Exchange rate policy and trade competitiveness: A firm-level analysis of Viet Nam’s food and beverage industry

By

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Executive summary

Trade competitiveness is an economic concept that cannot be simply defined. The essence of the concept is a combination of advantages in price, quality, product design, reliability, salesmanship, delivery times, after-sales service etc. that can result in high sales power for a firm or country over their competitors. More precisely, Krugman (1994) associated trade competitiveness with the ability of a country to export more than it imports. However, trade competitiveness only materializes if there is increasing economic welfare for a nation through increased trade.

In today’s era of globalization, no economy can remain sustainable in the absence of trading with other countries. A low level of competitiveness may cause a severe and chronic trade deficit, which, in turn, causes a great deal of harm for the economy. A persistent current account deficit can cause depreciation of a nation’s currency. A current account deficit may also indicate a low level of savings and excessive consumer spending. Low savings equally mean smaller capacity for domestic investment and thus might affect future economic growth if no alternative (i.e., foreign) sources of investment are found.

An exchange rate policy, among others, can be used as an effective instrument for improving trade competitiveness. The key role of an exchange rate policy is to set relative prices between tradables and non-tradables. In a flexible exchange rate system where international trade is possible, changes in the rate are more likely to affect tradable goods. In the case of non-tradable goods the situation is more rigid. Basically, the exchange rate affects competitiveness by making goods cheaper or more expensive. Depreciation of the exchange rate makes domestic goods cheaper in terms of foreign currency and foreign goods more expensive in terms of domestic currency, and the trade balance can therefore be expected to increase. Appreciation affects the trade balance in the opposite direction. In the real world, the level of success in the realization of this basic theory varies greatly. Exchange rate changes may or may not result in effects on trade. Those effects, if any, could be very different in the short term and the long term.

For developing countries, using an exchange rate policy to boost trade competitiveness is realistic. China is a contemporarily successful case study. During the past 10 years, China has become one of the largest international traders with an increasingly higher global trade surplus. In addition to improvements in productivity, its exchange rate policy plays a crucial role. Relevant adjustments by Chinese monetary authorities help the country to slow down appreciation against its major competitive currencies (i.e., the United States dollar, the euro etc.) and even maintain a relatively low level of depreciation. The “weak” Chinese yuan makes Chinese goods cheaper in international markets and increases their trade competitiveness.

Although an exchange rate policy is useful, its use in boosting trade competitiveness should be employed with caution. Maintaining depreciation can make goods cheaper, but it can also increase the risk of inflation. Moreover, exchange rate manipulation is strictly prohibited by the International Monetary Fund (IMF) and the World Trade Organization (WTO), and is always a sensitive issue in bilateral trade relations.
Introduction

Viet Nam’s economic transformation since the period of reforms, or doi moi (renovation), initiated in the mid-1980s, is remarkable. There have been dramatic changes in many aspects of the country’s economic and social life. Economic policies and institutions have evolved from those of a centrally-planned economy to those of a market-based economy. A shortlist of some of the most important reforms carried out in Viet Nam includes:

(a) The allocation of land-use rights to the people;
(b) Domestic price liberalization for most agricultural products;
(c) Functional separation of commercial banks and the central bank;
(d) Liberalization of the trade regime, culminating in WTO accession in 2007;
(e) The encouragement of foreign direct investment (FDI); and
(f) Ongoing legal reform aimed at strengthening property rights and contracts.

These reforms have resulted in enormous economic successes. The economic growth rate was around 8 per cent throughout much the 1990s and around 7 per cent from 2000. Export growth reached 5 per cent during 1995–2007. Furthermore, imports grew about one and a half times faster than exports during the same period. Currently, Viet Nam is the second largest rice exporter in the world, an astonishing fact given the food shortages in the late 1980s.

However, in late 2007 and early 2008, Viet Nam encountered a number of macroeconomic problems. In 2008, the Customer Price Index (CPI) inflation rate was more than 20 per cent (Merrill Lynch, 2008) while GDP growth slowed considerably. In the third quarter of 2009, the financial crisis that started in the United States of America pushed the global economy into a deep crisis and caused overall demand for goods and services to drop dramatically. As in other countries, the crisis had a negative impact on the Vietnamese economy. The GDP growth rate dropped from 7.5 per cent in the first quarter of 2008 to 3.1 per cent in the first quarter of 2009, and the export growth rate declined by 21.7 percentage points from 29.1 per cent in the first quarter of 2008 to 7.4 per cent in the first quarter of 2009 (World Bank, 2009).

Given those circumstances, there has been extensive debate on whether or not the Government of Viet Nam should allow the country’s currency to depreciate. There are two different opinions about the effect of such government involvement. On the one hand, some experts argue that although Viet Nam has experienced depreciation of its currency in recent years the Vietnamese dong is still overvalued compared with the United States dollar. In June 2005, the exchange rate was D 15,800:US$ 1. In June 2008, the rate was approximately D 16,500:US$ 1. In the same period, the inflation rate in Viet Nam was much higher than that in the United States. At the same time, Viet Nam’s trade deficit was increasing. In 2005, trade deficit was US$ 2.4 billion. It increased to US$ 10.4 billion in 2007. In 2008, the trade deficit was estimated to have reached US$ 14.9 billion. Proponents of this view argue that the relative overvaluation of the dong coincides with the increasingly more severe trade deficit. They claim that currency devaluation can help to boost Vietnamese exports as prices would be relatively cheaper.

Opponents of this opinion argue that currency depreciation will not necessarily help to improve exports, because if the ratio of imported intermediate goods in exported output is high, the benefit of exports may be less than the loss in imports (Abeyesinghe and Yeok,
In addition, exchange rate fluctuations in one economy adversely affect the monetary policies of other countries and could initiate counteractions by the latter States.

Given the extensive debate on whether or not currency depreciation is the right way to boost the economy, it is not surprising that Vietnamese policy makers remain very cautious when considering the use of the exchange rates as a tool to help domestic exporters. Nonetheless, the demand from businesses for currency depreciation is aggressive, particularly among firms in Viet Nam’s export-oriented food and beverage (F&B) industry. For the purpose of providing evidence-based recommendations, the results of analyses to determine to what extent changes in the exchange rate would affect the profitability of firms in the Vietnamese F&B sector are provided in this paper. Simulations were conducted for several scenarios of exchange rate depreciation and levels of exchange rate pass-through.

The simulation results suggest that Vietnamese F&B entrepreneurs would be net gainers in a Vietnamese dong depreciation against the United States dollar. Four measures of profitability improve significantly in response to a 17 per cent depreciation. In the case of a 50 per cent exchange rate pass-through, if firms do not react and changes in the exchange rate affect prices of inputs and outputs alone, the rate of return to liability will increase by 10 percentage points from 4.77 per cent to 14.81 per cent. If firms react by adjusting production to reach a new optimal level, the rate of return to liability will increase by 13 per cent to 17.69 per cent, if other factors remain constant.

In section I, this paper provides an overview of the food and beverage industry in Viet Nam, highlighting the structure of firms, the use of labour, the values of production and some international trade aspects. Section II discusses the theoretical framework, the simulation model and the simulation techniques. Section III describes the data used for the model and calibration of the simulation, and provides the empirical results of the different scenario analyses. Concluding remarks and recommendations are given in Section IV.

I. Overview of the food and beverage industry in Viet Nam

In an economy where agriculture accounts for 20 per cent of the national GDP and where the population that works in that industry represents 75 per cent of the country’s population, the food and beverages sector obviously plays a crucial role. The important aspects of the sector are highlighted below, including the growth of F&B firms, labour usage, production values and trade.

In the past decade the number of firms operating in the F&B sector has increased rapidly. In 2000, there were 3,502 firms, a number that increased at a steady rate to 5,458 in 2006. The average growth during that period was about 9 per cent per annum. However, compared with 37.6 per cent in other industries, this rate is relatively low. Figure 1 shows, that from 2000 to 2006 the contribution of F&B firms to the economy declined from 8.3 per cent of all firms to 4.16 per cent, respectively. Although the number of F&B firms continued to increase, the decline implies that the growth rate in F&B firms was relatively slower than that of other industries.
Figure 1. Food and beverage companies in the economy of Viet Nam, 2000–2006

![Graph showing the number of food and beverage firms and their percentage in total firms from 2000 to 2006.](image)


Figure 2 shows the employment levels in Viet Nam’s F&B industry between 2000 and 2006. F&B firms attract a large number of employees from the labour force. In 2006, 429,000 people were working in this industry compared with 263,000 in 2000. However, the proportion of F&B firms in the country has been steadily decreasing. From 2000 to 2006, this proportion declined by almost half while the number of people working in the industry increased.

Figure 2. Employees in the food and beverage industry, 2000–2006

![Graph showing the number of employees and their percentage in total employees from 2000 to 2006.](image)

Source: Author’s calculation, based on GSO Enterprise Censuses 2001–2007.

Figure 3 reveals the reason for those trends by illustrating the production value of firms in the F&B industry from 2000 to 2006. Starting at US$ 4.38 billion in 2000, F&B revenue increased steadily to US$ 12.98 billion in 2006. Figure 3 also shows the share of F&B revenue in the total revenue generated by the entire enterprise sector. The share fluctuated from 8.7 per cent to 10 per cent during that period. While F&B revenue increased smoothly, the fluctuation in the ratio of F&B to the total revenue of the entire enterprise sector suggests that the output of other industries was somewhat unstable.

Figure 3. Production value of F&B firms in Viet Nam, 2000–2006

![Graph showing the production value of F&B firms from 2000 to 2006.](image)
Figure 3. Total production value of the food and beverage industry, 2000–2006

<table>
<thead>
<tr>
<th>Year</th>
<th>US$ billion</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>9.00</td>
<td>10.01</td>
</tr>
<tr>
<td>2001</td>
<td>9.32</td>
<td>8.90</td>
</tr>
<tr>
<td>2002</td>
<td>8.32</td>
<td>9.52</td>
</tr>
<tr>
<td>2003</td>
<td>7.78</td>
<td>9.08</td>
</tr>
<tr>
<td>2004</td>
<td>8.90</td>
<td>8.69</td>
</tr>
<tr>
<td>2005</td>
<td>11.54</td>
<td>9.37</td>
</tr>
<tr>
<td>2006</td>
<td>12.98</td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s calculation, based on GSO Enterprise Censuses 2001–2007.
Note: An exchange rate of 17,000:US$ 1 was used to estimate the value in United States dollars.

Figure 4 summarizes the trade data on F&B taken from the TradeMap database. It shows that the sector has been experiencing increasing international trade. In 2003, the total exported value was US$ 4.6 billion while total imported value was only US$ 1.5 billion. In recent years, exports and imports have been increasing steadily. More importantly, the gap between exports and imports has widened, revealing that the Vietnamese F&B industry has been able to achieve trade surpluses during the past 5 years.

Figure 4. Exports and imports by the food and beverage industry, 2003–2007

Source: Author’s calculation, based on Trademap.net data.

II. Theoretical framework, model and simulation techniques

A. Exchange rate pass-through

In general, an exchange rate pass-through can be defined as the percentage change in prices of imported goods resulting from a 1 per cent change in the exchange rate between the exporting and importing country. Literature on exchange rate pass-through has been available since the 1980s. While research initially focused mainly on developed economies (Menon,
In analyzing how changes in the exchange rate can affect the profitability of Vietnamese firms, a review of studies on the exchange rate pass-through for emerging economies, particularly in Asian countries, is pertinent. Alba and Papell (1998) estimated the exchange rate pass-through into the CPIs of Malaysia, the Philippines and Singapore to be 0.090, 0.165 and -0.082, respectively. Calvo and Reinhart (2000), however, determined slightly different numbers. They used monthly data for Indonesia and Malaysia to study the exchange rate pass-through into the CPIs and derived rates of 0.062 and 0.020, respectively. In a more recent study, Sahminan (2005) estimated the exchange rate pass-through into import prices in Indonesia, the Philippines, Singapore and Thailand from 1974 to 2000. He calculated a much higher exchange rate pass-through than did Alba and Papell (1998) and Calvo and Reinhart (2000). The differences, however, are reasonable since Sahminan (2005) investigated the exchange rate pass-through in import prices while other studies looked at the pass-through into the CPI.

The exchange rate pass-through helped to establish the theoretical framework for the study. The reviewed literature suggests that there is an exchange rate pass-through in emerging markets, especially in the economies of the Association of Southeast Asian Nations (ASEAN), of which Viet Nam is a member. In many aspects, Viet Nam has many similarities with countries in the region, such as Indonesia, the Philippines and Thailand. Thus, it is reasonable to expect equal levels of exchange rate pass-through into export and import prices for Viet Nam. Assuming that the exchange rate pass-through exists, both domestic and import prices should be responsive to changes in the exchange rate.

Channels through which exchange rate changes can affect domestic prices include: (a) imported consumption goods; (b) intermediate goods; and (c) domestic goods invoiced in foreign countries (Sahminan, 2005). This paper mainly focuses on intermediate goods, the prices of which are usually adjusted after changes in the exchange rate. Specifically, currency depreciation is likely to result in a decrease in import and domestic prices, and vice versa. The level of responsiveness depends on the level of the exchange rate pass-through.

B. Calculation of profit

The standard method of calculating profit is to take total revenue less total cost. In this paper, profit is calculated using the following formula:

$$\pi = p \cdot y - w_1 \cdot K - w_2 \cdot L - w_3 \cdot T - OC$$

where $\pi$ is the profit, $y$ is the output, $p$ is the price of output, $K$ is the capital measured by total value of fixed assets, $L$ is labour, $T$ is tradable inputs, $OC$ is the cost of other inputs, $w_1$ is the price of capital, $w_2$ is the price of labour and $w_3$ is the price of tradable inputs.

The profit from the data is the actual profit. However, this profit does not necessarily represent the optimal production level at which profits are maximized. To distinguish the actual from the optimal profit, equation (1) is rewritten as equation (2):
The optimal profit is associated with the optimal level of inputs and, hence, the optimal level of output. The optimal profit is calculated using the following formula:

$$\pi_{\text{optimal}} = p_{\text{base}} \cdot y_{\text{base}}^\ast - w_{1\text{base}} \cdot K_{\text{base}}^\ast - w_{2\text{base}} \cdot L_{\text{base}}^\ast - w_{3\text{base}} \cdot T_{\text{base}}^\ast - OC_{\text{base}}$$

Relating the optimal profit to the actual profit function, equation (2) can be restated as:

$$\pi_{\text{base}} = p_{\text{base}} \cdot y_{\text{base}} - w_{1\text{base}} \cdot K_{\text{base}} - w_{2\text{base}} \cdot L_{\text{base}} - w_{3\text{base}} \cdot T_{\text{base}} - OC_{\text{base}}$$

The optima specified in equation (4) refer to optimal values of input and output that are derived from the Cobb-Douglas production function. The equation shows that actual profit differs from the maximum level of profit that firms can achieve when operating at optimal levels. There are two main reasons for this discrepancy. First, the data obtained from surveys may capture firms in a transitional phase approaching an equilibrium. Second, the equation used may not fully reflect the firms’ production processes. The difference between the optimal and the actual profit is the residual. There is no good way to model the residual and, thus, this paper assumes that shocks do not affect profits.

There are two ways in which firms can react to shocks. First, firms do not adjust their production after a price shock. In other words, they leave the quantities of input and output unchanged. In this case, the new profit is only affected by the price changes. The new profit is calculated as:

$$\pi_{\text{new}} = p_{\text{new}} \cdot y_{\text{base}} - w_{1\text{new}} \cdot K_{\text{base}} - w_{2\text{new}} \cdot L_{\text{base}} - w_{3\text{new}} \cdot T_{\text{base}} - OC_{\text{base}}$$

Second, firms react by adjusting the quantities of both input and output. In this case, the new profit is determined by both the new price and the new quantity. The formula for calculating the new profit is:

$$\pi_{\text{max}} = p_{\text{new}} \cdot (y_{\text{base}} - y_{\text{base}}^\ast) - w_{1\text{new}} \cdot (K_{\text{base}} - K_{\text{base}}^\ast) - w_{2\text{new}} \cdot (L_{\text{base}} - L_{\text{base}}^\ast) - w_{3\text{new}} \cdot (T_{\text{base}} - T_{\text{base}}^\ast) - OC_{\text{base}}$$

C. Derivation of optimal levels of inputs and outputs

As the basis of the simulation has been established (i.e., the formula used to calculate new profits under shocks), the focus is now moved to how to derive the optimal levels of inputs and output. It is shown below that the optima can be achieved by solving the profit maximization that is the aim of the firms.
Unconstrained profit maximization is set up by taking total revenue less total cost of business. Total revenue is simply the product of total output and price. In principle, the profit maximization can be set up as:

$$\max \; \pi = p \cdot y - w_1 \cdot K - w_2 \cdot L - w_3 \cdot T - OC$$  \hspace{1cm} (7)$$

The maximization problem can be solved under a specific specification of production. A Cobb-Douglas functional form is assumed with three inputs (i.e., labour, capital and tradable inputs). Thus, the production function for the F&B industry can be mathematically expressed as:

$$y = A \cdot K^\alpha \cdot L^\beta \cdot T^\gamma$$  \hspace{1cm} (8)$$

Plug the production function in equation (8) into equation (7), and the profit maximization becomes:

$$\max \; \pi = p \cdot [A \cdot K^\alpha \cdot L^\beta \cdot T^\gamma] - w_1 \cdot K - w_2 \cdot L - w_3 \cdot T - OC$$  \hspace{1cm} (9)$$

In the short term, firms do not adjust fixed assets, so $K$ is assumed to be rigid. $K$ is held constant in the profit maximization formula. Specifically, equation (9) is rewritten as:

$$\max \; \pi = p \cdot [A \cdot \overline{K}^\alpha \cdot \overline{L}^\beta \cdot \overline{T}^\gamma] - w_1 \cdot \overline{K} - w_2 \cdot L - w_3 \cdot T - OC$$  \hspace{1cm} (10)$$

In solving equation (10) the optimal input and output levels are derived as:

(a) The optimal level of labour input:

$$L_{optimal} = \left\{ \frac{p \cdot A \cdot \overline{K}^\alpha \cdot \overline{L}^\beta \cdot \overline{T}^\gamma}{w_2} \cdot \left( \frac{\gamma \cdot w_2}{\beta \cdot w_3} \right)^{\gamma - 1} \right\}^{\frac{1}{1 - \beta - \gamma}}$$  \hspace{1cm} (11)$$

(b) The optimal level of tradable input:

$$T_{optimal} = \left\{ \frac{p \cdot A \cdot \overline{K}^\alpha \cdot \overline{L}^\beta \cdot \overline{T}^\gamma}{w_3} \cdot \left( \frac{\beta \cdot w_3}{\gamma \cdot w_2} \right)^{\beta - 1} \right\}^{\frac{1}{1 - \beta - \gamma}}$$  \hspace{1cm} (12)$$

(c) The optimal output level:

$$y_{optimal} = p \cdot A \cdot \overline{K}^\alpha \cdot (L_{optimal})^\beta \cdot (T_{optimal})^\gamma$$  \hspace{1cm} (13)$$

These optimal values of input and output can then be plugged into equation (6) to derive the new profit based on the new prices.

### III. Data and empirical results

The data used for the analyses is part of the Enterprise Census 2006, a survey which has been conducted annually since 2000 by the General Statistics Office (GSO). In particular, GSO incorporates a detailed cost questionnaire for approximately 10 per cent of the surveyed enterprises. However, of the 8,754 companies on which there is detailed information, only 830 firms are representative of the F&B industry.

The variables used for the analysis include: (a) output measured by total revenue; (b) capital measured by total fixed assets; (c) labour measured by total number of employees; (d) total tradable costs; and (e) other costs.
A. Data processing

Although the available data are quite comprehensive, they also contain incomplete or unfeasible information. There are two types of data problems: (a) observations with negative or missing values, which is the case for 80 sets of data; and (b) outliers or observations with strange values (as shown in figure 5), which must be excluded because they would distort the simulations.

Figure 5. Distribution of values in data before cleaning

For the purpose of detecting outliers, the iterative outlier detection algorithm proposed by Hadi (1992 and 1994) is used rather than subjectively dropping the most extreme observations at the two tails of the distribution. Applying Hadi’s method, 412 out of the 830 observations are outliers and thus have been removed from the data set. Undoubtedly, the number of outliers is enormous. This might well reflect the way the census was done. Data
collection was conducted via a reporting system by which firms filled out the questionnaire and send it back to the statistics office. There are many concerns about the quality of the data. However, in Viet Nam, the Enterprise Census is a unique source of data on which researchers can rely when studying the enterprise sector. The final graphs of the value distributions with improved lower variations are shown in figure 6.

**Figure 6. Distribution of values in data after cleaning**

The final sample data set contains 418 observations. Table 1 presents the summary statistics of the key variables used for the regression, and subsequently for the simulations. The values in levels show that the variation within the industry is huge. On average, firms in the F&B industry yielded total revenue of D 10.9 billion in 2005. The largest individual revenue was D 89.3 billion while the smallest individual revenue was only D 22 million. The

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1 In fact, some small enterprise surveys exist, but they are barely useful for any purpose other than that of the designer.
The high value of standard deviation (almost one and a half times the mean) indicates the fact that revenues of F&B firms are spread over a very large range of values. Like revenues, the scale of total fixed assets, tradable costs and non-tradable costs varies widely. Together with enormous gaps between the minimum and maximum values, standard deviations of the variables are always high. It is interesting to note that in terms of employment, the F&B sector does not have large-sized firms. The average firm has 44 employees. The smallest firm has two employees while the largest firm has 320 employees. These figures indicate that F&B industry is not labour-intensive.

Variables in logarithm form are the ones used in estimating the parameters of the Cobb-Douglas production function. Transforming the levels into logarithm form helps to reduce variations dramatically. Those variables would be directly put into an OLS procedure to estimate the parameters in equation 8.

It is worth noting that the F&B firms are heavily concentrated in southern Vietnam. In the 418-firm sample, 329 firms are located in the south. A location map of F&B firms is provided in the annex.

Table 1. Summary statistics of key variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total revenue (D million)</td>
<td>418</td>
<td>10 883</td>
<td>16 460</td>
<td>22.00</td>
<td>89 269</td>
</tr>
<tr>
<td>Total fixed assets ((D million)</td>
<td>418</td>
<td>2 497</td>
<td>3 585</td>
<td>18.00</td>
<td>19 497</td>
</tr>
<tr>
<td>Total labour (persons)</td>
<td>418</td>
<td>44</td>
<td>61</td>
<td>2</td>
<td>320</td>
</tr>
<tr>
<td>Total tradable costs (D million)</td>
<td>418</td>
<td>9 332</td>
<td>15 339</td>
<td>2.00</td>
<td>83 578</td>
</tr>
<tr>
<td>Total non-tradable costs (D million)</td>
<td>418</td>
<td>1 481</td>
<td>1 814</td>
<td>9.00</td>
<td>105 917</td>
</tr>
<tr>
<td>Total revenue in log</td>
<td>418</td>
<td>8.00</td>
<td>1.84</td>
<td>3.09</td>
<td>11</td>
</tr>
<tr>
<td>Total fixed assets in log</td>
<td>418</td>
<td>6.92</td>
<td>1.43</td>
<td>2.92</td>
<td>9</td>
</tr>
<tr>
<td>Total labour in log</td>
<td>418</td>
<td>3.09</td>
<td>1.15</td>
<td>0.69</td>
<td>5</td>
</tr>
<tr>
<td>Total tradable costs in log</td>
<td>418</td>
<td>7.41</td>
<td>2.30</td>
<td>0.99</td>
<td>11</td>
</tr>
<tr>
<td>Total non-tradable costs in log</td>
<td>418</td>
<td>6.48</td>
<td>1.42</td>
<td>2.25</td>
<td>9</td>
</tr>
</tbody>
</table>

Source: Author’s calculations, based on GSO Enterprise Census 2006.

B. Profitability analysis

An analysis of the cost structure can provide useful insights into a firm’s production process and can help in understanding to what extent shocks potentially affect a firm’s business in general and profitability in particular. Costs of production can be classified in several ways, depending on the purpose of analysis. A detailed classification could break costs into (a) materials, (b) labour, (c) depreciation, (d) interest and (e) other costs. Table 2 shows that materials and labour constitute the largest share of total costs. On average, materials account for 47 per cent and labour for 30 per cent, i.e., more than 75 per cent of total costs. The fact that labour is the second largest cost component reflects the labour-intensive character of the F&B industry.

Total costs can also be classified into fixed and variable costs. The higher the fraction of variable costs, the more flexible firms can be in adjusting their production process if shocks

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2 A few large firms with more than 500 employees appeared in the before-cleaning data set.
occur. The average fraction of F&B firms is 93.7 per cent, which is higher than that of firms in other industries (91.4 per cent) although, in general, the average fraction of all firms is very high.

Another way of classifying costs that is helpful and closely linked to the simulation analysis in this paper is to categorize costs into tradable and non-tradable costs. Tradable costs, which are far more sensitive to changes in the exchange rate, account for 67 per cent of total costs for F&B firms and only 46.8 per cent for other firms. Cost structures do not vary substantially across ownership or geography.

<table>
<thead>
<tr>
<th>Table 2. Cost structure of food and beverage firms</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Ownership</th>
<th>Total sample</th>
<th>South</th>
<th>North</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOE</td>
<td>11</td>
<td>21</td>
<td>386</td>
</tr>
<tr>
<td>FDI</td>
<td>89</td>
<td>329</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>418</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Number of observations | 418 |

<table>
<thead>
<tr>
<th>As percentage of production values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials</td>
</tr>
<tr>
<td>Labour costs</td>
</tr>
<tr>
<td>Depreciation</td>
</tr>
<tr>
<td>Interest</td>
</tr>
<tr>
<td>Other costs</td>
</tr>
<tr>
<td>Fixed costs</td>
</tr>
<tr>
<td>Variable costs</td>
</tr>
<tr>
<td>Tradable costs</td>
</tr>
<tr>
<td>Non-tradable costs</td>
</tr>
<tr>
<td>Total costs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>As percentage of total costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials</td>
</tr>
<tr>
<td>Labour costs</td>
</tr>
<tr>
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</tr>
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</tr>
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</tr>
<tr>
<td>Variable costs</td>
</tr>
<tr>
<td>Tradable costs</td>
</tr>
<tr>
<td>Non-tradable costs</td>
</tr>
</tbody>
</table>

Source: Author’s calculation, using GSO Enterprise Census 2006.

Table 3 presents a set of indicators that help to determine the profitability of firms in the F&B industry. The indicators include (a) returns to total revenues, (b) returns to own liability, (c) returns to fixed assets and (d) returns to total assets. In this set of indicators, returns refer to total profit before income tax.

Each indicator evaluates profitability from a different angle. The ratio of returns to total revenues measures how much profit firms generate from the sales of their products. Return to own liability measures the magnitude of profit a firm makes using its own money. The return to fixed assets is calculated by taking profit before income tax divided by total fixed assets. The ratio measures how effectively a firm is using its fixed assets to generate profits. The greater a firm’s return to fixed assets, the more effectively that firm is said to be using its fixed assets. The fourth term is the return to total assets, which is defined in the same way.
way and means the same with the return to fixed assets, except that the base to evaluate the profitability are total assets instead of fixed assets.

Table 3. Rates of returns of food and beverage firms (Unit: percentage)

<table>
<thead>
<tr>
<th>Number of observations</th>
<th>Total sample</th>
<th>Ownership</th>
<th>Geography</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>418</td>
<td>SOE</td>
<td>FDI</td>
</tr>
<tr>
<td>Returns to total revenues</td>
<td>2.61</td>
<td>0.15</td>
<td>0.65</td>
</tr>
<tr>
<td>Returns to own liability</td>
<td>4.77</td>
<td>0.31</td>
<td>2.00</td>
</tr>
<tr>
<td>Returns to fixed assets</td>
<td>11.13</td>
<td>0.96</td>
<td>3.06</td>
</tr>
<tr>
<td>Returns to total assets</td>
<td>3.07</td>
<td>0.65</td>
<td>1.02</td>
</tr>
</tbody>
</table>

Source: Author's calculation, using GSO Enterprise Census 2006.

C. Estimation of the profit function

The coefficients for the Cobb-Douglas production function in equation (8) are estimated using the data from 418 firms. To simplify the simulations the variables are transformed by taking the natural logarithm of the original variables. By doing so, the non-linear production function becomes linear, where the coefficients can be estimated using an OLS procedure. The regression is run with the Stata software in an environment with controlled robustness of standard errors. Estimation results are shown in table 4. All the coefficients are highly statistically significant. The set of capital, labour and tradables explains 93 per cent of the variation in the revenue of F&B firms.

The estimation results help us rewrite equation (8) in the following specific form:

\[
y = 5.633 \times K^{0.107} \times L^{0.152} \times T^{0.683}
\]  

(14)

Table 4. Estimation of the production function

|                     | Coef.       | Std. Err.   | t     | P>|t|   | [95% Conf. Interval] |
|---------------------|-------------|-------------|-------|-------|----------------------|
| lnK                 | .1072526    | .0207309    | 5.17  | 0.00  | .0665016 .1480036    |
| lnL                 | .1522773    | .0325772    | 4.67  | 0.00  | .0882401 .2163146    |
| lnT                 | .6826737    | .0211016    | 32.35 | 0.00  | .6411341 .7241534    |
| _cons               | 1.72875     | .1202112    | 14.38 | 0.00  | 1.492449 1.96505     |

Note: Robust standard errors are heteroscedasticity consistent.

The current exchange rate is approximately US$ 1: D 17,000. For the purpose of the simulation it was assumed that the central bank adjusted the exchange rate by weakening the Vietnamese dong as explained in the introduction. Accordingly, the new exchange rate is assumed to be US$ 1/D 20,000 (a 17.6 per cent devaluation of the dong). The effects of this depreciation depend on the level of pass-through and how firms react to shocks. Therefore, simulations for two pass-through scenarios were conducted to estimate the significance of such adjustments: (a) a 100 per cent pass-through; and (b) a 50 per cent pass-through.
D. Scenario 1:100 per cent pass-through

In this scenario it is assumed that changes in the exchange rate will fully translate into changes in the price of tradable goods. In this case, prices of tradable inputs are the same, whether or not the firms use imported or domestic tradable inputs.

Two cases are assumed, depending on how firms react to the shock. On the one hand, firms do not adjust their production and shocks will be translated through changes in prices of output and tradable inputs alone. On the other hand, firms adjust the production process to approach the new optimal level. New optimal levels of inputs and output are calculated by plugging the coefficients of the production function estimated above as well as the new prices into equations (11), (12) and (13). The new maximized profit is then derived straightforwardly following equation (6).

The summary of the simulation is presented in table 5. The profitability of F&B firms responds very positively to the dong depreciation. If the effects of an exchange rate change were solely reflected in changes in prices, profitability measured by the rate of return to liability would increase by a nominal 20.09 per cent, from 4.77 per cent to 24.86 per cent, which translates into a profitability improvement of five times. Other measures of profitability, including the rate of return to total revenues, the rate of return to fixed assets and the rate of return to total assets would also improve substantially. Moreover, if firms react to the depreciation, the profitability would be even higher. On average, the rate of return to liability increases by a nominal 12 per cent compared to the case where firms do not react to the depreciation.

There is heterogeneity in the effects of the exchange rate changes on the profitability across ownership. FDI firms benefit the most and “other” firms gain the least when measured by the rate of return to liability. However, in the other measures of profitability, “other” firms are the biggest gainers, which lead to the conclusion that FDI firms rely more on borrowing than other types of firms.

Differences between firms in northern and southern Viet Nam are significant. In all the measures of profitability, southern firms perform better than northern firms. This finding is consistent with the observed situation in which four measures of profitability of southern firms than those of northern firms. This helps to explain why F&B firms are concentrated in the south rather than in the north, as shown in the map in the annex.

Table 5: Profitability of food and beverage firms in scenario 1:100 per cent pass-through

<table>
<thead>
<tr>
<th>Ownership</th>
<th>Total sample</th>
<th>SOE</th>
<th>FDI</th>
<th>Others</th>
<th>North</th>
<th>South</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of observations</td>
<td>418</td>
<td>11</td>
<td>21</td>
<td>386</td>
<td>89</td>
<td>329</td>
</tr>
<tr>
<td>Returns to total revenue</td>
<td>2.61</td>
<td>0.15</td>
<td>0.65</td>
<td>2.79</td>
<td>1.00</td>
<td>3.04</td>
</tr>
<tr>
<td>Returns to liability</td>
<td>4.77</td>
<td>0.31</td>
<td>2.00</td>
<td>5.01</td>
<td>2.55</td>
<td>5.35</td>
</tr>
<tr>
<td>Returns to fixed assets</td>
<td>11.13</td>
<td>0.96</td>
<td>3.06</td>
<td>11.86</td>
<td>3.22</td>
<td>13.27</td>
</tr>
<tr>
<td>Returns to total assets</td>
<td>3.07</td>
<td>0.65</td>
<td>1.02</td>
<td>3.25</td>
<td>1.26</td>
<td>3.56</td>
</tr>
</tbody>
</table>

Scenario: Exchange rate increased by D 3000/US$ 1, equivalent to 17.6 per cent ==> Price of tradable inputs and output to increase by 17.6 per cent

No reaction from firm ==> Level of inputs and outputs remains unchanged

| Returns to total revenue | 7.38 | 4.71 | 6.23 | 7.52 | 6.05 | 7.74 |
| Returns to liability | 24.86 | 25.24 | 51.24 | 23.54 | 21.26 | 25.80 |
| Returns to fixed assets | 33.88 | 11.13 | 19.40 | 35.32 | 20.02 | 37.63 |
Returns to total assets | 10.19 | 6.20 | 7.83 | 10.44 | 6.84 | 11.1
With reaction from firm => Level of inputs and outputs is determined by the optimization mechanism

Returns to total revenue | 18.92 | 7.09 | 15.56 | 19.44 | 14.99 | 19.98
Returns to liability | 36.32 | 38.81 | 60.61 | 35.06 | 39.73 | 35.43
Returns to fixed assets | 44.05 | 15.57 | 23.74 | 45.97 | 29.83 | 47.90
Returns to total assets | 14.93 | 8.51 | 10.07 | 15.37 | 11.10 | 15.96

Source: Author's calculation using GSO Enterprise Census 2006.

E. Scenario 2: 50 per cent pass-through

This scenario assumes that half of the changes in the exchange rate will translate into changes in the price level of tradable goods. In other words, a 10 per cent change in the exchange rate will lead to a 5 per cent price adjustment of tradable goods.

Table 6 summarizes the results of the 50 per cent scenario. Although there are improvements in the profitability of F&B firms, they are not as big as in the 100 per cent pass-through scenario. If firms do not react to changes in the exchange rate, the return to liability of F&B firms in Viet Nam will increase by 10.04 per cent (from 4.77 per cent to 14.81 per cent), equal to profitability improvement of 2.5 times. If firms react to the changes, the profitability would improve to 17.69 per cent, after firms have adjusted their production to reach the new optimal level.

| Returns to total revenue | 5.19 | 2.62 | 3.67 | 5.34 | 3.73 | 5.58
| Returns to liability | 14.81 | 12.78 | 26.62 | 14.28 | 11.90 | 15.57
| Returns to fixed assets | 22.51 | 6.04 | 11.23 | 23.59 | 11.62 | 25.45
| Returns to total assets | 6.63 | 3.43 | 4.43 | 6.84 | 4.05 | 7.33

No reaction from firm => Level of inputs and outputs remains unchanged

With reaction from firm => Level of inputs and outputs is determined by the optimization mechanism

| Returns to total revenue | 8.31 | 3.26 | 6.20 | 8.57 | 6.15 | 8.90
| Returns to liability | 17.69 | 16.18 | 28.97 | 17.16 | 16.53 | 17.98
| Returns to fixed assets | 25.06 | 7.16 | 12.31 | 26.26 | 14.08 | 28.02
| Returns to total assets | 7.82 | 4.00 | 4.99 | 8.08 | 5.12 | 8.55

Source: Author's calculation, using GSO Enterprise Census 2006.

IV. Conclusion and recommendations
Some economists, government officials and entrepreneurs believe that the exchange rate between the Vietnamese dong and the US dollar has been lower than expected in the past few years. In other words, the Vietnamese dong is overvalued. It is thought that Viet Nam’s exportability would be improved if the exchange rate is adjusted towards depreciation. From a policy perspective, it is helpful to see if a currency adjustment is beneficial for the economy as a whole, and for some specific industries and sectors in particular. The F&B industry of Viet Nam is standing in the middle of the need for such action.

Using the micro data for the company level, simulations were conducted in order to see if depreciation of the Vietnamese currency would have any impact on the profitability of firms in the F&B industry. The simulations suggested that profitability within the industry would improve significantly if the dong depreciated. A simulated 17.6 per cent depreciation of the dong showed that the profitability of F&B firms, measured by the rates of return to liability, revenues, and assets, would increase nominally from 10 per cent to 20 per cent, depending on the level of exchange rate pass-through and the reaction of firms to the shock. Given such positive effects, it is understandable that the pressure on the Government from the F&B sector for currency interactions is high. However, the adoption of such a policy should only be considered once the officials can foresee the overall impact of such adjustments on the whole economy.

The analysis was subject to many constraints, one of which was data availability. There were no sources of data other than the 2006 Enterprise Census. Two types of problems existed concerning the data. One was that the data contained inconsistencies and outliers. Hadi’s algorithm was used to detect the outliers but the number of outliers was too large (almost 50 per cent of the sample size). The other problem was that because the data had only one wave this did not allow for panel analysis, which helps to eliminate endogeneity. However, according to GSO, the 2008 Enterprise Census was due to be released; it can then be panel established with the 2006 Enterprise Census.

Although the results of the simulation of a Vietnamese currency depreciation showed a positive scenario for F&B firms, further action should be taken before thinking about turning the hypothetical depreciation into real policy. First, analyses should be conducted for other industries and the economy as a whole. A depreciation policy might be beneficial for one industry but harmful to others. Second, policy makers should be certain of the context in which the depreciation policy is to be applied. As the exchange rate policy cannot do the job alone, supporting policies are needed. The exchange rate policy will be more effective if it goes in coincidence with improvements in productivity, product quality and market access. Finally, the data for understanding the enterprise sector should be improved in terms of both quantity and quality.
References


Annex

Distribution map of food and beverage firms in Viet Nam

Distribution of F&B firms
- 0 - 50 firms
- 51 - 150 firms
- 151 - 250 firms
- 251 and over

The map is for illustrative purposes only. The boundaries, colors, denominations and any other information do not imply any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries.