

THE DYNAMICS OF FIRM COMPETITIVENESS: EVIDENCE FROM COST BEHAVIOR OF FILIPINO FIRMS

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ABSTRACT

The challenges of our modern times require firms to be competitive for long-term survival. Competitive advantage is not only measured by the revenues (top-line) and profits (bottom-line) but also by how firms operate efficiently (costs). Recent studies show another dimension to cost behavior pattern, called “sticky cost”, which explain how firms are able to adjust their resources with changes in activity-levels due to either temporary market fluctuations or a more permanent demand shift. Using panel data analysis, this study analyzed and confirmed asymmetrical cost behavior of Philippine firms. When compared with other countries, the results provide an indication why they are less competitive.

Keywords: Cost stickiness, Cost behavior, Competitiveness

INTRODUCTION

Competitiveness and sustainability have been key aspirations of most firms in this modern industrial age. In their quest to gain competitive advantage and to adopt to fast changing operating environments, firms have embarked on a journey to constantly and continuously re-engineer their products, processes and even business models. In monitoring performance as a result of these realignments, companies readily realize the importance of the strategic dimension of traditional accounting and financial constructs such as costs.

From an economic standpoint, costs are associated with optimal firm response. In an ideal situation, optimality occurs and when this happens, firms gain competitive advantage. But the real challenge is whether firms can alter their processes readily with changes in activity levels. This is where studies on company’s cost behaviour, whether they are asymmetric or not with changes in volume, become relevant reminders for firms to consciously design their cost structures with flexibility. This becomes more significant during times of crisis where firms usually pursue cost-cutting or right-sizing programs to remain competitive.

While cost cutting programs are popular strategies during times of crisis, businesses in general still aim to develop competitive advantages over their rival firms by maximizing revenues thru differentiation, minimizing costs thru efficiencies, or focusing on a niche market (Agarwal et al, 2009). In pursuing this, decision-makers and managers need to be aware and to understand the nature and factors that individually or collectively affects their competitive position.

Anderson and Lanen (2007, 2009) in their working paper asserts that understanding and describing how firms manage their cost and cost structure is one of the neglected area of study. As such, we see a current influx of researches focusing on costs and its behaviour since it is one of the most quantifiable factors that determine whether a firm is achieving its operational, tactical and strategic objectives in developing competitive advantage.

From an institutional economics perspective, this wave of studies on cost behaviour models particularly the phenomenon of stickiness presents another dimension to understanding how firms behave and cope with uncertainties as well as bring into the limelight the need for firm to be conscious of deliberately design a suitable cost structure to remain competitive.

It is in the light of these developments that this study is pursued. This study aims to confirm whether asymmetric cost behaviour is exhibited by Philippine firms which is similarly observed from firms in the US, UK, Germany, France and Brazil. Furthermore, the study attempts to compare the degree of cost symmetry of firms in different countries and relate it to their competitiveness.

“STICKY” COST BEHAVIOR

Most management and cost accounting textbooks would describe and view cost behaving either as variable or fixed the former changing proportionally to changes in business activity level. This traditional cost behaviour models assume that the direction of change is symmetrical during both economic downturns (i.e. period of economic crisis, cost reduction programs) and upturns (i.e. period of economic growth, expansion). This implies that the magnitude of change of costs depends only on the extent of a change in level of activity, and not on the direction of change.

The question of whether the traditional model of fixed and variable (with volume) cost is a sufficiently accurate representation of production economics as a basis for management decisions has led to an increased interest in the sticky cost behaviour. In the 1980's and 90's, researchers have offered ABC as an alternative model that is allegedly more faithful to the economics of modern management and provides a better support to decision-making in that setting (Cooper and Kaplan, 1998).

When Noreen and Soderstrom (1997) tested the predictive accuracy of the traditional cost model, they documented a curious pattern – some cost accounts exhibited a lower response to volume decreases than to volume increases. This discovery was consistent with assertions in the ABC literature about how managers adjust costly resources in response to exogenous demand shifts (Cooper and Kaplan, 1998). This assertion motivated Anderson et al (2003) to argue that if managers deliberately adjust resources committed to activities, then the direction of volume changes will affect actual costs and the traditional model of fixed and variable costs does not hold. Their empirical test contrasts the two models of cost behaviour. While efficient production specifies that the optimal combination of inputs for a given level of output, several factors may intervene to preclude or limit resource adjustments. These factors are hypothesized to lead to “sticky” cost behaviour in which cost adjust asymmetrically; more quickly for upward than for downward demand shifts.

Recent studies by Cooper and Kaplan (1998) and Noreen and Soderstrom (1994 and 1997), however, began challenging this assumption. They provided a new framework for understanding costs using industrial and hospital settings. They posit that overhead costs rise more with increases in activity volume than they fall with decreases. In 2003, Anderson, Banker and Janakiraman (2003) found evidence that discretionary costs (i.e. sales, general, and administrative or SG&A) do not behave symmetrically with activity. They described this behaviour as “sticky” and called this phenomenon as “cost stickiness”, which implies that the magnitude of the increase in costs associated with an increase in activity driver or volume is greater than the magnitude of the decrease in costs associated with an equivalent decrease in

volume. In short, the sticky behaviour indicates that there is an asymmetrical behaviour where costs rise faster than they decline.

Anderson et al (2003)'s empirical model has sparked a series of studies on cost stickiness as a behaviour which could explain core competencies of firms, governance structures and even how it could improve business forecasting [Balakrishnan and Gruca (2008); Banker and Chen (2006), Calleja, Steliaros and Thomas (2006), Weiss (2010)]. It has likewise ignited a debate on the cause of this stickiness on whether these are deliberately done by managers or are triggered by factors beyond their control.

Furthermore, Cooper and Kaplan (1998), and Noreen and Soderstrom (1997) posit that overhead costs raise more with increases in activity volume than they fall with decreases. A central component of cost management is the manager's response to exogenous shocks to output demand. Exogenous shocks are hypothesized to cause managers to revisit the relationship between activity and input levels, and between revenues and costs, and to evaluate costly adjustments as compared to the status quo. Adjustment costs are typically ignored in traditional cost accounting. Cooper and Kaplan (1998) further argued that cost management renders the traditional model of fixed and variable cost behaviour obsolete.

Anderson, et al (2003) reiterates that the prevalence of sticky costs is consistent with an alternative model of cost behaviour in which managers deliberately adjust resources in response to changes in volume. This model likewise distinguishes between costs that move mechanically with changes in volume and those that are determined by the resources committed by managers. When volume falls, managers must decide whether to maintain committed resources and bear the costs of operating with utilized capacity or reduce committed resources and incur adjustment costs of retrenching and if volume is restored, replacing committed resources at a later date.

Calleja et al (2006) extended Anderson et al's (2003) study by comparing cost behaviour of publicly listed firms in the UK, US, France and Germany. Their study showed that costs are sticky across all firms and countries. However, French and German firms exhibit higher level of stickiness attributing it to the different governance systems in their respective countries. De Madeiros and Costa (2004) used Brazilian firms as samples and found that cost stickiness is "significantly more intense than in American firms". They ascribe this to the less stable economy of Brazil claiming that because of this, managers find it difficult to predict if the decrease in revenues is permanent or only temporary. This may be an indicator that economic and legal structure as well as cultural factors influences adjustment costs and cost stickiness.

In another study, Balakrishnan and Gruca (2008) examined the relationship between cost stickiness and a firm's core competency. Instead of using a firm level data, they used data from different departments within hospitals. Their study concluded that cost at the firm level generally exhibits stickiness which is consistent with Anderson et al's (2007) study. However, within the firm, costs that relate to core activities (e.g. direct patient care) are relatively stickier compared to support activities. This implies that costs connected to core competency are likely to exhibit higher degree of stickiness.

The industry effect on cost stickiness was made by Subramaniam and Weidenmier (2003). In their study, manufacturing firms exhibited the highest level of stickiness, while merchandising firms the lowest.

In her presenting their study in the 2008 Global Management Accounting Research Symposium in Sydney, Australia, Chen, Lu and Sougiannis (2012) concluded that cost stickiness is directly related to a manager's empire-building incentives and is negatively related to

corporate governance. This is more evident among firms that are more vulnerable to managerial empire-building.

Weiss (2010) and Homburg and Nasev (2008) claim that cost stickiness does not only affect effective cost management but is costly for firms because of its impact on earnings and profit asymmetric timeliness. Cost stickiness is associated with cash flow uncertainty which is said to impact on the conditional conservatism of firms. This implies that earnings are less timely when the magnitude of cost stickiness is higher. Furthermore, managers see this information asymmetry between them and the external users as an incentive to overstate financial performance since future positive net present values are unverifiable. They claim that this is why conditional conservatism which distinguishes efficient from inefficient cost sticky firms should offset the incentive by limiting management's discretion. Efficient cost sticky firms are characterized by declining current sales and rebounding expected sales while inefficient cost sticky firms are projected to have a permanent decline in sales. Interestingly, Weiss (2010) also found that cost stickiness leads to an average of 25% poorer earnings forecast than firms with anti-sticky cost behaviour.

Anderson et al's (2003) cost stickiness model is not without critic. Anderson and Lanen (2007 and 2009) challenged their conclusions. Anderson and Lanen (2007 and 2009) raised the possibility that this phenomenon may be produced by a "mechanical" cost relation associated with technical and engineering production specifications. Balakrishnan and Soderstrom (2008) attempted to address this critique by examining situations with predictable variations in cost stickiness due to expected variations in adjustment costs. They concluded that overall evidence from archival data is not robust. This suggests that "we need finer tests to gain more insights into how managerial incentives affect cost management".

It is then very evident that knowing how costs behave provides insight to how firms behave in general and managers construct the firm's resource infrastructure in particular.

Testing Cost Stickiness

Empirical model

To test the sticky cost hypothesis, this study used a log-log model derived from the cost function derived from the Cobb-Douglas production function shown as Equation 1. Uy (2011) presents a derivation of this empirical model from the production function.

$$\log\left(\frac{c_t}{c_{t-1}}\right) = \gamma_0 + \gamma_1 \log\left(\frac{y_t}{y_{t-1}}\right) + \gamma_2 D_t \log\left(\frac{y_t}{y_{t-1}}\right) + \varepsilon_t \quad (1)$$

where $D_t = 1$ if $\Delta y_t < 0$, and $D_t = 0$ if $\Delta y_t > 0$.

For comparability, this study used Anderson et al's (2003) measurement choices. Thus, Equation 1 results to:

$$\log\left(\frac{SG\&A_{i,t}}{SG\&A_{i,t-1}}\right) = \beta_0 + \beta_1 \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) + \beta_2 D_t \log\left(\frac{Rev_{i,t}}{Rev_{i,t-1}}\right) + \varepsilon_{i,t} \quad (2)$$

where $D_t = 1$ if $\Delta Rev_{i,t} < 0$, and $D_t = 0$ if $\Delta Rev_{i,t} > 0$.

This was used as the basic empirical model of this study and was used to determine existence and prevalence of cost stickiness. Specifically, this model examined the response of the

SG&A costs at time t to a same period change in sales revenues. It used ratio and log forms to improve variable comparability and to minimize the heteroskedasticity problem resulting from large variations in firm sizes.

This log-log model interpreted the estimated coefficients using percentage. In this basic model, when D_t is zero, implying a positive change between two periods, the parameter β_1 would indicate the percentage change in SG&A expenditures when sales revenue increases by one percent. On the other hand, if the change is negative, D_t has a value of one and the percentage change in SG&A costs with a one percent decrease in sales revenue is captured by the sum of β_1 and β_2 . Moreover, β_1 and β_2 are expected to have positive and negative values respectively. If the value of β_2 is zero, then cost stickiness is non-evident because the magnitudes of SG&A costs' increase and decrease are the same ($\beta_1 = \beta_1 + \beta_2$). On the other hand, if $\beta_2 < 0$, then the degree of increase in SG&A due to an increase in sales level is greater than the degree of decrease due to a decrease in sales activities ($\beta_1 > \beta_1 + \beta_2$), signifying the presence of costs' sticky behavior.

In summary, the coefficient β_1 measures the percentage increase in SG&A costs with a 1% increase in sales, while the combined coefficients, $(\beta_1 + \beta_2)$ measures the percentage decrease in SG&A costs with a 1% decrease in sales. In the traditional fixed- and variable-cost model, it proposes that total cost changes are invariant to the direction of the change in activity, which means that $\beta_2 = 0$.

Description of Data

The dataset constructed from the Reuters database and the Osiris database as well as from the respective company financial statements contains 4 sectors/industries composed of 85 companies for the periods 1999 to 2009. Overall, the dataset contains a total of 935 observations (Table 1).

Panel A: Distribution of Annual Revenue, SG&A Costs, Fixed Assets and Employee Costs from 1999 to 2009				
	Mean	Median	Standard Deviation	
Revenues	11,654,285	1,693,517	33,040,691	
Sales, General and Administrative (SG&A) Costs	3,043,360	448,147	9,958,504	
SG&A costs as a % of revenues	26.11%	26.46%	30.14%	
Fixed Assets	14,373,092	2,930,001	36,669,230	
Fixed Assets Intensity	27.94	1.81	223.24	
Employee Costs	658,899	117,476	2,989,249	
Employee Intensity	0.22	0.07	30.55	
Panel B: Periodic Fluctuations in Revenues and SG&A Costs from 1999 to 2009				
	% of firm-years with negative %	Mean % decrease across periods	Median % decreases across periods	Standard Deviation of % decreases

	change			across periods
Revenues	33.81%	19.97%	13.24%	79.05%
SG&A Costs	38.47%	24.77%	16.87%	76.37%

Estimation Results

To provide the estimation framework to ascertain the existence and magnitude of cost stickiness, a basic linear panel data model which is the empirical representation of the functional form derived from the cost function based on the Cobb-Douglas production function was used. The measurement techniques and considerations developed in Anderson et al (2003) were also incorporated in the model. Two panel-data techniques were used in order to ensure the robustness of results: (1) fixed effects and (2) random effects model. The individual fixed effects model assumes that the slopes are fixed but the intercepts are different for each firm. In this case, there are no time effects affecting the regression, but individual effects only. These effects can be observed or not observed and they are generally correlated to the regressors, i.e. they are endogenous. On the other hand, the random effects model assumes that, if there are effects not belonging to the model, these are exogenous and uncorrelated to the regressors (Baltagi, 2001). The regression results are shown in Table 2.

	Random Effects Model	Fixed Effects Model		
		Basic Model	Controlling for heteroskedasticity	First-order Autocorrelation *
β_0	0.0156 (0.69)	0.1086 (0.46)	0.1086 (0.42)	0.0145 (0.65)
β_1	0.5776 (5.68)	0.5460 (4.97)	0.5460 (2.93)	0.5276 (3.98)
β_2	-0.2651 (-1.50)	-0.3989 (-1.98)	-0.3989 (-1.19)	-0.5007 (-2.25)

* choice model

Because both fixed and random effects models have unobserved heterogeneity components, it is important to distinguish them using an inferential framework. In choosing between the fixed effects and the random effects model, the Hausman test is used. The results of the Hausman tests shows that the preferred model is the fixed effects (i.e. prob>chi2 is significant).

The modified Wald test was used to test of heteroskedasticity for the fixed effects model. Because the included samples display size variation, it is reasonable to expect that heteroskedasticity may be present. The results show that presence of heteroskedasticity using the Modified Wald test.

Controlling for heteroskedasticity, our fixed effects model would now show that cost stickiness disappears. The intuition is clear. Cost stickiness as a phenomenon largely depends on the ability of firms to adjust. More flexible contractual arrangements or protocols may be

perfected over time by more organized companies. Thus, there is a correlation between cost stickiness and size variation of firms.

Equally important and given the temporal nature of the cost stickiness phenomena and the effect of prior period decisions when lagged effects of the dependent variables are considered. Thus, we control for first-order autocorrelation. Results show that cost stickiness exists and significant at 95%. This is the choice among the basic models considered in this study.

In the final model would show that the magnitude of cost increase as a function of an increase in revenues is greater than the magnitude of cost reduction as a function of an equivalent reduction in revenues or cost behaves asymmetrically for listed Philippine firms. More specifically, for every 1% increase in revenue, there is a corresponding 0.53% increase in SG&A costs, while for every 1% decrease in revenues, there is a 0.03% decline in SG&A costs, showing the asymmetric behaviour of SG&A costs. Thus, we confirm the prevalence of sticky cost behaviour among listed Philippine firms.

In testing for unit root, we used the results of the dynamic panel model (Arellano-Bond) wherein the coefficient of the log dependent variable is significant and not equal to 1 which proves that unit root is not problem in our model.

Cost Stickiness in Filipino Firms

In this study, we find empirical support for a model of cost behaviour where Philippine firms adjust resources asymmetrically to changes in the level of activity or “sticky cost” behaviour. Over the 1999-2009 period, the evidence suggests that SG&A costs, across listed Philippine firms in different industries, are sticky.

It is interesting to note that the downward adjustments (i.e. $\beta_1 + \beta_2$) is relatively small for Philippine firms (0.03% for every 1% decline in revenues) compared to US firms (0.35%-0.89% for every 1% decline in revenues), UK firms (0.98% for every 1% decline in revenues), German firms (0.845% for every 1% decline in revenues), France (0.92% for every 1% decline in revenues) and Brazil (0.32% for every 1% decline in revenues) where cost stickiness is likewise detected (Table 3). This implies that although all the firms exhibit asymmetric cost behaviour, Philippine firms adjust their resources very slowly to demand conditions compared to its western counterparts, especially for downward adjustments and thus, stickier relative to other countries.

Sample Firms	β_1	$\beta_1 + \beta_2$	Cost Definition	Database	Reference
US Firms	0.546%	0.191%	SG&A Costs	Compustat	Anderson et al (2003)
	0.697%	0.576%	SG&A Costs	Compustat	Subramaniam and Weidenmier (2003)
	1.014%	0.942%	Costs of goods sold	Compustat	
	0.927%	0.845%	Total costs	Compustat	
	0.948%	0.897%			
UK Firms	0.983%	0.964%	Operating costs	Thomson Banker One	Calleja et al (2006)
German Firms	0.984%	0.898%			
French Firms	0.987%	0.897%			
Brazilian Firms	0.593%	0.324%	SG&A Costs	Economica	de Madeiros and Costa (2004)
Philippine Firms	0.530%	0.030%	SG&A Costs	Osiris, Reuters	This Study

It is important to consider, though that cost stickiness as a measurable concept hinges on the composition and nature (i.e. total costs, operating costs, manufacturing costs, sales, general

and administrative costs) of costs. Likewise, it is possible that stickiness could be affected by the inflexibility of cost structures and configurations such as large fixed relative to variable costs and vice versa.

If firms are able to adjust their resources and cost structures quicker than their rivals not only within their country but also globally, we can argue that they are able to compete better. Operational flexibility can be measured in terms of how firms are able to adjust their cost levels to corresponding changes in activity levels. Ideally, if activity level increases by 1%, their costs should likewise increase by 1%, and if activity level decreases by 1%, firms should likewise adjust their costs downward by 1%. We could therefore draw on this symmetrical behaviour of costs as an indicator of firms' operational flexibility which we call cost symmetry ratio (CSR). Using the β_1 and $\beta_1 + \beta_2$ values our empirical model, we could compute the CSR as follows

$$CSR = \frac{\text{increase}}{\text{decrease}} = \frac{\beta_1}{\beta_1 + \beta_2} \quad (3)$$

Using the coefficients from the studies of Calleja et al (2006), de Maderios and Costa (2004) and this study, we compute the CSR of firms from six countries (Table 4).

Sample Firms	Change in Costs			Cost Symmetry Ratio (CSR)
	per 1% revenue increase (β_1)	per 1% revenue decrease ($\beta_1 + \beta_2$)	Difference	
US Firms *	0.948%	0.897%	0.051%	1.06
German Firms *	0.984%	0.898%	0.086%	1.10
UK Firms *	0.983%	0.964%	0.019%	1.02
French Firms *	0.987%	0.897%	0.090%	1.10
Brazilian Firms **	0.593%	0.324%	0.269%	1.83
Philippine Firms	0.530%	0.030%	0.500%	17.67

* Based on Calleja et al (2006) study
** Based on de Maderios and Costa (2004) study

While firms from other countries also exhibit similar asymmetrical cost behavior, we could observe that their cost symmetry ratios have higher values and are closer to 1. For instance, in Calleja et al's 2006 study, the flexibility ratio of US firms is 95:90 (1.057), UK firms 98:96 (1.02), German firms 98:90 (1.096), and French firms 99:90 (1.1). In a similar study by de Maderios and Costa in 2004, the flexibility index of Brazilian firms stand at 59:32 (1.83).

The higher values signify that firms are able to adjust quicker with both upward and downward changes in activity levels, while the ratio's proximity to 1 signify the higher degree of symmetry. Thus, comparing the cost symmetry ratios we could infer two things from this. First, firms from other countries show greater operational flexibility in managing their costs than the Philippines. They adjust their resource allocations quicker than that of Philippine firms. Second, Philippine firms are not just slower but they are even more rigid in adjusting downwards (0.03% for 1% decrease in activity vs. 0.90% by US firms). This could be caused by different economic (e.g. GDP), political (e.g. labor laws) and even cultural factors.

A “Missing” Link: Cost Stickiness and Competitiveness

Literature explains competitiveness both as a multidimensional and relative concept which can be examined on a country-, industry- or firm-level. Sala-I-Martin et al (2010) in the Global Competitiveness Report defines competitiveness as the set of institutions, policies, and factors that determine the level of productivity of a country while Murths et al (1998) describes it as the economic strength of an entity with respect to its competitors in a global market economy in which goods, services, people, skills, and ideas move freely across geographical borders. In other words, firm-level competitiveness describes the ability of firms to design, produce and/or market products superior to those offered by competitors, considering both the price and non-price qualities (D’Cruz and Rugman, 1992).

The annual Global Competitiveness survey, together with other similar competitiveness ranking survey, emphasizes the key role of institutions private firms as a major contributor to a nation’s competitiveness. Nations can compete only if their firms are competitive. Porter (1998) further adds that “it is firms, not nations, which compete in international markets”.

In the Global Competitive Report 2010-2011, Switzerland (ranked 1), United States (ranked 4), Germany (ranked 5), United Kingdom (ranked 13), and France (ranked 15) remained in the top 20. Brazil (ranked 56) and the Philippines (ranked 85) slightly improved their world competitiveness rankings. Table 5 compares the country ranking , GCR scores and the CSR of these countries.

Sample Firms	Country Ranking*	GCR Score*	CSR
US Firms **	4	5.43	1.06
German Firms	5	5.39	1.10
UK Firms	13	5.25	1.02
French Firms	15	5.13	1.10
Brazilian Firms	56	4.28	1.83
Philippine Firms	85	3.96	17.67

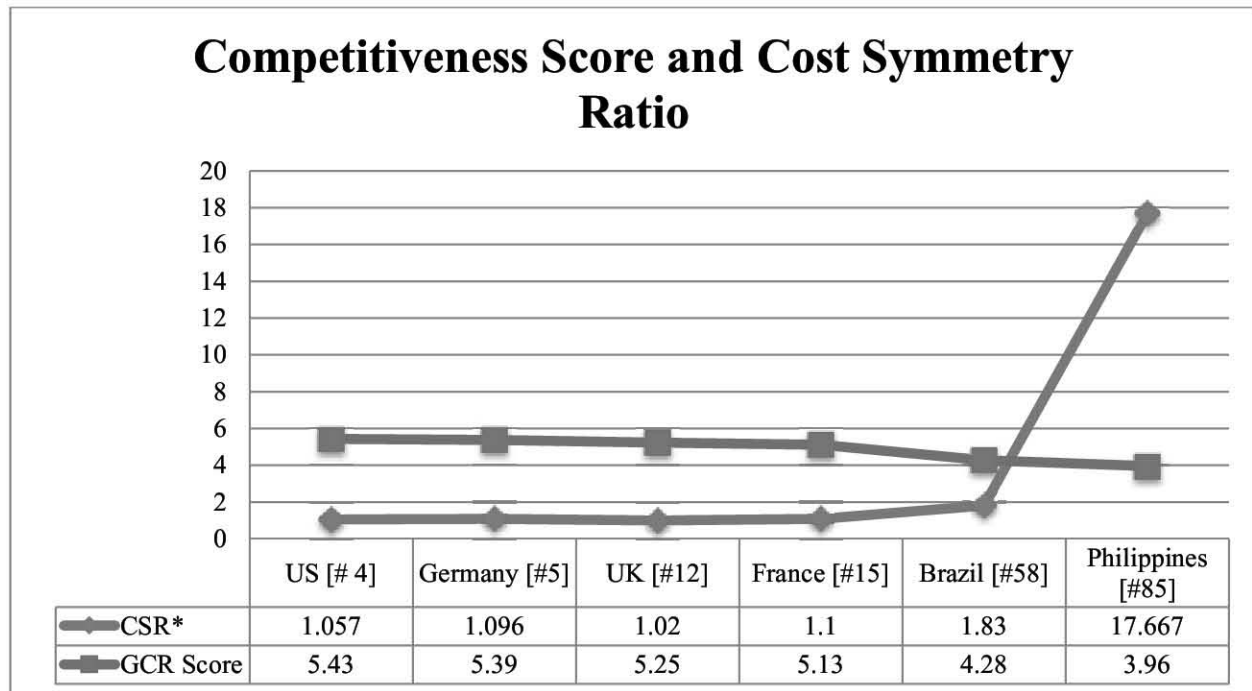
* According to the Global Competitiveness Report (2011)
 ** Based on Calleja et al (2006) for comparative purposes.

Brazilian and Philippine firms exhibit slower response to changes in revenues compared to those in the US, German, UK and French companies, which makes them less competitive and this is reflected the GCR rankings.

Interestingly, when we compare the cost symmetry ratio (CSR) of firms with the competitiveness scores of the country they belong to, we find that they are negatively correlated (correlation coefficient, -0.77). The higher the cost symmetry ratio of firms, the lower their GCR score as shown in the graph below.

While this diagram provides an interesting pattern showing a correlation between the collective cost behaviour of firms which is an indication of flexibility and adaptability and a country’s competitiveness, further studies are needed to validate, confirm and define this relationship.

Figure 1.
COMPARATIVE DIAGRAM OF COUNTRY RANKING AND COST STICKINESS



CONCLUSIONS AND RECOMMENDATIONS

In this study, we find that Philippine firms exhibit asymmetric cost behaviour which is similarly observed by other studies on US, UK, German, French and Brazilian companies. Although all of them exhibit cost stickiness, a closer look at the degree of stickiness firms from each country would show a curious pattern which shows a negative relationship between the competitive ranking of the country and the degree of stickiness. This partially could explain why countries are less competitive than others. It is recommended that this be explored further in future studies.

The implications of the degree of stickiness to the ability or inability of firms to respond quickly to changes in the market in particular and to their competitiveness in general are tremendous. In a global economy where political and economic boundaries are disappearing fast, the degree of cost stickiness could influence the long-term survival of firms. Firms should be cognizant of this and adopt and adapt mechanisms which could enable them to react promptly to changes in the market and remain competitive.

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