

Financial Econometrics

Multiple regression

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How do firms choose the level of debt they want to hold? In this session you will evaluate four different determinants of the debt level. Below you find a list including the variable name in brackets as well as the economic rationale for investigating that variable.

- Tax benefits: interests are tax deductible. The more interests you pay, the lower your effective tax rate. (EffectiveTaxRate)
- Management discipline: higher level of tax will force management to serve debt-associated costs rather than using funding on non-profitable projects. Institutional investors often impose more debt on management due to the disciplining effect. (InstitutionalHoldings)
- Variance of income: the more variable a firm's income is the higher the chance of bankruptcy, and the higher the chance that creditors do not get their payments (EBITDA_EV)
- Collateral: Firms with a lot of tangible might have an easier time raising debt, as they can pledge collateral. (NetPPE_TotalAssets)

Please use *Data_lab_multiple_regression.csv*.

Please complete the following tasks:

1. Load the data and winsorize all variables at the 1% level.
2. Estimate regression: Estimate five different regressions models explaining a firm's debt level *MarketDebt_Capital* by the aforementioned determinants. Construct four simple regressions using one determinant per regression and one multiple regression including all four determinants. Report the results in a stargazer table. Make sure that you report t-values rather than standard errors.
3. Joint hypothesis test for multiple coefficients. Test whether only InstitutionalHoldings and NetPPE_TotalAssets matter, in other words whether EBITDA_EV and EffectiveTaxRate are jointly zero. Construct the appropriate H0 and use *linearHypothesis()* from the *car* package. In addition, compute the relevant F-statistic and p-value manually.
4. Single restriction on multiple coefficients. Test whether the effect of InstitutionalHoldings and NetPPE_TotalAssets is the same. Construct the appropriate H0 and use *linearHypothesis()* from the *car* package. In addition, transform the regression so that the restriction becomes a restriction on a single coefficient.