

Foreign direct investments by capital arbitrage models:  
The loss of their validity and China's special case

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# 1 Extended Abstract

Negative interest rate policies to incentivize economic subjects spending and investing money for long term growth is getting more popular in times of needs for positive shocks or stability. The policy, however, can only affect the liquidity within the domestic country, the aim of the investment is not set. So foreign countries profit by getting spillover effects without having to face a higher inflation rate. Empirical results of separated interest rates' effects on FDI are significantly negative in a Random Effects, Fixed Effects and Hausman-Taylor estimation. We can justify the usage of these static models over dynamic models theoretically and statistically for this research. Because outward FDI positions can occur negatively, we in addition provide three different transformation functions and their effects on the dataset structure to solve the log-linearisation problem efficiently. Our contributions are the comparison of non-negativity transformation functions, the redefinition of the role of interest rates determining FDI and the explanation of reasons for China's special case regarding the role of interest rates on outward FDI. Instead of the volatile FDI flows, the dependent variable in our research is bilateral outward FDI stock since it reflects economic activity abroad more precisely and has econometric advantages to be discussed in more detail in the course of work. In these datasets of FDI between Organisation of Economic Co-operation and Development (OECD) members in the years 2003 to 2013 and China's FDI in 156 foreign countries in the years 2003 to 2012, a non-neglect-able share of negative and real zero FDI positions occur. Negative positions result from higher liabilities to the partner country in comparison to their income. Therefore, the standard procedure for gravity models, calculating with logarithms (logs), is not as effortless as it is in many estimations for bilateral trade, where negative values do not exist. We compare three different functions to compute transformed logs of FDI and discuss advantages and disadvantages for each of them.

$$\begin{aligned}y &= \log \left[ x + \sqrt{(x^2 + 1)} \right] = \log1sto; \\y &= \log [x - \min(x) + 1] = \log2sto \\y &= \log \left[ \frac{x - \min(x)}{\max(x) - \min(x)} \cdot \lambda \right] = \log3sto\end{aligned}\tag{1}$$

For *log1sto* we use Busse and Hefeker's (2007) transformation. Squaring the actual observation  $x$  and adding one ensures positivity in the root regardless of what value of  $x$  is assumed. Although this method is actually the inverse hyperbolic sine function, Busse and Hefeker's (2007) contribution is widely accepted in academic research and is often related to them. The second transformation *log2sto* for the FDI stocks shifts the observations interval into the positive. *log3sto* is the third transformation from absolute values to logs. Again, we subtract the minimum of observations from  $x$  and scale it on the range of observations with  $\max(x) - \min(x)$  in the denominator. When taking logs, the size of the interval is highly relevant due to the logarithm compression ability, therefore, it is multiplied by  $\lambda$ . Firstly, we set  $\lambda = 1$  resulting in negative transformed values with the maximum of zero. Unlike *log1sto* and *log2sto*, transforming with *log3sto* deletes one observation, because the numerator gets zero for the minimum of observations and log transforming is not possible. We compare these transformations with random generated numbers for different distributions

(Figure 1). With respect to the chosen control variables from the gravity model setting and the individual

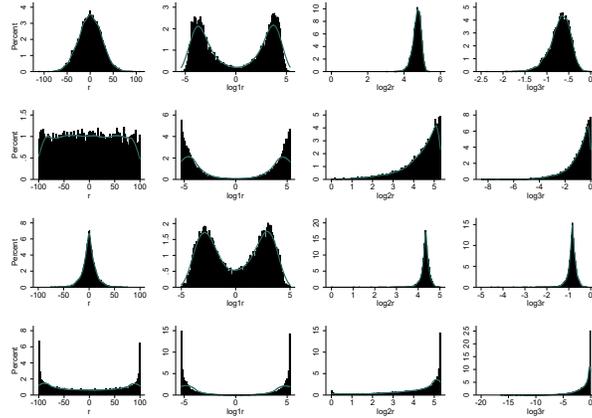


Figure 1: Histograms of Transformation Functions

parts of the economic index of freedom, we develop four hypotheses which are to be tested in the empirical section.

**Hypothesis 1** *The impact of interest rates on inflation is national while it is international on investments.*

**Hypothesis 2** *The domestic interest rate determines outward FDI significantly negative.*

**Hypothesis 3** *The foreign interest rate determines outward FDI significantly negative.*

**Hypothesis 4** *China's outward FDI is neither driven by domestic nor by foreign interest rates.*

We conclude that the choice between transformation functions highly affects outcome as figure 1 shows. H1 cannot be rejected with our models chosen for OECD countries. It should be mentioned that only the second part, the international effect of interest rates, is tested sufficiently. The estimation results suggest that both interest rates affect investments separately. Even though cross correlation indicates that interest rates' impact on inflation is only national, the validity of these results is statistically vulnerable. We use these results in combination with previous studies about the linkage of inflation with interest rates and economic theory as a reason to not reject H1. Since H2 and H3 cannot be rejected for OECD countries either, established capital arbitrage theories can be rejected and this established model fails to explain observed investments. Both interest rates of countries  $i$  and  $j$  negatively affect outward FDI of country  $i$  in  $j$  separately. The theoretically assumed positive impact of interest rates in country  $j$  cannot be observed. The gravity model confirms its relevance and validity as a provider for control variables over all models with its highly significant impact factors. H4 neither can be rejected. China again shows different results. Outgoing investments seem to be driven by other factors than interest rates. Large capital stocks of multinational enterprises make China independent of interest rates and lead to more strategic based investments in comparison to OECD countries.