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GPX Index: Using Gross Profit Margins to Calculate Real Exchange Rates

The theory of purchasing power parity posits that in the long run exchange rates between two countries should trend toward a rate that equalizes prices of goods and services in both locales.

However, it is important to mitigate input differentials such as labor costs, supply/demand and inflation divergence between countries. Manufacturing a simple wooden chair in China would be cheaper in China than in the US due to labor costs disparity. Also, the Chinese demand/supply of wooden chairs may vary from that of the demand/supply in the US which would also have material impact on the price that wooden chairs are sold in each locale.

To control for these effects, one could look to a US equity index such as the S&P 500, a US index that lists the 500 largest corporations by market cap listed on the NYSE, displaying the returns of broad sectors of goods and services representative of the wider economy. Xavier Gabaix**,** Professor of Finance at Harvard University, has estimated that productivity variance of the US's largest 100 companies has accounted for more than one third in fluctuations of US GDP.

We must not only look at the S&P 500 firms' revenues, but also at their cost of goods sold (COGS), an expense a company incurs in order to manufacture, to create, or to sell a product. It includes the purchase price of the raw material as well as the direct labor cost of end product. But we must control for direct labor inputs which could have material impact on COGS. To strip out direct labor cost from COGS, it is calculated as beginning inventory for the period plus the total amount of purchases made during the period before subtracting ending inventory. This calculation gives the total amount of inventory or, more specifically, the cost of this inventory sold by a company during the period.

COGS as a percentage of sales minimizes the divergent effects of labor costs and other operating inputs such as research and development, selling and general and administration costs.

Gross profit margin = Sales – COGS/Sales

Controlling for these exogenous variables, the median gross profit margin for making a chair in China should be relatively the same as that in the US. But what about the demand and supply of wood in China versus the US? This could impact prices. Demand for goods and services will be reflected in both locales by the increase/decrease in revenues for the S&P 500 and the Shanghai Stock Exchange Composite Index SHCOMP listed companies along with the waxing and waning of their respective COGS. Hence, increased demand for S&P500 company goods and services will show up in higher revenues which will move in tandem with higher COGS due to increased demand.

How could exchange rates be calculated using GP margins of equity indexes. By way of example, lets us assume that the FY 2016 Q4's S&P 500's median Gross profit margin were 42 per cent and SHCOMP's median gross profit margin for the same period were 52 per cent. This would suggest that the Yuan, the Chinese currency, is undervalued by 20 per cent relative to the US dollar (52 × D =42 ; D is 80. 1-80 = 20 per cent).

This framework assumes that the price elasticity of S&P 500 companies is at the relatively the same elastic limit as that of the SHCOMP index listed companies and that monopoly effects between the two countries are similar.