# Solution to Asset Financing Constraint for Brazilian Funds (FIDC): Correlation Between Aggregate Receivables Purchase and Aggregate Cash Flows to Funds

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## Background & Motivation

Trade credit is an important source of financing in countries where monetary policies are restrictive and financial institutions are not well developed. In this study, we focused on the trade credit extension in Brazil, since its firms seek trade credit as a substitution to credit loans and have seen a rise of trade credit usage in the past few years, a different trend than that in the U.S. and other Latin America countries [1]. Receivables indirectly go from firms to funds (FIDCs), who would demand receivables to replace paid-off credit loans and to demand assets for their investors. Since receivables purchase is helpful for FIDCs growth and market activity, exploring its indicators can be beneficial.

## Research Questions

1) How is aggregate receivables purchases correlated with aggregate cash flows to FIDCs?
2) Does aggregate purchase of receivables correlate with the economic condition and FIDCs' size?

## Data

Since the underlying data are proprietary at the Central Bank of Brazil, I used mock-up data created by Henry Zhang, my MIT UROP mentor.
- Data set merge: created a new data set that merges four data sets to incorporate all relevant variables.
- Data tidying: created a new dataframe to capture the aggregated purchase that sums the transactions in df_fund_firm by time and firm level, which records all purchases of receivables with each row representing one transaction, since we are only interested in the aggregate receivables in a month.

The merged data set has 840 rows and 19 columns, with each row representing one fund in one month, and this subset of data has 10 firms from 2017-01 to 2023-08.

Note: both variables aggregate purchase and aggregate cash flows are kept in the unit of Brazilian real (BRL), because aggregate cash flows can be and some are negative in the given period, therefore cannot be logged.

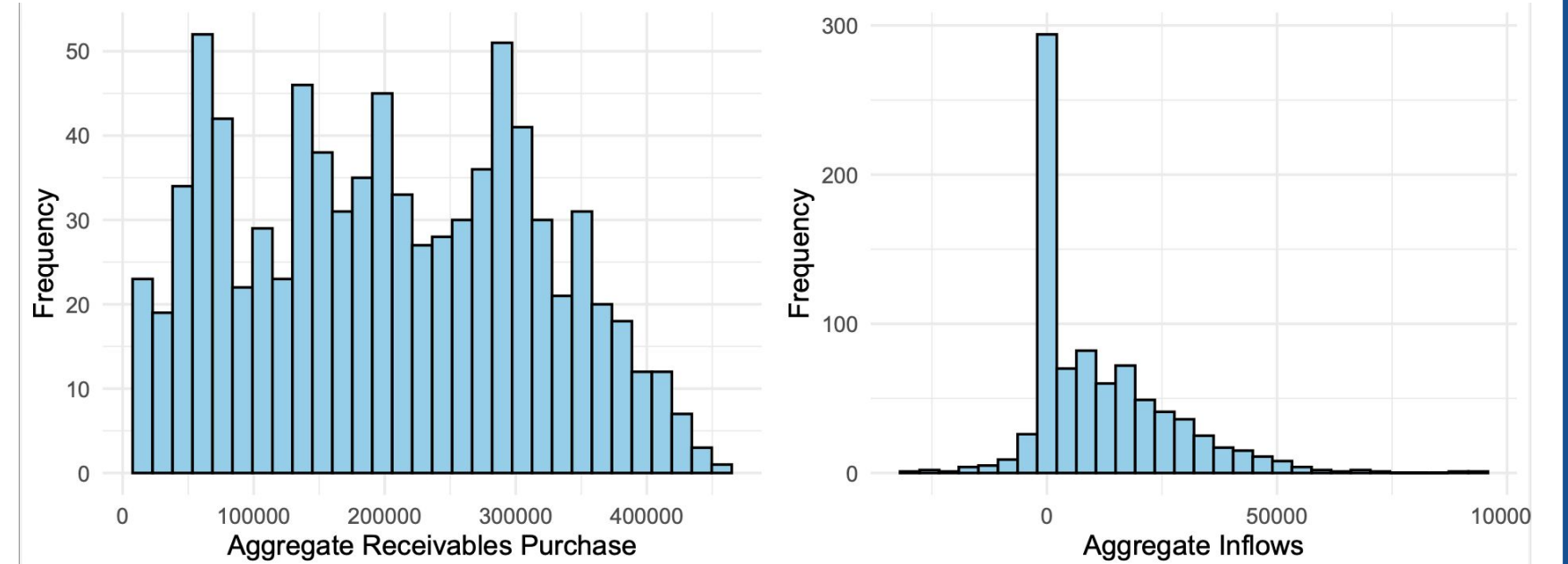**Figure 1. Distribution of Aggregate Variables (BRL)**



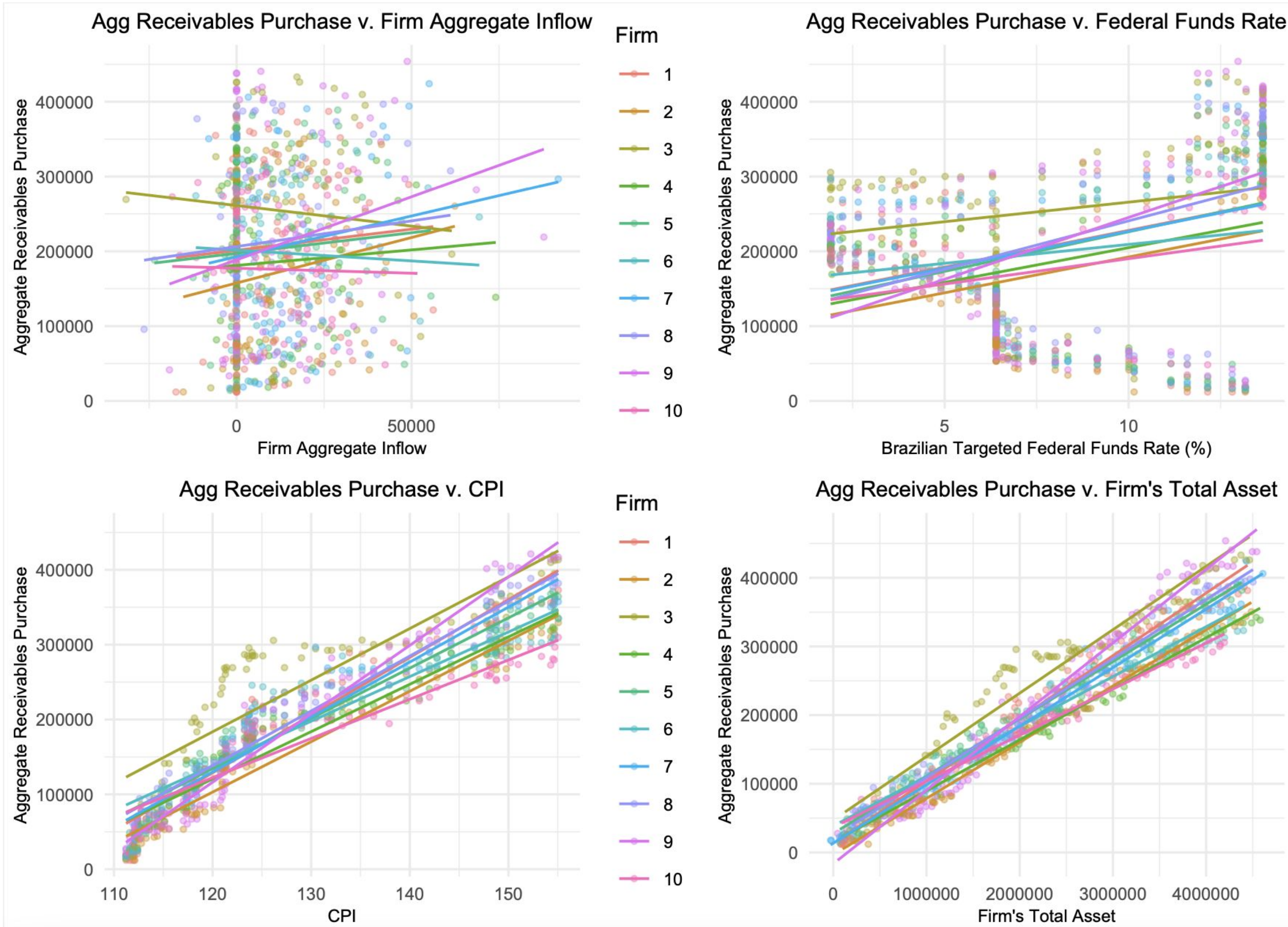## Figure 2. Relationship Between Aggregate Receivables Purchase and Indicators



## Figure 3. Results of Models

| | Model 1 (Aggregate flow) | Model 2 (Agg flow + selic + cpi) | Model3 (Agg flow + cpi + nav) |
|---|---|---|---|
| **BIC** | 19774.16 | 18901.76 | 18620.91 |
| **Adjusted R^2** | 0.958 | 0.956 | 0.965 |
| **Intercept** | 21999.940 (.0037**) | -795206.415 (.0038**) | 381503.517 (<.001***) |
| **Aggregate Cash Flow** | 0.593 (<.001***) | 0.578 (<.001***) | 0.553 (<.001***) |
| **Targeted Federal Funds Rate** | | -3307.180 (0.879) | |
| **CPI (Consumer Price Index)** | | 7737.048 (<.001***) | -3285.223 (<.001***) |
| **Firm's Total Asset** | | | 0.118 (<.001***) |

**Figure 4. Residual v. Fitted Values Plot for Model 3**
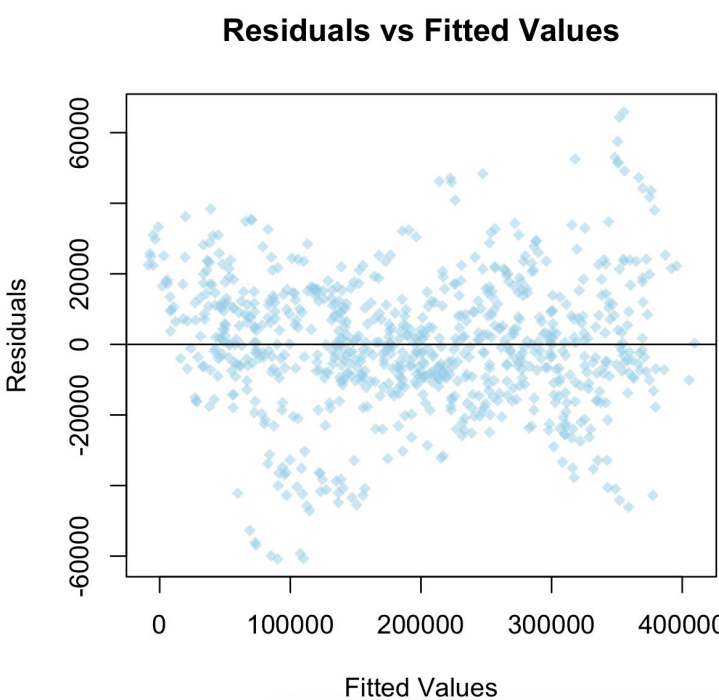


## Answer to RQ1

Model 1 is a simple regression that attempts to answer RQ1. The result shows that there is a positive relationship between the two, indicating that a higher cash inflow is associated with larger purchase of receivable of funds.
This and all following regressions take into account that the firms appears multiple times in the data set in different time periods.

## Answer to RQ2

The aggregate purchase of receivables is positively correlated with the Brazilian economic condition and FIDC's size.
- Model 2 incorporates indicators of the economic condition:
  - Brazilian federal funds rate: when the rate is raised, funding costs increases, disencouraging consumption and investment in the economy [2]
  - CPI: a higher CPI indicates there is rising inflation pressure in the economy
  → CPI is a useful indicator of the economic condition
- Model 3 is the best model (BIC decreases and adjusted R^2 increases, and ANOVA produces a statistically significant F-value with p-value<.001), which only incorporates CPI from model 2 to indicate the economic condition, and add FIDC's total assets as an indicator of firm size.
  - The result of model 3 suggests that aggregate purchase of receivables negatively correlates with CPI and positively correlates FIDC's total asset.

## Conclusion and Discussion

Our results from model 3 can be explained by the mechanism of Brazilian FIDC receivables usage:
- A positive correlation between aggregate receivables purchase and aggregate cash flow agrees with the mechanism that FIDCs purchase receivables to require assets for investors, who are also their shareholders. Thus, FIDCs would demand a larger amount of receivables when they have larger net cash flow.
- A negative correlation between aggregate receivables purchase and the Brazilian CPI has the mechanism of when CPI increases, there are more inflation pressure on the economy and may lead to higher interest rate. This can erode the real value of purchases, and discourages investment, leading to FIDCs becoming reluctant to purchase receivables.
- A positive correlation between the total asset of FIDCs and their aggregate receivable purchase is reasonable since larger firms might have larger cash flows, higher asset demand, and more access to purchasing receivables.

[1] Saito, Richard & Bandeira, Márcia. (2010). Empirical Evidence of Trade Credit Uses of Brazilian Publicly-Listed Companies. BAR : Brazilian Administration Review. https://doi.org/10.1590/S1807-76922010000300003
[2] Banco Central Do Brazil government website. Selic rate. Retrieved from https://www.bcb.gov.br/en/monetarypolicy/selicrate