Exchange Rate Volatility and Employment Growth in Ghana's Manufacturing Sector

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Abstract

The study aimed at determining how employment growth in the Ghanaian manufacturing sector is affected by the fluctuating exchange rate. The data was obtained from World Bank development indicators' and the Ghana Statistical Service as well as the state of the Ghanaian economy. The study employed Ordinary Least Squares (OLS) regression technique to examine the effect of exchange rate volatility on employment growth. The study revealed that exchange rate volatility has effect on employment growth in manufacturing sector firms in Ghana. That is the depreciation of the Ghanaian currency against US Dollar significantly slows the rate of employment at the manufacturing sector in Ghana. Similarly, interest rate has a negative relationship with employment growth in the Ghanaian manufacturing sector. However, Gross Domestic Product (GDP) exhibits a positive relationship with employment growth. Through the prudent management of exchange rate, employment in the manufacturing sector can see a significant growth. Hence, policy makers should liaise with Monetary Policy Committee of the Bank of Ghana which set base rate and bankers to use the interest rate as a tool to facilitate employment growth in the manufacturing sector.

Key words: Exchange rate volatility, Employment growth, Manufacturing sector, Ghana,

Introduction

Increasing capital market integration following the collapse of the Breton Woods system and the accompanying financial liberation wave of the 1980s and 1990s exposed both developed and developing countries to large swings in exchange rates. As a result, the effects of exchange rate volatility on investment and growth have increasingly become of particular interest to both researchers and policy makers. Increasing exchange rate volatility is expected to reduce investment and growth through its effects on macroeconomic uncertainty, Profit expectations- especially in tradable goods sectors (Aizenman and Marion,1999), balance sheet effects, and availability of external credit, economic growth, and aggregate investment (Bahmani-Oskooee and Miteza,2003).

According to a majority of empirical research in international economics, increasing uncertainty and volatility in exchange rate is found to have an economically and statistically significant negative effect on investment, growth and trade in both developed and developing countries (Belke and Setzer 2003; Ramey and Ramey,1995; Lensink and Morriery, 2006).

Over the past decade, Ghana has been pursuing an open and liberal-market economic policy with respect to international trade and investment. The country is, therefore, affected by world economic conditions in a number of ways.

In 1995 exports amounted to nearly 23% of GDP and imports to 34%, much of which consisted of intermediate and capital goods. Ghana's economy is thus heavily dependent on international trading conditions and levels of demand in the industrialized countries which are Ghana's principal customers. These countries are important sources of finance for investment in Ghana, either directly or indirectly through international financing agencies such as the World Bank Group. Public investment, which still accounts for more than half of total investment in Ghana, is especially reliant on external finance, with about three-quarters of the public investment programme financed from official development assistance (ODA) sources. Development partners also provide technical assistance which is mainly directed to the improvement of human resources (ISSER, 2002). For nearly 50 years, a considerable proportion of international trade has been conducted under the auspices of the General Agreement on Tariffs and Trade (GATT), of which Ghana was a member. The guiding principles of GATT are the reduction in trade barriers in the form of both import tariffs and non-tariff restrictions, and the elimination of discriminatory practices which favour some countries over others (Bond, 2002).

Even among the lower income developing countries the effects of the Uruguay Round was mixed. On the positive side, the general reduction in tariffs and other barriers will improve access to export markets by all exporting countries. Of particular interest to Ghana is the phasing out of the multi-fibre agreement, which allowed the maintenance of quantitative controls (or export quotas) on exports of textiles. However, whether or not a country is able to secure benefits from the general liberalization in international trade will largely depend on supply elasticities in its domestic industries. To a large extent these supply elasticities depend on the ability of local producers to increase both the quality and quantity of their outputs to take advantage of export market opportunities (Braun and Larrain, 2005). In Ghana, such ability is still at a low level as it is heavily dependent on employees and terms of trade.

On the negative side, low income developing countries will suffer from further reductions in trade discrimination. The country continued with various economic stabilization programmes in the year 2000 by taking some difficult, but necessary steps such as ending subsidies on petroleum prices, liberalizing interest rates in order to streamline the economy. Solid macroeconomic management coupled with major debt relief measures and relatively high cocoa and gold prices have been the keys to the steady improvement in real Gross Domestic Product (GDP) growth, which in 2004, topped 5% for the first time in a decade and reached an estimated 6.2% in 2006. A parallel line of research has analyzed the channels through which exchange rate volatility affects firm performance including its effects on profit margins, domestic prices and firm indebtedness (Mann, 1986). In contrast, the research on the employment effects of exchange rate volatility has been much limited with an exclusive focus on developed countries. (Pallage and Rope, 2003).

The Negative effects of exchange rate volatility is more pronounced especially when exports are invoiced in the importers currency as is the case in all developing countries (Qian and Varangis, 1994). Sub-Saharan Africa (SSA) is not on track to achieve the Millennium Development Goals (MDGs) on poverty. This is the recent message of the United Nations MDGs Report 2007 (Stone, 2007). Even though most economic parameters have improved slightly in the region, this progress is rated marginal compared to other emerging regions and too slow to reach the MDG by 2015 as stipulated. For instance, SSA has seen a decline of the proportion of people living on one dollar a day or less from 45.9% in 1999 to 41.1% in 20004. But compared with other emerging regions, this is still the highest incidence of poverty and the slowest decline since globalization (Wei and Zhang, 2006).

Productivity growth in SSA has been much lower than the world average. Apart from that, the scanty growth pattern that has engendered “complacency and boastfulness” among most African leaders is not socially inclusive. It tends to benefit mostly the owners of a small number of large enterprises which does not result in significant increase of formal employment. Several decades of project-based aid for local economic development, entrepreneurship development, vocational training and the like have yielded disappointing overall results. Although laudable pilot-based projects do exist, these often remain isolated commissioned events with no country-wide outreach and no measurable effect on aggregate employment growth. On the macro level, regimental adjustments of institutional structures prescribed an orthodox mix of trade and price liberalization as well as putting embargo on formal employment to accommodate a lean staff; but these likewise failed to accelerate employment growth. There is little upward mobility of enterprises and a lack of medium-sized enterprises (MSEs) depicted by the prevalence of weak inter-firm specialization and linkages, lack of export competitiveness and low innovative capabilities in this world of technological advancement (Yang, 2007).

Most importantly, commodity-based growth has since post-colonial regimes exposed the region to terms of trade fluctuations and exchange rate volatility which do not ensure growth. The colossal challenge then is to create economic dynamism and productivity growth which is not based on "Oil" and the few other commodity sectors - using a private-led development framework, buttressed by a substantial government financing support through the empowerment of the financial sector.

Ghana exports quite a sizable number of mineral resources which hither to have been classified as "raw primary products" without adding value to them, making its market vulnerable to exchange rate volatility. In contrast, developed countries which are notorious for being highly industrialized buy Ghana's raw materials, add value to them by processing them and then sell these value-laden finished goods to Ghana for substantial profits to boost employment growth in their manufacturing sectors for the realization of a sustainable economic growth that is able to withstand the shocks of exchange rate volatility.

It is therefore not far from right that the solution to Ghana's unemployment and other economic problems may rest not in the undertaking of countless austerity measures, but in the effective management of the impacts of exchange rate volatility on employment growth in the manufacturing sectors, since increasing uncertainty and volatility in exchange rate is found to have an economically and statistically significant investment, growth and trade reducing effect.

The negative effects of exchange rate volatility is more pronounced especially when exports are invoiced in the importers currency as is the case in all developing countries (Qian and Varangis, 1994). Ghana's manufacturing sectors have experienced poor growth, low levels of profitability and a general non-performance after the post Nkrumaist era. Therefore, the research expects to fill an important gap in the literature not only by focusing on the direct employment effects of exchange rate volatility in emerging economies like Ghana that faces significant levels of economic instability.

Records from the 2004 publication of the State of the Ghanaian Economy (ISSER, 2005) indicate that the major macro-economic issues which have persistently constrained Ghana's industrial growth needs to be tackled frontally during the Medium-Term Development Plan period (Qian and Varagis, 1994).

In the year 2007, the redenomination of the Ghanaian cedi brought with itself certain economic advantages. For instance, in terms of the exchange rate, the value of the cedi to the U.S dollar was pegged at Gh¢ 0.90 to U.S $1.00. However, in year 2011, barely after one year of oil production and export in Ghana the cedi has seen a consistent depreciation which is reported to be having a negative effect on every aspect of the Ghanaian economy.

Currently, the exchange rate averaged Gh¢ 1.48 per a Dollar reaching an historical high of Gh¢ 2.01 per a Dollar as at August of 2012. A recent report from the Bank of Ghana indicates that both the dollar accounts of individuals and corporate entities alike are either going to be closed down or levied so as to stem the tide on the free fall of the cedi due to the fluctuations of the exchange rate, as a result, the effects of exchange rate volatility on investment and growth have increasingly become of particular interest to researchers, policy makers and business entities. Increasing exchange rate volatility is expected to reduce investment and economic growth through its effects on: Macroeconomic uncertainty, Profit expectations, especially in tradable goods sectors, Balance sheet (that is from debt) effects, and availability of external credits, economic growth, and aggregate investment.

In light of the submissions outlined above, it is suggested that since depressive trends in employment growth in manufacturing sectors of developing and emerging economies is linked to negative effects of exchange rate volatility, it is relevant to examine how the prevailing exchange rate volatility in Ghana has affected employment growth in the manufacturing sector.

Methodology

This study employed macro economic data over a period of ten years spanning from 1990 to 2010. The data were collected from World Bank development indicators' and the Ghana Statistical Service as well as the state of the Ghanaian economy.

Data was analysed using both qualitative and quantitative approach. In case of qualitative approach descriptive statistics was used to compare variables numerically and to ascertain a pattern in the data set. According to Saunders, Lewis and Thornhill (2007), statistics to describe a data usually summarizes the information in the data by disclosing the average indicators of the variables used in the study. For the quantitative analysis linear regression model was employed to predict the real value of the dependent variable y for a vector of independent variables $x = (x_1, x_2, \dots, x_n)$. The linear regression model has the form:

$$f(y_i) = \beta_0 + \sum_{i=1}^{n} x_i \beta_i + \mu_i \quad 1$$

Where y is the dependent variable and x the independent variables while β and μ are the paramerter to be estimated and the error term respectively. The data gives $(y_1, x_1), \dots, (y_n, x_n)$. The coefficient $\beta = (\beta_1, \beta_2, \dots, \beta_n)$. The Residual Sums of Squares (RSS) is maximized by

$$RSS(\beta) = \sum_{i=1}^{n} (y_i = f(x_i)^2 \quad 2$$

That is if y_i's or the independent variables are conditionally independent given the independent variables x_i's.

$$RSS(\beta) = (y - x\beta)^{'} (y - x\beta) \quad 3$$

Solving for β gives

$$\hat{\beta} = (x^{'} x)^{-1} x^{'} y \quad 4$$

The left hand side of equation 4 indicates the change in the dependent variable when there is a unit change in the independent variable. According to the (Gauss – Markov theorem), there are various econometric methods that can be used to derive estimates of the parameters of economic relationships from statistical observations. However, the OLS method has been identified as the most widely used method for possessing five unique characteristics. These are: the parameter estimates obtained by OLS have some optimal properties and the computational procedure of OLS is fairly simple as compared with other econometric techniques; and the data requirements are not excessive. Also this method has been used in a wide range of econometric relationships with fairly satisfactory results and, it is an essential component of most other econometric techniques.

Identification of the Dependent and Independent Variables

Dependent variables -Employment Growth (EG)

According to Colander (1994) employment growth is the percentage change in employment from one year to the next. It is also defined as the speed at which the economy can create and fill new jobs – according to the U.S. Department of Commerce, Bureau of Economic Analysis. Employment Growth is therefore the long-term (year-to-year) increase in the human resources capacity to supply increasingly diverse goods and services by way of getting more of the active population of a nation into job outlets to ensure a sustainable rise in national output.

Choice and description of variables

Exchange Rate (ER)

Exchange rate is the rate at which one country's currency can be traded for another country's currency (Colander, 1994). A market-based exchange rate changes whenever the values of either of the two component currencies change.

A currency tends to become more valuable whenever demand for it is greater than the available supply. It becomes less valuable whenever demand is less than available supply (this does not mean people no longer want the weaker currency, but rather they prefer holding their wealth in some other form, possibly another currency). A high exchange rate, makes foreign currencies cheaper, hence lowering the price of import.

Lowering import prices places competitive pressure on manufacturing firms and helps to hold down inflation. This tends to benefit residents' living standard. At the same time, a high exchange rate encourages imports and discourages exports. This may affect the manufacturing companies that export most of their products and consequently affect employment. This may also lead to balance of trade deficit which can exert contractionary pressure on the economy by decreasing aggregate demand for government output. On the other hand, low exchange rate has the opposite effect. It encourages export and discourages import. This causes balance of trade surplus which exert an expansionary effect on the economy (Colander, 1994). This phenomenon has direct effect on employment growth of the manufacturing sector. In this regard, the relationship between the exchange rate volatility and employment growth can be negative or positive depending on the nature of the exchange rate over time.

Inflation Rate (INF)

Inflation refers to a persistent and appreciable increase in general prices of goods and services in an economy. (Wood, Zeffane, Champan ,Fromholtz and Morrison 2004). As prices change, the value of money or its purchasing power also changes**.** A nation that puts high priority on reducing unemployment will typically stimulate the economy to try to increase income and create jobs. This initiative may cause the domestic currency to depreciate relative to other currencies. When inflation is very high, employment growth is expected to increase significantly. When incomes increase, the demand for manufactured goods increases accordingly thereby causing expansion in businesses; hence more jobs are created. Therefore, a positive relationship is expected between the inflation rate and employment growth. This variable is specified as percentage change in Consumer Price Index (CPI).

Interest Rate (IR)

Colander (1994) refers to interest rate as cost of capital. Interest rate are prone to variations because of differences in the time period, the degree of risk, and the transactions costs associated with different financial instruments, depending on the choices of investors. It is expected that increase in interest rate would discourage employment growth.

Gross Domestic Product (GDP)

Gross Domestic Product is the central measure of national accounts, which summarizes the economic position of a country (or region). It can be calculated using different approaches: the output approach; the expenditure approach; and the income approach.. GDP data in national currencies can be converted into Purchasing Power Standards (PPS) using Purchasing Power Parities (PPPs) that reflect the purchasing power of each currency, rather than using market exchange rates; in this way, differences in price levels between countries are eliminated. It also gives a quantitative expression of the investment rate of an economy; captures the incomes of all households, public institutions as well as the private sectors for estimating the gross national income. In this study the GDP was calculated using expenditure approach. The general form of the multiple regression model is specified as:

$$EG_i = \beta_0 + \beta_1 ER_i + \beta_2 INFL_i + \beta_3 IR_i + \beta_4 GDP_i + \mu_i \,. \qquad 5$$

Results and discussion

Descriptive Statistics

The descriptive statistics of the variables used in the model are shown in Table 1. The average Employment growth rate in percentage for the period under study is 1.9 with a standard deviation of 1.0237.The results show that on the average employment growth at the manufacturing sector in Ghana achieved a growth rate of about 2% which is quite low compared to the population growth rate and rate at which educational institutions are producing graduates in the country.

Also the low standard deviation of 1.0237 suggests that over the period the growth rate is around the average. On the average, Gross Domestic Product (GDP) for the period is 0.00410624 in Billions of Cedis with a standard deviation of 0.00324. Thus the deviation from the mean for the various years is very small. The average inflation rate is 22.6 % with a standard deviation of 12.8423 and it is fairly representative of the observed data.

The high standard deviation suggests that only few years achieved the mean figure of 22.6% inflation rate. On the other hand the average lending rate or cost of capital from the formal financial institutions is 32.671% for the period under review (1990-2010) which is dispersed at 7.775. The low dispersion indicates that for most of the years under review the interest rate is close to the mean interest rate of 32.7% which is quite high and may have negative implication for manufacturing firms to borrow to expand their operation hence increase employment.

The exchange for the period was highly volatile as it lacks stability. On the average the period recorded exchange rate of 0.65 of Ghanaian Currency (Cedis) to the United State of America (USA) Dollars. Exchange rate recorded a very high standard deviation of 54.25 for the period.

Table 1: Descriptive statistics of the variables used in the regression model.

	EG (%)	ER ($)	INFL (%)	IR (%)	GDP (b¢)
Average	1.90	0.65	22.60	32.67	0.00411
Standard Deviation	1.02	54.25	12.84	7.78	0.00324
Maximum	4.80	2.16	59.50	59.50	0.00898
Minimum	1.10	0.32	10.00	10.00	0.00056

Relationship between employment growth and the independent variables

To ascertain the relationship between Employment Growth (EG) and the independent variables correlation analysis was employed. Table 2 presents the results of the correlation analysis. The result shows positive and significant relationship between Employment Growth and G.D.P; implying that when GDP increases, employment growth also increases and vice versa. However, correlation test revealed statistically significant but negative relationship between Employment Growth and Exchange Rate

Thus an increase in exchange rate has the tendency to reduce employment growth and vice versa. (Table 2).

Table 2 correlation matrix of the variables

		Employment growth	Exchange rate	Inflation	Interest rate	Gross domestic product
EMPLOYMENT GROWTH	Pearson Correlation	1	-0.488**	0.346	-0.035	0.574**
	Sig.(2-tailed)		0.025	0.124	0.880	0.007
	N	21	21	21	21	21
EXCHANGE RATE	Pearson Correlation	-0.488**	1	-0.349	-0.157	-0.753***
	Sig. (2-tailed)	0.025		0.121	0.496	0.000
	N	21	21	21	21	21
INFLATION	Pearson Correlation	0.346	-0.349	1	0.474*	0.598**
	Sig. (2-tailed)	0.124	0.121		0.030	0.004
	N	21	21	21	21	21
INTEREST RATE	Pearson Correlation	-0.035	-0.157	0.474**	1	0.393*
	Sig. (2-tailed)	0.880	0.496	0.030		0.078
	N	21	21	21	21	21
GROSS DOMESTIC PRODUCT	Pearson Correlation	0.574**	-0.753***	0.598**	0.393	1
	Sig. (2-tailed)	0.007	0.000	0.004	0.078	
	N	21	21	21	21	21

*** Significant at 1%; ** Significant at 5%; * Significant at 10%

Inflation has positive relationship with Employment Growth. Thus, as Inflation increases, employment growth also increases and vice versa.-However, the correlation is not statistically significant. Similarly, Interest rate also exhibit insignificant but negative relationship with employment growth (See Table 2).

Factors influencing Employment growth

The results of the multiple regressions gave R-Squared of 0.728. This suggests that about 73% of the total variations in employment growth (EG) can be explained by the variations in the independent variable(s). What this means is that the variables considered in the model accounts for 73% of change in (Employment Growth) in the Ghanaian manufacturing sector. This leaves only 28% of the variation in the dependent variable (EG) to be accounted for by other confounding variables. At a certainty of 95% confidence level, the F-Statistic was estimated to be 2.245 which are statistically significant at 1% level of significance.

This value implies that all the independent variables in the model jointly contributed to the variations in Employment Growth of the manufacturing sector, the coefficient of the individual independent variables as shown in Table 3 represents the average change in Employment Growth when there is a unit change in the independent variable. For example the coefficient for Exchange Rate (-1.084) implies that if exchange rate changes by one unit provided all the other variables are held constant there would be -1.084 unit change in employment growth within the manufacturing sector. The negative sign indicates that if Exchange Rate increases by one percent, Employment Growth would correspondingly decreases by 1.084×10^{-6} units. Considering the critical values (t-ratios) of this variable it can be deduced that Exchange Rate with a t-ratio of -0.021 is contributing significantly to Employment Growth, although its effect is weak.

Interest rate with a t-ratio of -1.285 is inversely related to Employment Growth in the Ghanaian manufacturing sector. This indicates that an increase in Interest Rate exerts a negative effect on Employment Growth. That is, a high rate of interest increases the costs of borrowing and production, leading to low output levels and low levels of employment. However, Interest rate is not statistically significant The value -0.061 represents the average change in Employment Growth when Interest Rate changes by one percent, provided all the other independent variables are kept constant; implying that if Interest Rate increases by one unit.

Table 3. Regression result on factors affecting employment growth

Variables	Coefficients	Standard Errors	t - ratios
Constant (Intercept)	2.698	1.172	2.303
Exchange Rate (ER)	-1.084	0.000	-0.021
Inflation (INFL)	0.015	0.022	0.661
Interest Rate (IR)	-0.061	0.001	-1.285
Gross Domestic product (GDP)	0.188	115.124	1.637
R^2	0.728		
F-value	2.245.		

Source: Field data, 2012.

Employment Growth decreases by 0.061 units.. Thus, the variability in employment growth is explained by the variations in interest rate.

The value 0.015 represents the average change in Employment Growth when Inflation changes by one percent, provided all the other variables are kept constant. Thus, if Inflation changes by one percent, Employment Growth will correspondingly increase by 0.015 units. Inflation with a t-ratio of 0.661 is contributing significantly to the estimated regression model. As confirmed by the Philips relationship in Macroeconomics, a decrease in inflation towards a single digit leads to unemployment and vice versa. Thus, inflation is inversely proportional to employment growth in the manufacturing sector of the economy.

The value 0.188 represents the average change in Employment Growth when Gross Domestic Product changes by one percent, provided all the other independent variables are held constant; implying that when Gross Domestic Product increases by one percent, Employment Growth will correspondingly increase by 0.188 units. Conversely, when Gross Domestic Product decreases by one percent, Employment Growth would decrease by 18 percent. GDP with a t-ratio of 1.637 has statistically significant effect on Employment growth within the manufacturing sector in Ghana.

For instance, the aggregative effect of all the major sectors of every economy has implication for the total GDP and for that matter the industrial, agricultural, and the services sectors all add up to give a supportive but indirect correlation effect to GDP.

Conclusion and policy implication

From the result above it can be concluded that exchange rate volatility has effect on employment growth within the manufacturing sector in Ghana. It has been established that when the cedi depreciate against other major, currencies including the US dollar, this slow the rate of employment within the manufacturing sector in Ghana. Similarly, interest rate although insignificant, has a negative relationship with employment growth in the Ghanaian manufacturing sector. However, Gross Domestic Product establishes a positive relationship with Employment Growth. The depreciating Ghanaian currency is one of the underlying factors for the depressive employment growth in the manufacturing sector of the economy. Therefore, policy makers should liaise with bankers to use the interest rate as a tool for increasing employment growth.

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