Does high current account balance indicate a better place for investment?

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Course: Quantitative Methods II

1 Motivation

This report aims to help large consumer goods companies determine best place to relocate production. Theoretically, multinational corporations prefer expanding their business to a region where the economy is in a healthy condition in the hope of stable operation. Current account balance to GDP ratio serves as an indicator of the health of the economy and international competitiveness. Graph 1 shows a positive relationship between the proportion of current account balance to Gross Domestic Product (GDP) and Ease of Doing Business score. This paper tries to examine the above assumption that high current account balance to GDP ratio makes a better place to conduct business.

2 Data Selection

The report uses the Doing Business dataset collected by the World Bank Group. The unit of observation is country. The outcome variable (y) is the Ease of Doing Business score.[1] The independent variable of interest (x) is the percentage of the current account balance to GDP. In addition, we include control variables to account for other factors that could affect EDB scores. GDP per capita, total time to export,[2] and proportion of access to electricity are included as other predictors to account for the effects of the economic level of a country, administrative efficiency, and infrastructure. Therefore, the question is, *when all the other factors are constant, does high current account balance predict a better place to run business?*

3 Methodology

This report conducts multiple regressions using the Ordinary Least Squares Methods. Below are two models estimating the Ease of Doing Business score (y). Model (1) shows the relationship

[1]The Ease of Doing Business score is on a scale from 0 to 100, where 0 represents the worst and 100 the best situation for operating business.

[2]The variable for the total time to export is reproduced by adding up border compliance time and documentary compliance time (hours).

between the EDB score and the proportion of current account balance to GDP. Model (2) improves model (1) by adding other variables that may affect the score. GDP per capita and Time to export are logged to prevent the skewness of original data undermining regression results. These two models can explain how much Ease of Doing Business scores would change according to one unit change in the percentage of the current account balance to GDP when holding all else constant.

$$\hat{y} = \hat{\beta}_0 + \hat{\beta}_1(CuAcct.Bal.) \tag{1}$$

$$\hat{y} = \hat{\beta}_0 + \hat{\beta}_1(CuAcct.Bal.) + \hat{\beta}_2 \ln(GDPpc) + \hat{\beta}_3 \ln(ExportTime) + \hat{\beta}_4(Elec.Access) \tag{2}$$

4 Regression Analysis and Results

Table 1 presents the results of regression analysis. Regression (1) to (4) are hierarchical regressions based on our model. **Model (1)** shows that **one percent point increase of current account balance to GDP ratio is associated with 0.49 increase in the EDB score**. Model (1) is statistically significant at 99.9% confidence level. From regression (1) to (4), the adjusted R^2 increases, which implies that the explanatory power of the model increases when we add more explanatory variables. Meanwhile, as the number of root MSE becomes closer to zero, the amount of variance of y explained by x_i increases. However, by adding more explanatory variables, the model losses statistical significance, as shown in regression (4).

5 Regression Diagnostics

First, the overall accuracy of the model is very high. As Figure 2 shows, the distribution of predicted values and observed values are close to a 45-degree line. Second, VIFs of all explanatory variables are less than 3, indicating non-collinearity. Third, Figure 3 visualizes the outliers in our data using different thresholds.[3] We remove the above outliers and run the regression again. See Regression (5) The model without outliers obtains statistical significance at 99% confidence level. The coefficient for current account balance in **Regression (5)** shows **as the proportion of current account balance to GDP increases by 1 percent point, EDB Score increases by 0.26 unit, when holding all else constant**. Forth, Figure 4 demonstrates homoskedasticity of residuals for the second model; however, the Breusch-Pagan test and "imtest" both have high p-values, 0.92 and 0.76 respectively, indicating potential omitted variable problems. Regression (6) uses robust standard errors to fix this problem.

6 Discussion and Conclusion

The result supports our assumption that higher ratio of current account balance to GDP indicates easier to do business, but the impact is limited. In addition, there are potential measurement errors which could bias the results. For one thing, the EDB Data has selection bias in that it targets SMEs rather than larges firms. For another, the proportion of population access to electricity may be affected by geographical distribution, challenging the representativeness of the data. Moreover, the

[3] Outliers are identified under at least one of the following criteria: Studentized residuals, leverage, Cook's distance, DFIT.

EDB data lack of complete information about tax on export/international trade which is essential to consumer goods company's global expansion. Lastly, a dataset containing substantial information about large firms and tax on trade is needed in future research.

7 Appendix: Regression table and figures

Table 1: Regression Table

	Ease of Doing Business Score (0-100)					
	(1)	(2)	(3)	(4)	(5)	(6)
Current Account Balance	0.490***	0.120	0.0947	0.124	0.263**	0.124
(% of GDP)	(0.101)	(0.0817)	(0.0759)	(0.0757)	(0.0835)	(0.0783)
Logged GDP per capita		5.720***	4.081***	3.001***	2.459***	3.001***
		(0.501)	(0.567)	(0.711)	(0.639)	(0.719)
Logged Export Time			-2.276***	-2.284***	-2.284***	-2.284***
			(0.451)	(0.443)	(0.408)	(0.407)
Electricity Access				0.0816*	0.130***	0.0816*
				(0.0334)	(0.0354)	(0.0359)
Constant	65.73***	14.73**	37.43***	39.98***	40.74***	39.98***
	(0.908)	(4.521)	(6.145)	(6.134)	(5.778)	(6.248)
Observations	154	153	153	153	133	153
Adj. R^2	0.128	0.528	0.594	0.607	0.690	0.607
rmse	10.89	8.015	7.431	7.310	6.045	7.310

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: The effects of current account balance in model (2) (3) (4) and (6) are not statistically significant.

In model (1) and (5), coefficient of current account balance are statistically significant at 99% confidence level.

Regression (5) is regression (4) run without outliers. Regression (6) is the robust regression of model (4).

VIFs of all models are less than 3.

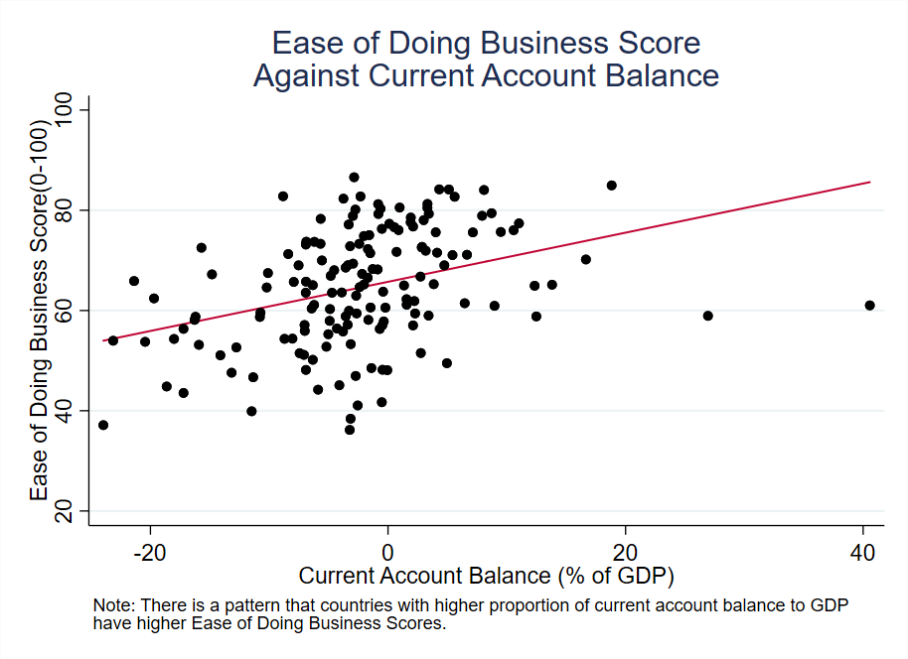

Figure 1: Scatter plot of Ease of Doing Business Score against Current Account Balance

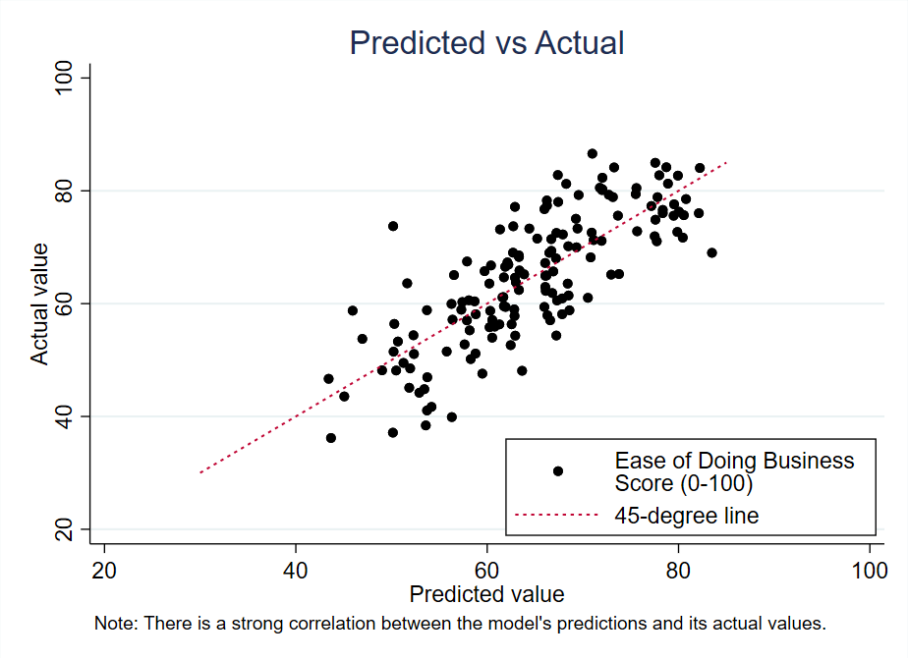

Figure 2: Scatter plot of Predicted Values and Observed Values

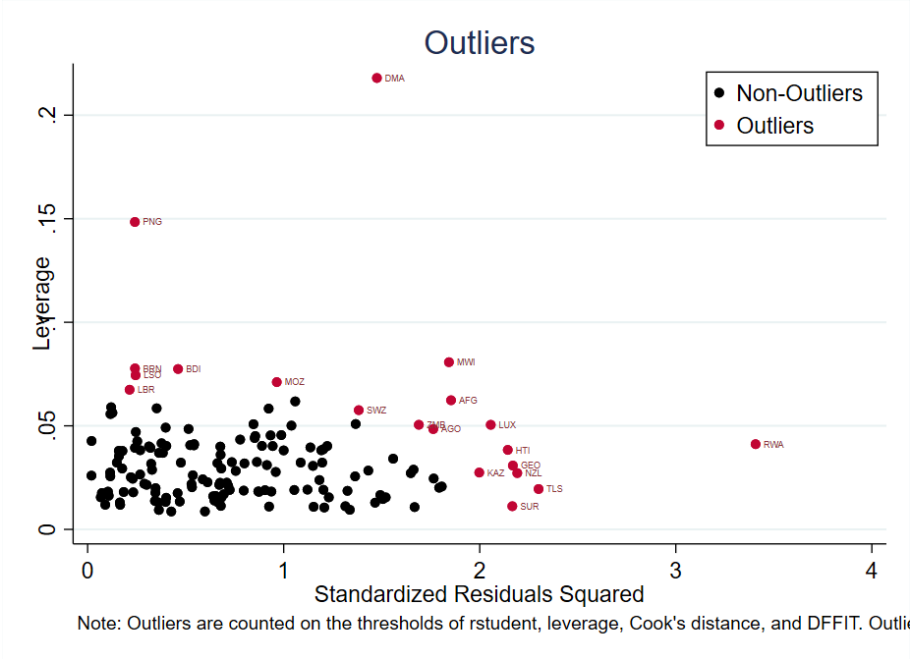

Figure 3: Distribution of Outliers

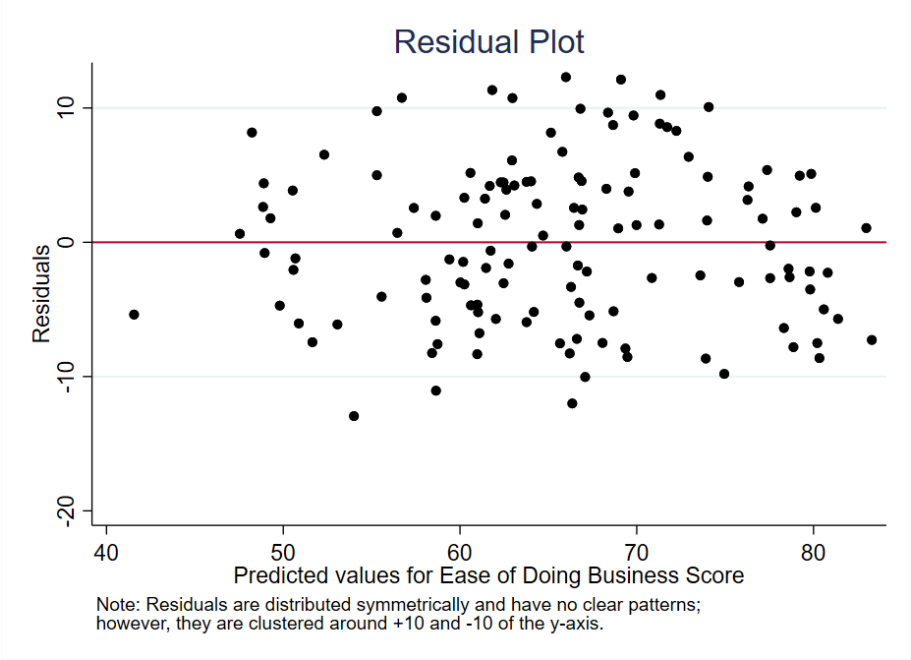

Figure 4: Distribution of Residuals