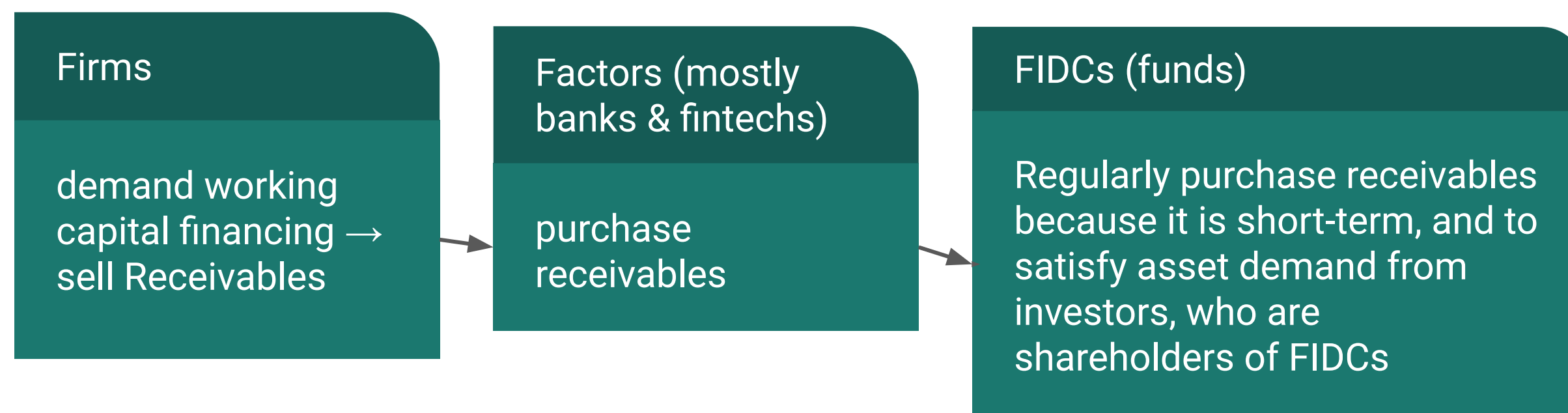


# Solution to Asset Financing Constraint for Brazilian Funds (FIDC): Correlation Between Aggregate Receivables Purchase and Aggregate Cash Flows to Funds

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## Background

Firms demand working capital financing, of which factoring (the sale of accounts receivable) is one type, because their cash inflows don't match their cash outflows. Factors (mostly banks and fintechs) purchase the receivables from firms, and in turn sell some of the receivables to funds called FIDCs, who securitize debt similarly to a collateralized loan obligation. Funds regularly purchase receivables because receivables are short-term (most purchases are to replace paid-off receivables) and there is asset demand from investors who are shareholders in the fund. Net inflows from these investors changes how much funds purchase.



## Research Questions

- 1) How is aggregate receivables purchases correlated with aggregate flows to FIDCs
- 2) Does economic condition and firm performance correlate with the aggregate purchase of receivables

## Data

Since the underlying data of the financial intermediation of trade credit are proprietary at the Central Bank of Brazil, I used mock-up data created by Henry Zhang, my MIT UROP.

There are three categories of data sets:

- Asset issuance (df\_fac\_nr, df\_fac\_r, fof\_fsbm\_nr, fof\_fsm\_rec, foc\_fsbm\_nr, foc\_fsm\_rec)
- Fund flows (df\_fund\_flows is at the fund-shareholder-transaction level, df\_fund\_flows\_panel aggregated to the fund-month level)
- Fund and asset snapshots

After fully exploring all relevant data set, I created a new data set that merges four of the above data sets to incorporate all relevant variables (selic from df\_rates, flows from df\_fund\_flows\_panel, purchase (expected\_pur) from df\_fund\_firm, return from df\_nav).

Data tidying: created a new dataframe df\_receivables\_purchase to capture the aggregated purchase that sums the transactions in df\_fund\_firm by time and firm level, as df\_fund\_firm records all purchases of receivables with each row representing one transaction, yet 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 I am using has 10 firms with time from 2017-01 to 2023-08. (will generate data for more firms).

## Models and Analysis

In order to study RQ1, model 1 is a simple regression that attempts to explain the correlation of aggregate receivables purchase and aggregate inflow. 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.

The best model (model 3; BIC decreases and adjusted  $R^2$  increases, and ANOVA produces a statistically significant F-value with  $p\text{-value} < .001$ ) suggests that there is a positive relationship between aggregate purchase and cash inflow and nav respectively, and a negative relationship with CPI. This model incorporates variables that indicate the economic situation and firm's financial standing:

- selic: target for Brazilian federal funds rate
- cpi: Consumer Price Index (CPI), a higher CPI indicates there is rising inflation pressure in the economy
- nav: total assets of each fund

Note: both aggregate purchases and aggregate cash flows are kept in the unit of \$, because aggregate cash flows can be negative in the given period and many values are negative, therefore cannot be logged, table 2 explores the distribution of these two variables

Table 1. Results of Models

	Model 1 (Aggregate Inflow)	Model 2 (Aggregate Inflow + selic + cpi)	Model3 (Aggregate Inflow + selic + cpi + nav)
BIC	21909.55	18901.76	18674.82
Adjusted R <sup>2</sup>	0.005439	0.9084	0.9315
Intercept	196127.833 ( $<.001^{***}$ )	-772104.071 ( $<.001^{***}$ )	158257.837 ( $<.01^{**}$ )
vl_inflow_net	0.591 ( $<.05^*$ )	0.585 ( $<.001^{***}$ )	0.578 ( $<.001^{***}$ )
selic		-6346.135 ( $<.001^{***}$ )	680.85 (1)
cpi		7814.477 ( $<.001^{***}$ )	-1437.261 ( $<.05^*$ )
nav			0.101 ( $<.001^{***}$ )

Table 2. Residual vs fitted values plot for Model 3

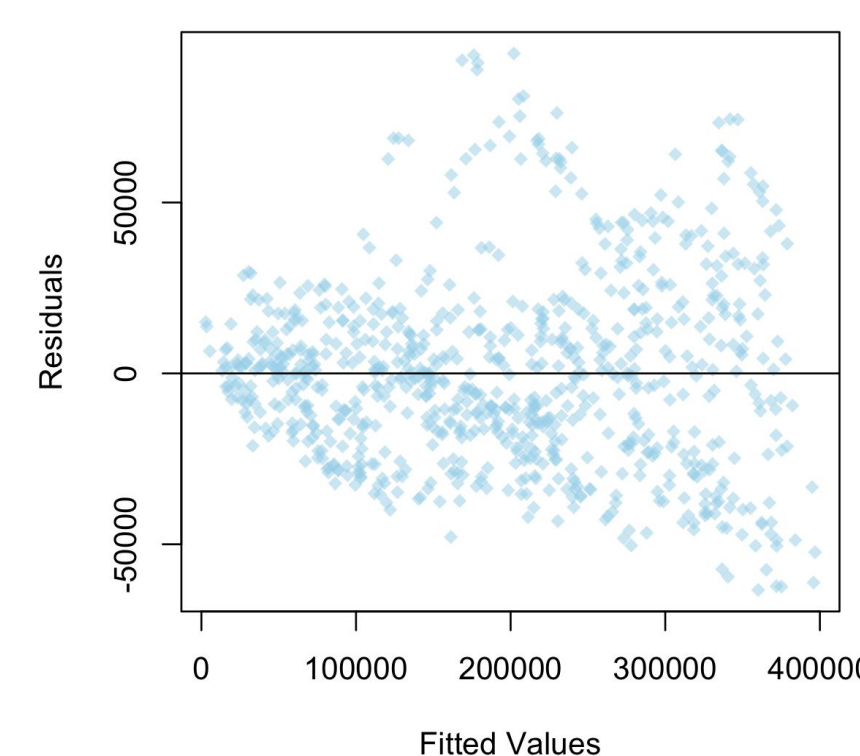
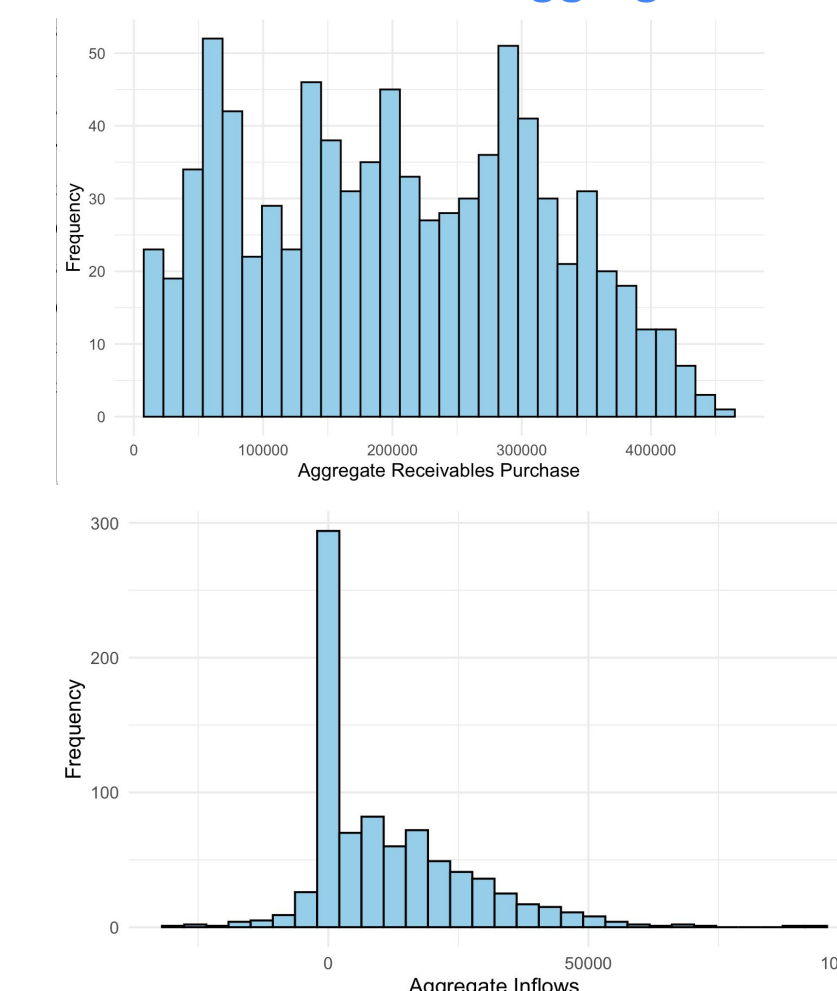


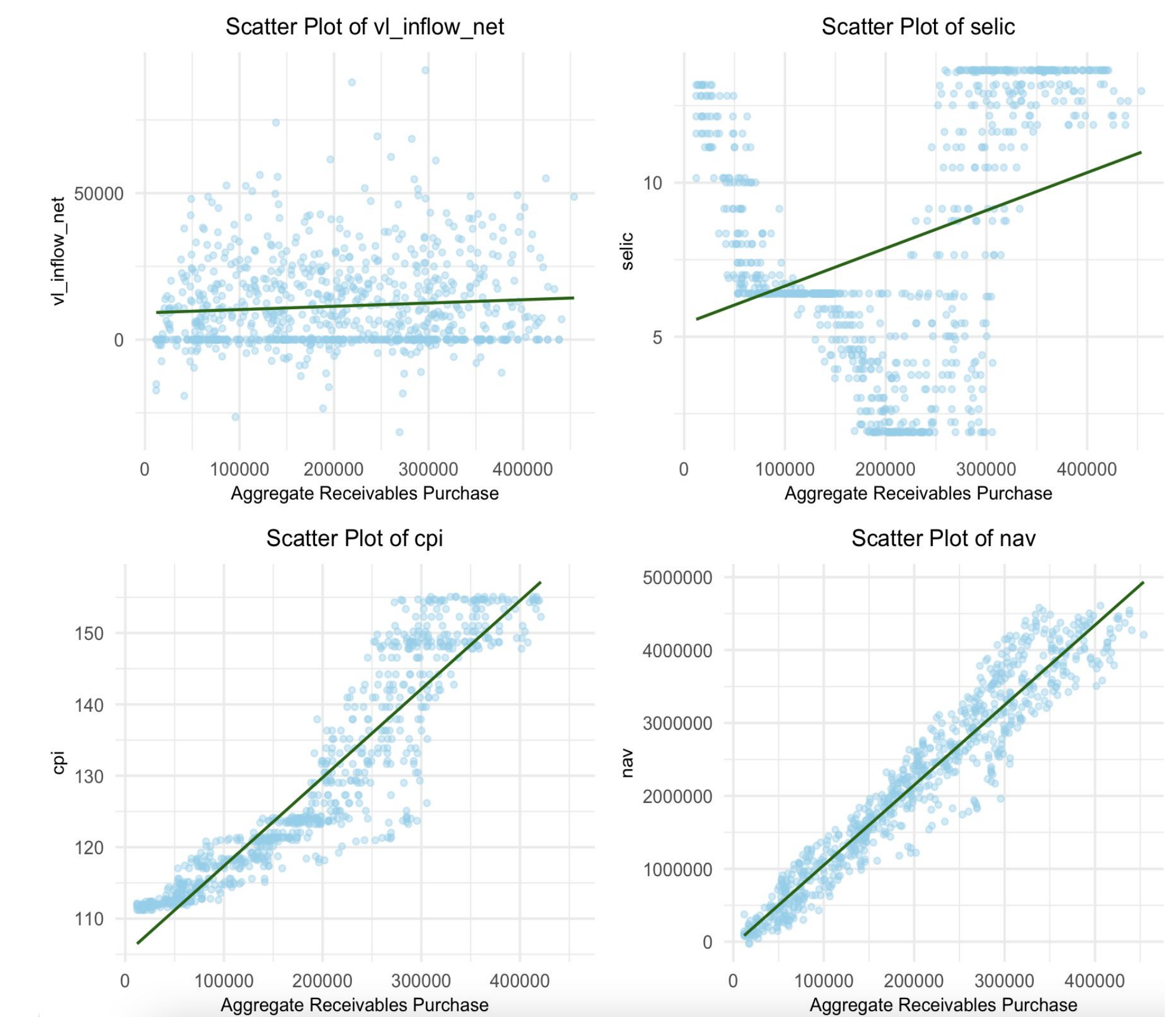
Table 3. Distribution of Aggregate Variables (\$)



## Conclusion and Discussion

Our results from model 3 can be explained by the mechanism of Brazilian FIDC receivables usage. A 1 dollar increase in aggregate cash flow to funds is correlated with 0.58 dollar increase in aggregate receivables purchase, which confirms the hypothesis that FIDCs use receivables as a way to finance their asset, and thus would demand a larger amount of receivables when they are seeking cash inflows. A negative correlation between the Brazilian CPI and aggregate receivables purchase has the mechanism of when CPI increases, there are more inflation pressure on the economy and implies that firms will pay a higher price for receivables since the supply is inelastic, which discourages them from purchasing. A positive correlation between the total asset of FIDCs and their aggregate receivable purchase suggests that larger firms might have higher level of aggregate purchase, which is a reasonable relationship since larger firms might have higher asset demand and more access to purchasing receivables.

Table 4. Relationship between aggregate receivables purchase and all other indicators in Model 3



## Limitations & Future Directions

Before Ruhlman:

- explore missing data and find ways to handle them instead of directly dropping
- check mixed-effect model (fix the code)
- try to handle aggregate \$
- add citation