity to the change of M1 money supply and the change of inventory. For example, the change of inventory is consistently negative and statistically significant in the case of follow-on returns but not statistically significant in the case of a new venture capital fund.

REFERENCES

Available upon request