

Estimating total trade finance assets: methodology

The estimation of the total value of trade finance in a country considers the relationship between bank assets in the country, based on published data, and trade finance assets identified in the survey. This relationship can take the functional forms of either a power law distribution or the asset variables can be proportional to each other.

Power law

The hypothesis is that as banks become larger (in terms of total assets), they gain access to the largest trade finance contracts and have a larger network of correspondent banks than smaller banks. Therefore, larger banks would have a greater market share of trade finance assets than total assets as compared to smaller banks (see Figure II.1). The functional form of this relationship is assumed to be:

$$TF = \alpha TA^k$$

where TF and TA are the trade finance assets and total assets of a bank, α is the size parameter of the estimated Pareto distribution and k is the shape parameter larger than 1.

Proportional

The hypothesis is that the total assets of a bank are not related to their preference for, or access to, trade finance assets. Precisely, a constant proportion of trade finance assets to total assets of a bank is assumed, regardless of the size of the bank. The functional form of this relationship is assumed to be:

$$TF = bTA$$

where b is a number between 0 and 1 (see Figure II.2).

FIGURE II.1 Power law distribution

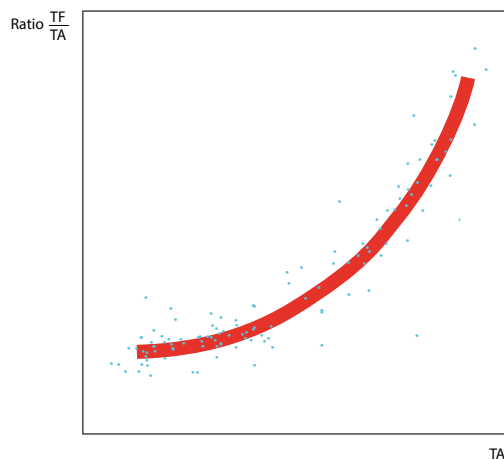
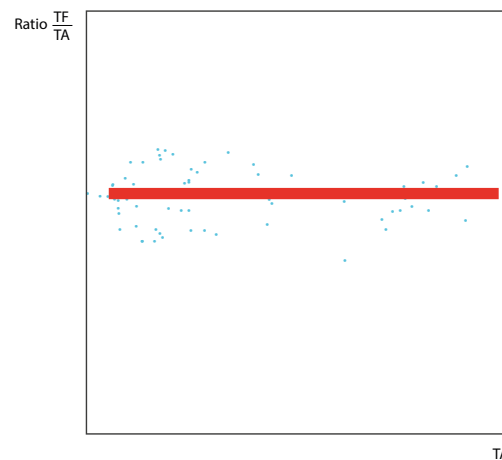


FIGURE II.2 Proportional distribution



Based on the sample survey results, the coefficients of both methodologies using country-specific linear regressions are estimated. When estimating the coefficient b in country c in the proportional model is straightforward, natural logs of trade finance assets and total assets in the power law relationship are taken in order to estimate the following equation via linear regression:

$$\ln TF_{b,c} = A_c + k \ln TA_{b,c} + \epsilon_{b,c}$$

A simple test for the power law is a one-sided t -test for $k > 1$ in the above regression. For ease of interpretation and analysis, the preferred test for the power law is a one-sided t -test for $\bar{K} > 0$ in the regression:

$$\ln \frac{TF_{b,c}}{TA_{b,c}} = A_c + \bar{K} \ln TA_{b,c} + \epsilon_{b,c}$$

The preferred specification chosen for the proportional relationship is a straightforward no-intercept regression of the bank's total assets on its trade financing:

$$TF_{b,c} = B_c TA_{b,c} + \epsilon_{b,c}$$

where $TF_{b,c}$ is the value of trade finance assets of bank b in country c and $\epsilon_{b,c}$ is the error term. For both the power law and the proportional relationships, the models are estimated separately for each country to allow for distinct market conditions across the region. The analysis and estimates from this exercise are then used to predict the trade finance lending for non-reporting banks as a function of their total asset holdings. This enables the total trade finance coverage in the country to be estimated.

The results indicate that while data on banks in Cambodia sufficiently point towards the existence of a power law in trade financing, banks in Viet Nam fail to exhibit a clear-cut relationship in this direction. Eventually, the rejection of the power law in the framework ($k = 1$) collapses the model back to the proportional relationship. Hence, the prediction of trade finance coverage does not differ appreciably for Viet Nam whether the power law relationship with $k \approx 1$ is used or a proportional relationship.

Once the coefficients are estimated using the proportional methodology, the trade finance assets of banks that were not in the survey results can be estimated given their known total assets (e.g. from each bank's annual report) and the estimated coefficients. Finally, the observed and estimated trade finance assets of all banks in a country are combined to estimate the total value of trade finance in that country.