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Wall and Main: Assessing Aggregations of Public Firms and Macroeconomic Accounts

Introduction

Businesspeople and investors often treat basic macroeconomic accounts like GDP as indicators for their firms' revenues and profits. Indeed, the simplified circular flow model of the economy—familiar to all introductory economics students—implies that economic output and the sum of all firms' revenue should relate closely. However, this assumption needs constant reassessment. First, macroeconomic accounts like GDP represent the value of *final* goods and services produced in the *United States*—companies that sell internationally or produce inputs for other companies will find that their firm-level flows might not impact US macro variables. Second, economic shifts, both cyclical and secular, might change the relationship between macroeconomic accounts and firm-level data. Finally, the baseline relationship for subsets of firms, like large public firms represented in stock indices, might not be one-to-one with the rest of the economy.

These observations require continual reexamination into the relationship between businesses and the well-publicized macro figures. This paper will examine a database of large public companies from 2012 to 2022 alongside macro variables to find which and to what magnitude they relate to each other.

Data

Firms

I calculated firm aggregations with data from S&P CompustatIQ via the Wharton Research Data Service (WRDS). My primary variables of interest are revenues, profits, and enterprise value.

Not all firms report every financial quarter: some report annually or semi-annually. Likewise, some firms move in and out of the dataset due to bankruptcies, delistings, and initial public offerings. I allow firms to enter and exit the dataset once—I filter away a public firm that leaves and then becomes public again, like, for example, Dell. The resulting dataset includes 4,301 firms and 107,827 firm-quarter observations which I sum into 44 quarters (2012Q1 to 2022Q4).

Macro

On the macro side, I gather several quarterly time series from the Federal Reserve. Below I list the accounts and their definitions.

All for *non-financial corporate businesses* (except for those notated with *)

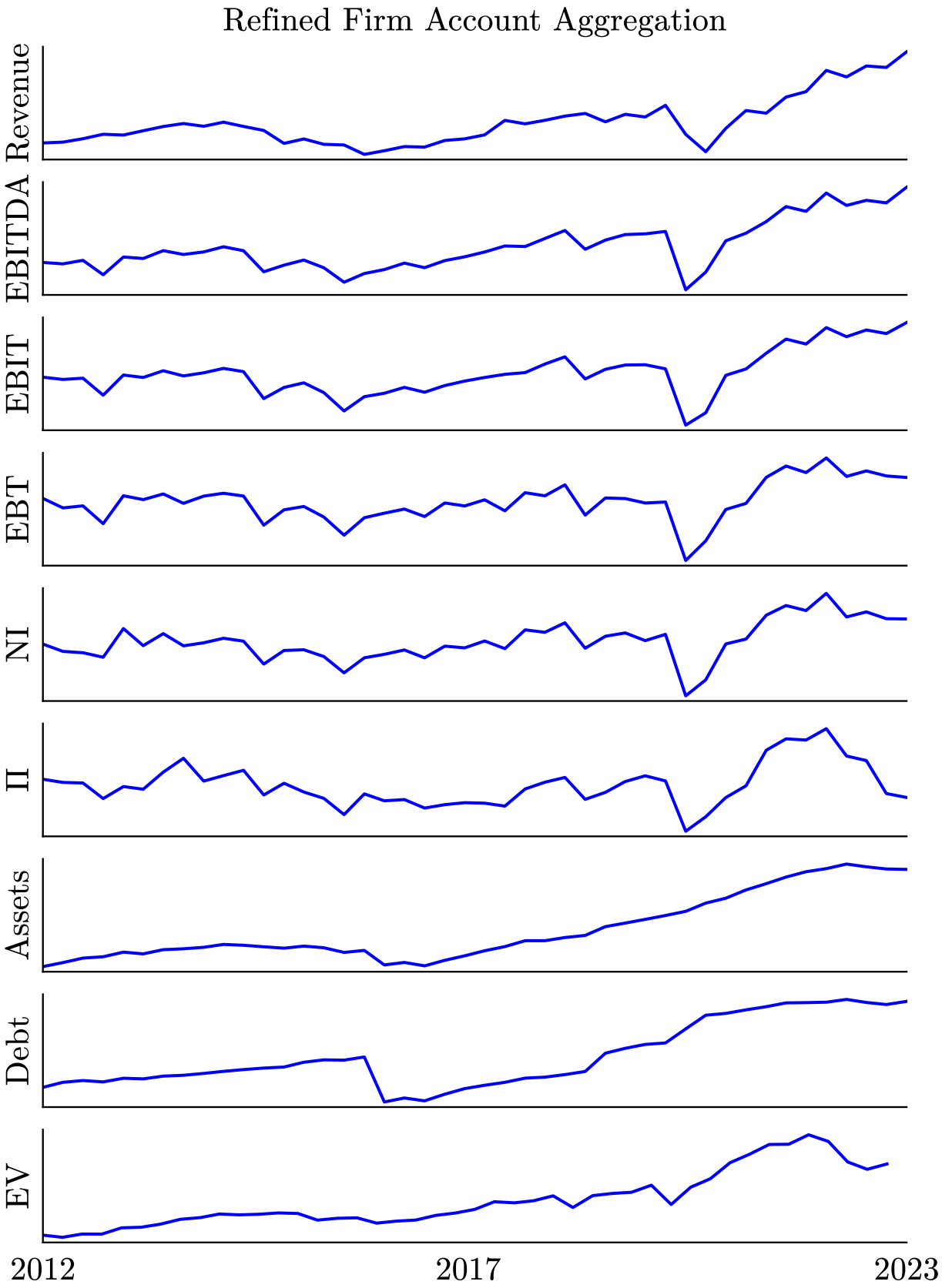
- Nominal GDP*: `NGDPSAXDCUSQ`
- Debt: `TCMILBSNNCB`
- Debt as % of market value: `NCBCMDPMVCE`
- Profits Before Tax (without IVA and CCAdj): `BOGZ1FU106060005Q`
- Profits Before Tax (with IVA and CCAdj): `BOGZ1FU106060035Q`
- Total Assets: `TABSNNCB`
- Total Liabilities: `TLBSNNCB`
- Total CapEx (transactions): `BOGZ1FU105050005Q`
- Gross Value Added of Nonfinancial Corporate Businesses: `BOGZ1FU106902501Q`
- Net Value Added of Nonfinancial Corporate Businesses: `BOGZ1FU106902605Q`
- Revenue, Excluding Indirect Sales Taxes, (transactions): `BOGZ1FU106030005Q`
- Earnings Before Interest and Tax: `BOGZ1FU106110115Q`
- Retained Earnings: `BOGZ1FU106110405Q`
- Taxes on Corporate Income: `BOGZ1FU106231005Q`

GVA is the value of all firms' revenue minus the input costs.

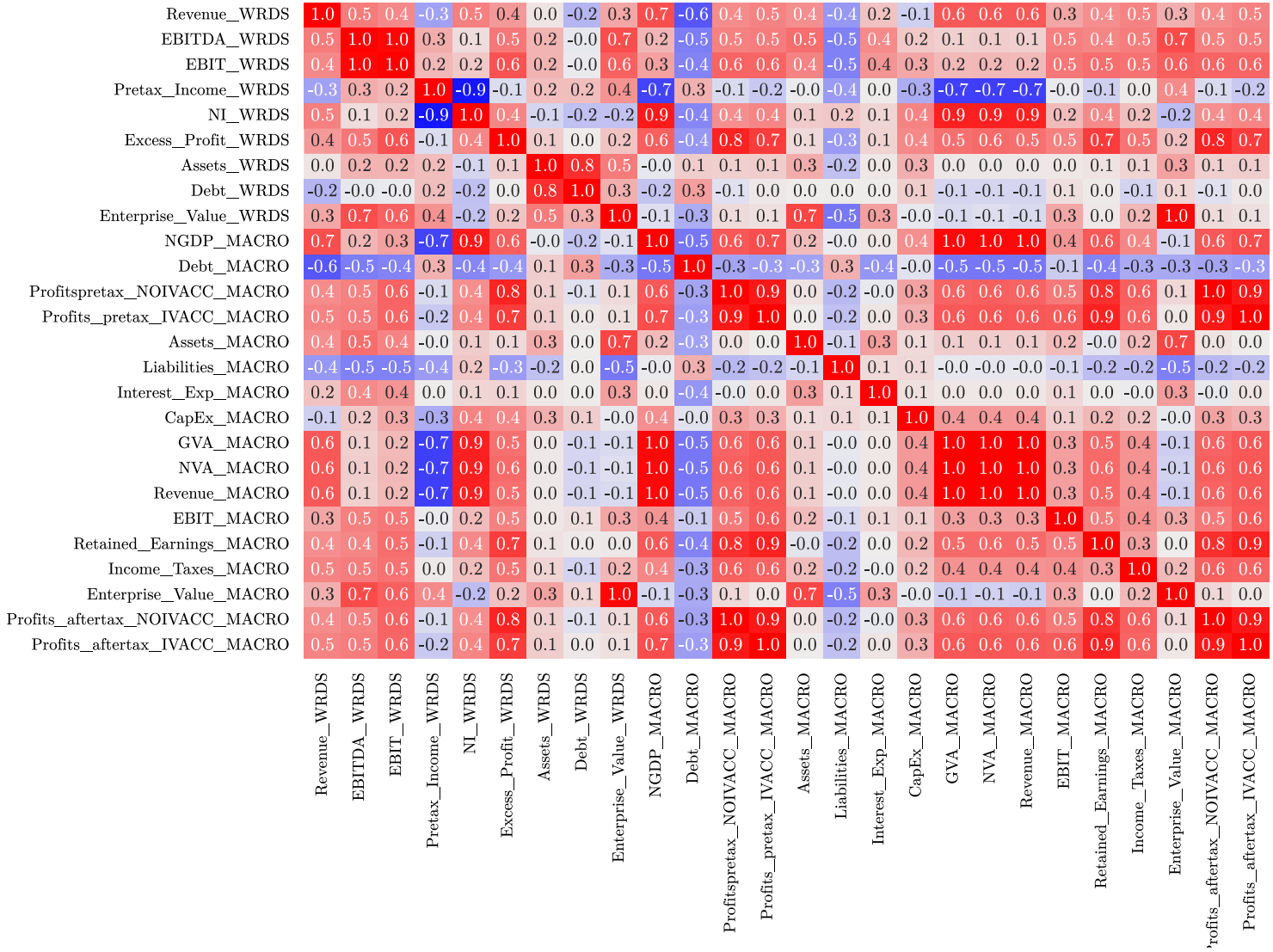
NVA is GVA minus depreciation (consumption of fixed capital).

IVA and CCadj mean that the measure subtracts the consumption of capital and inventory value adjustments (i.e. depreciation).

My goal is to test which accounts best move with those of large public companies. To do this, I use correlation analysis and several linear log-log regressions.


Refined Firm Account Aggregation
Revenue
EBITDA
EBIT
EBT
NI
II
Assets
Debt
EV
2012
2017
2023

Correlations for %Δ-%Δ Relationships (MACRO: FRED data; MICRO: WRDS data)



Dependent Variable: **Revenue Δ%**

Exog. Δ%	Nom. GDP	GVA
Slope	1.611 ***	1.164 ***
	(0.283)	(0.223)
Intercept	−0.008	−0.004
	(0.007)	(0.006)
R^2	0.442	0.400

Dependent Variable: **EBITDA Δ%**

Exog. Δ%	CP BT&BCC	NVA	Nom. GDP
Slope	0.380 ***	0.401	1.077
	(0.116)	(0.446)	(0.687)
Intercept	0.008	0.010	0.002
	(0.013)	(0.015)	0.016
R^2	0.208	0.019	0.057

Dependent Variable: **EBIT Δ%**

Exog. Δ%	CP BT&wCC	FRED EBIT	Nom. GDP
Slope	2.293 ***	0.678 ***	2.451 **
	(0.508)	(0.185)	(1.110)
Intercept	−0.008	0.010	−0.007
	(0.020)	(0.021)	(0.026)
R^2	0.332	0.246	0.106

Dependent Variable: **EBT Δ%**

Exog. Δ%	CP BT&wCC	FRED EBIT	Nom. GDP
Slope	−58.918	−2.705	−496.202 ***
	(56.392)	(19.583)	(75.043)
Intercept	2.955	2.223	8.042 ***
	(2.248)	(2.174)	(1.738)
R^2	0.026	0.000	0.516

Dependent Variable: **NI Δ%**

Exog. Δ%	CP wCC	CP BCC	Nom. GDP
Slope	14.731 ***	4.662 ***	55.288 ***
	(4.632)	(1.643)	(4.558)
Intercept	−0.289	−0.180	−0.748 ***
	(0.185)	(0.180)	(0.106)
R^2	0.198	0.164	0.782

Dependent Variable: **EV Δ%**

Exog. Δ%	FRED EV	Nom. GDP
Slope	0.669 ***	−0.178
	(0.027)	(0.414)
Intercept	−0.002	0.017 *
	(0.002)	(0.010)
R^2	0.938	0.005

Dependent Variable: **Assets Δ%**

Exog. Δ%	FRED Assets	Nom. GDP
Slope	0.231 *	−0.019
	(0.125)	(0.103)
Intercept	0.003	0.007 ***
	(0.003)	(0.002)
R^2	0.076	0.001

Dependent Variable: **Debt Δ%**

Exog. Δ%	FRED Debt	Nom. GDP
Slope	0.623 **	−0.223
	(0.277)	(0.193)
Intercept	−0.004	0.009 **
	(0.006)	(0.004)
R^2	0.110	0.032